出國報告（出國類別：進修）

參訓
「第8屆亞洲火山學會火山訓練營」

服務機關：內政部國家公園署陽明山國家公園管理處

姓名職稱：鄭紹安技士

派赴國家/地區：日本

出國期間：**114**年**9**月**22**日**-9**月**27**日

報告日期：**114**年**12**月**8**日

摘要

亞洲火山學會（Asian Consortium of Volcanology, ACV）旨在促進亞洲地區火山學研究與跨國合作，並在亞洲火山災害頻繁的背景下，推動「與火山共存」及永續發展的理念。為加強各國在火山研究與防災領域的交流，該學會自 2015 年起每年辦理火山訓練營，並以各國火山作為研習場域。今年為第 8 屆，於島原半島舉行。本次訓練營以雲仙岳為核心主題，內容包含專題講座、經驗交流及野外實地考察。雲仙岳曾經歷多次噴發，最近一次為 1991–1994 年的平成大噴發，期間發生火山碎屑流、土石流等災害，因此本次課程亦著重於火山監測與災害管理等議題。透過本次研習，建議本處未來持續強化與研究單位的交流合作，並積極推動火山科學與防災教育相關工作，以提升整體防災能力。

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壹、進修目的

亞洲火山學會（Asian Consortium of Volcanology, ACV）成立的宗旨在於促進亞洲地區火山學研究與跨國合作。由於環太平洋火山帶（以下稱火環帶）的西側位於亞洲地區，火山活動頻繁且災害風險高，因此期望透過學術交流、技術共享與策略合作，提升各國的監測與防災能力。該學會主要任務包括：分享最新火山研究成果與監測技術，交流各國火山減災與應變經驗；培育新一代火山科學家；推動跨國火山研究與監測合作；並每年舉辦野外訓練營，藉由實地考察分享火山觀測的實務經驗。目前 ACV 的核心成員涵蓋東亞與東南亞位於火環帶周圍的國家：日本、中國、印尼、香港、南韓、菲律賓、新加坡與臺灣（依筆畫排序），其中臺灣由大屯火山觀測站為代表。

陽明山國家公園是臺灣第一座以火山為主體所設立的國家公園，園區內保留多樣的火山地景，包括噴氣孔、火山口及溫泉等地景。本園內的大屯火山群同時也被認為是一座活火山，為維護特殊火山地景同時監測火山動態，本處長期與大屯火山觀測站維持密切合作，推廣火山地質與防災教育等工作。本次受大屯火山觀測站邀請，一同參加第8屆火山訓練營，期能透過本次野外訓練營了解各國火山特性與掌握火山監測技術趨勢，亦有助於與大屯火山觀測站共同推動大屯火山群的監測及防災教育。

貳、進修人員

本次進修人員由內政部國家公園署陽明山國家公園管理處推薦人員１名，經陳請內政部核定如下：

姓名	服務機關／單位	職稱
鄭紹安	內政部國家公園署陽明山國家公園管理處	技士

參、進修行程

本次訓練營期間為 114 年 9 月 22 日至 9 月 27 日，共 6 日。扣除首尾 2 日的交通時間，實際訓練天數為 4 日，其中 2 日為講座與海報分享，另外 2 日的野外實地考察。

講座部分涵蓋本次考察區域的基礎地質介紹，以及各國學者分享火山研究成果與防災經驗。海報環節則由與會者張貼海報並進行 3 分鐘簡報，簡報後再進行自由討論，讓大家自行針對感興趣的議題講者進行交流。

野外實地考察地點包括雲仙國立公園、島原市及小濱市，內容包含相關博物館與災害遺跡參訪、火山地質觀察以及火山觀測站參觀。詳細行程如表 1 所示。

表 1、第 8 屆火山訓練營日程表

日期	內容
9/22（一）	抵達福岡機場 18:00　接駁巴士出發 21:00　抵達住宿處（島原海濱飯店）
9/23（二）	09:00　開幕儀式 **講座** 09:30　Volcanism in Northern Kyushu: Prof. Nobuo Geshi 10:15　Unzen Fugengakeeruption #1 Prof. SetsuyaNakada 11:00　休息時間 11:15　Unzen Fugendakeeruption #2 Prof. Hiroshi Shimizu 12:00　午餐時間 13:00　Database of Asian Volcanology Dr. Benoit Taisne 13:45　休息時間 **海報環節** 14:30　海報內容短講 #01 - #10 15:30　自由討論 17:00　結束

日期	內容
9/24（三）	**野外考察 DAY1** 09:00　雲仙岳災害紀念館 11:10　雲仙岳災害紀念碑 12:10　午餐 13:25　防砂未來館與大野木場小學校舍遺跡 15:00　平成新山自然中心 16:05　交流活動 17:30　返回旅館
9/25（四）	**野外考察 DAY2** 09:20　雲仙地獄 10:50　仁田嶺雲仙纜車 – 搭乘纜車 – 妙見岳 12:20　午餐（小濱海洋公園） 14:00　小濱歷史資料館 15:40　千千石觀景台 16:50　返回旅館
9/26（五）	**講座** 09:00　Recent Volcanic activity in Japan Dr. Eisuke Fujita 09:45　Volcanic Erosion Control Plan in Japan Dr. Akihiko Ikeda 10:30　休息時間 10:45　Recent Volcanic activity in Indonesia Dr. HeruningtyasDesi PURNAMASARI 11:30　午餐時間 13:00　The duet of thermodynamics and kinetics in magmatic systems Prof. Weiran Li (Alex) 13:45　休息時間 **海報環節** 14:00　海報內容短講 #11 -#20 15:00　自由討論

日期	內容
	閉幕儀式 16:00　頒發結業證書 18:00　晚宴
9/27（六）	08:00　接駁巴士返回 12:00　抵達福岡機場

圖 1、本次進修地點一覽。

肆、進修內容

一、 講座內容

（一） 九州地區的火山

九州位於菲律賓海板塊與歐亞板塊的交界處，受板塊隱沒作用的影響，在此形成一系列火山島弧地形，稱為「西南日本島弧」（SW Japan Arc，又稱琉球島弧 Ryukyu Arc）。在島弧之後，由於地殼張裂作用，弧後（Back-arc）區域也有許多火山活動，可以說九州就是在這樣的火山作用下形成的區域。

若從地體構造的角度來看，九州地區主要可劃分為三個張裂帶，分別是：沖繩海

槽（Okinawa Trough）、鹿兒島地塹（Kagoshima Graben）與別府－島原地塹（Beppu–Shimabara Graben）。其中後兩者分布了至少 17 個活火山群，是九州火山活動最旺盛的地區。

依構造位置與火山特性，這些火山群大致可分為三大類：西北群（Northwestern Group）、中九州群（Central Kyushu Group）與南九州群（Southern Kyushu Group）。

西北群主要分布於九州西北方的離島，甚至可延伸至濟州島，其岩性與九州其他區域的差異最大，多為鐵鎂含量較高的基性噴出岩（玄武岩）。此區火山地形多以平緩的熔岩台地為主，噴發型態較為寧靜，目前活動性也相對較低。

中九州群的火山則主要集中在別府－島原地塹，包括本次進修參訪的雲仙岳，以及著名的阿蘇火山。南九州群的火山位於鹿兒島地塹，包含著名的櫻島火山。此二火山群活動性很高，九州大部分的活火山都在本區域，其岩漿組成偏酸性，以安山岩質為主，噴發型態多為「猛爆式噴發」，火山體也多呈錐狀。這些火山不但極具風險，又位於人口稠密的熊本、福岡區域周邊，因此是日本火山監測的重點區域。

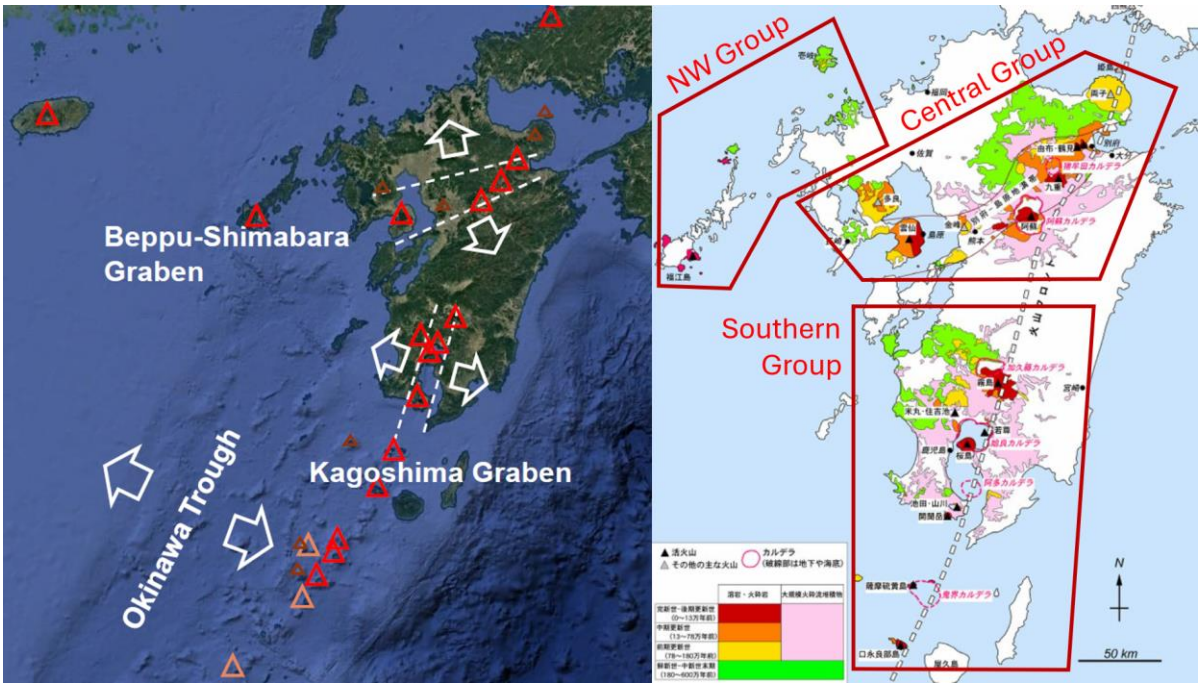


圖 2、九州地區的地質構造與火山分布情況（摘自講者九州大學 Nobuo Geshi 教授）。

（二） 島原地區的火山活動

本次進修地點是位於長崎縣東南部的島原半島，島原半島的成因主要是由於火山作用，半島內有超過20座大大小小的火山，其中較著名的火山包含：普賢岳、平成新山、妙見岳與眉山等山岳，這些火山群合稱為「雲仙岳」又稱為雲仙火山[1]，因此雲仙岳並不特定指哪一座山峰，類似「陽明山」之於七星山、大屯山或小觀音山等山峰的關係。

雲仙岳地區的火山活動活躍，擁有特殊的火山地景，加上火山地形落差形成豐富的高山植被景觀，包含：以「地獄景觀」為名的雲仙溫泉、平成新山的熔岩穹丘（Lava dome）與九州杜鵑（深山霧島）……，因此也被日本政府指定為最初一批的國立公園（另外2座分別是瀨戶內海國立公園與霧島國立公園）。

根據歷史記載，雲仙岳地區在有文獻紀錄的年代至少發生3次噴發事件[2]。第一次噴發紀錄為1663年（寬文3年），普賢岳北北東約900公尺處出現熔岩流，長達約1公里，覆蓋大片森林，稱古燒熔岩流（原文：古焼溶岩流）。第二次噴發紀錄為1792年（寬政4年），自1791年末起開始發生連續地震，隔年2月普賢岳地獄跡火口發生噴岩，隨後開始產生熔岩流，持續近2個月，熔岩最遠達2.7公里，稱新燒熔岩流（原文：新焼溶岩流）。同年5月，在火山地震的影響下，眉山山體發生大規模崩塌，山體滑入東側有明海引發巨大海嘯，造成對岸肥後（今熊本）地區大量死傷，島原與肥後地區合計死傷人數約1萬5千人，為日本史上最嚴重的火山災害，史稱「島原浩劫肥後動亂（原文：島原大変肥後迷惑）」。而這些當時滑入海中的崩積物，至今仍堆積於島原東邊的海岸周圍，形成一個個的小島，為現今秩父浦公園的九十九島（如圖 3）。如果仔細觀察岸邊與島上的沉積物也能發現他們的淘選度相當的差，粒徑差異相當大（圖 4），為典型的崩積層分布狀態。

近代最後一次噴發則發生於上世紀90年代，自1984年開始，普賢岳周邊地震活動逐漸頻繁，並於1990年發生蒸氣噴發，隨後於1991年開始噴發熔岩流以及火山碎屑流，同年5月熔岩流噴發形成熔岩穹丘。接著火山進入活躍期，除了熔岩流以外，還伴隨

[1] Names and origins of Mt.Unzen, 九州地方環境事務所
[2] 雲仙岳　有史以降の火山活動, 国土交通省気象庁

多次大規模火山碎屑流，其中6月3日與8日的火山碎屑流造成嚴重災害，死亡與失蹤共43人，房屋毀損逾三百棟。此後火山持續間歇活動至1995年，間歇噴出的熔岩與火山碎屑流總量約2億立方公尺，這些不穩定的堆積物也引發了多起土石流災害，至今仍對下游居民形成風險。

在這幾年的活躍期後，普賢岳東側形成一座全新的熔岩穹丘，其高度甚至超越原先雲仙火山群中最高的普賢岳（海拔1,359公尺），也成為現今長崎縣的最高峰，海拔達 1,483 公尺。由於該山峰形成時間正值平成年號改元不久，因此命名為「平成新山」，而本次火山噴發事件也被稱為稱「平成火山大噴發（原文：平成大噴火）」。1996年後，地震活動明顯減緩；1997年至2006年間僅觀測到少量火山微震與輕微地殼變動，顯示火山逐漸進入休止階段。整體而言，平成新山的成長與地表活動在1995年後大幅趨緩，標誌著自1990年開始、持續6年的主要噴發期正式告終。

圖 3、秩父浦公園的九十九島，由大量崩落的土石形成的小島。

圖 4、島園海灘由土石流堆積物構成，淘選度較差。

二、 野外考察第 1 日

（一） 雲仙岳災害紀念館（又名：がまだすドーム）

雲仙岳災害紀念館，又稱「Gamadas Dome（原文：がまだすドーム）」，其中「がまだす」是島原地區的方言，意思是「盡力而為」。這個名稱不僅代表地方的語言文化，也象徵島原居民在平成大噴發後堅韌不拔的精神。本館位於島原市臨海地區，視野開闊，天氣晴朗時可遠眺妙見岳、平成新山與眉山等火山（圖 5），欣賞雲仙火山群壯麗的地貌。可惜本次到訪時雲霧濃密，無緣見到火山群的全貌，但仍能感受到火山的雄偉氣勢。

紀念館以火山為核心主題，內容涵蓋科學、歷史與防災教育三大面向。展示以 1991–1995 年平成雲仙岳大噴發為主軸，透過文字、照片、影音與模型重現火山碎屑流、熔岩穹丘的形成過程，以及火山災害對周邊聚落造成的深遠影響。同時，本館亦介紹島原地區自古以來的火山噴發紀錄，呈現島原半島與火山共存的歷史脈絡。

館內展示了許多於災害中受到破壞的物件，如被高熱燒熔的金屬器具、焚毀的建物殘片等，使參觀者能直接感受到火山災害的威力。此外，館內也特別紀念在此場災害中犧牲的人們，包括為觀測火山而不幸遇難的火山學家克拉夫特夫婦，讓後人理解

火山研究背後所承受的風險，也提醒大眾對大自然須保持敬畏。

雲仙岳災害紀念館不僅是記錄災難的場所，更是一座以科普教育與歷史傳承為使命的火山文化基地，透過多媒體展示與沉浸式體驗，使參觀者能更全面地理解火山、災害與人類社會之間的互動關係。

圖 5、遠眺雲仙岳火山群。前為眉山，後為普賢岳與平成新山，當天被雲層遮擋。

1. 1991 – 1995年 平成大噴發的過程

一進入展場，最先映入眼簾的是島原地區的地形模型。本展區利用投影技術，將平成大噴發期間各階段的熔岩流與火山碎屑流範圍與路徑投射在立體模型之上，以視覺化的方式呈現災害的動態變化（*圖 6*）。透過模型上的流向投影，參觀者不僅能清楚辨識不同階段噴發的範圍與影響區域，也能更直觀地理解地形如何控制熔岩與火山碎屑流的侵襲方向，作為災害與疏散範圍的評估。

此外，展場中另有一區以一系列模型呈現平成大噴發各個階段的變化（*圖 7*），這些模型按時間順序展示熔岩穹丘的生成、火山碎屑流的增加造成地形在時間上的變化，讓觀眾能夠理解平成大噴發並非單一事件，而是一連串持續多年間歇噴發的火山。

在平成大噴發後，日本開始在雲仙岳展開一系列更深入的火山研究，其中規模最具代表性的便是 Unzen Volcano Scientific Drilling Project（USDP）深鑽計畫。該計畫旨在鑽取千米以上的深部岩心，了解雲仙火山過去的噴發史與岩漿成份的演化。本館特別展出 USDP 鑽探取得不同深度的岩心薄片 ，讓大眾能透過偏光顯微鏡觀察火成岩的結構與礦物組成。

展區內的偏光顯微鏡設置了電動切換薄片的裝置，觀眾可透過按鈕選擇想查看的岩石薄片，裝置便會旋轉載台，將對應的薄片移至觀察位置。隨後薄片還會原地自轉，因為礦物在偏光模式下會顯示特有的干涉色，而礦物的干涉色會隨著角度的偏轉而改變，所以透過旋轉使觀眾看到更有趣的畫面（*圖 8*）。偏光顯微鏡作為礦物觀察的利器，如此的展示方式不但具備互動性，也讓民眾了解地質學家是如何鑑定岩石裡的礦物，是非常有趣的設施。

圖 6、島原地區的地形模型，利用投影方式標示火山碎屑流。

圖 7、平成大噴發期間的地形變化。

圖 8、偏光顯微鏡展示 USDP 計畫中各深度的岩石薄片 。

2.　島原大變劇場

此劇場以生動的方式呈現雲仙岳火山的歷史噴發事件，內容涵蓋1663年與1792年2次重大的火山活動，尤其以造成巨大災害－島原浩劫和肥後動亂的1792年為主要劇情核心。整體演出以擬人化的手法讓觀眾更容易理解火山的情緒與變化，透過投影技術將火山的表情投映於背板上，搭配旁白與角色配音，使火山「開口說話」，以「不舒服」的情況述說火山到達噴發臨界。

舞台設計上採用可動式電動軌道，能靈活切換前景、中景與後景，模擬不同視角的場景轉換，讓觀眾能在火山與一般居民的視角做切換。前段先以民眾觀察到大量火山地震做鋪陳，預示著火山可能即將噴發。再切換至火山視角，以火山的不舒服表達已達臨界。最後一幕為眉山崩塌，舞台透過電動軌道使眉山傾斜，創造出山體崩塌的震撼效果，重現當年災難的劇烈場景。視角再切換至逃難的人們，表現出災難對人類社會的影響，讓觀眾在娛樂與學習之間，深刻體會火山災害的可怕與對大自然需保持敬畏。

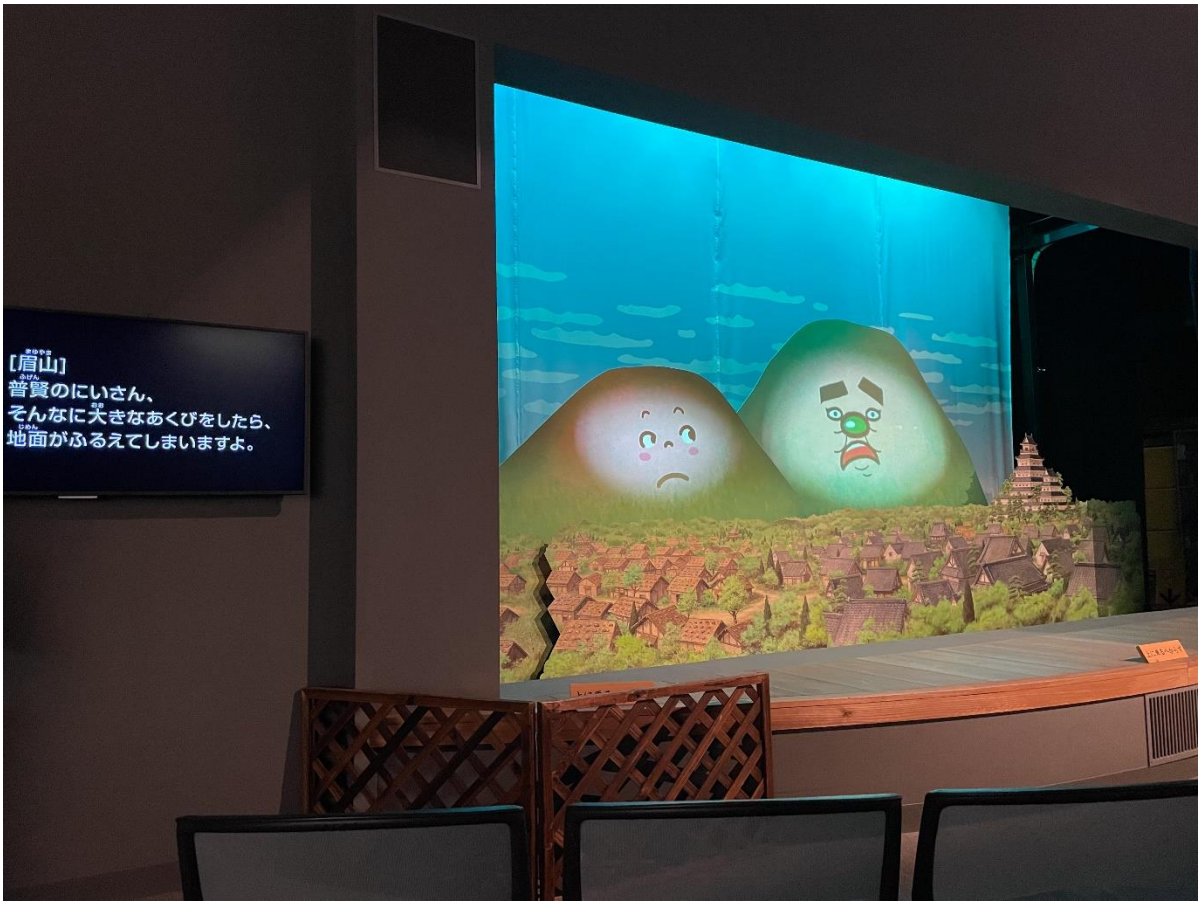


圖 9、島原大變劇場。

3. 火山摧毀的物品

本區展示了大量 1991-1995 年間「平成大噴發」被火山災害摧毀的實物（圖 10），真實呈現出當年火山碎屑流所造成的毀滅性景象。火山碎屑流所經之處溫度極高，可達攝氏300度以上，與火山口的距離有關，產生的熱風使塑膠製品變形、木製品碳化，甚至連玻璃製品都因此融化。這些展品不僅是災害的見證，更讓人們直觀感受到火山噴發所釋放出的巨大能量與自然力量的無情。

圖 10、受火山碎屑流高溫破壞的物品。

在平成大噴發期間，為了記錄火山活動的真實過程，許多媒體記者與火山學者不畏危險，進駐普賢岳南麓的水無川北堤一帶拍攝。該地點距離火山口約4公里，地勢略高，能清楚拍攝普賢岳周邊的火山活動，因此該處被當時媒體俗稱「定點」。由於5月下旬至6月初火山活動逐漸活躍，火山碎屑流的頻度與規模持續增大，即使當局多次發布避難勸告，仍有記者與研究人員留在現場記錄珍貴影像。然而，1991年6月3日下午，熔岩穹丘崩塌，釋放出當時規模最大的火山碎屑流，伴隨強烈的高溫熱風。由於風向突變，高溫氣流朝定點方向席捲而來。極高溫與猛烈氣流使現場人員幾乎無法逃生，導致包括記者、學者、消防人員與警察在內多人罹難，成為戰後日本最嚴重的

火山災害之一。

2005年，調查人員在現場發現一台當時罹難攝影師小村幸司（日本テレビ Nippon TV 記者）所使用的索尼專業攝影機（*圖 11*）。攝影機外殼雖然因為高溫而融化變形，但裡面的錄影帶經過仔細修復後，機內的錄影帶竟部分保存完好，影像記錄了火山碎屑流來襲前，災難發生的瞬間，為火山災害留下了極為珍貴的紀錄。該攝影機與修復後的影像如今一同陳列於本館內，除了紀念第一線人員的貢獻，也提醒人們尊重自然與災害風險評估的重要性。

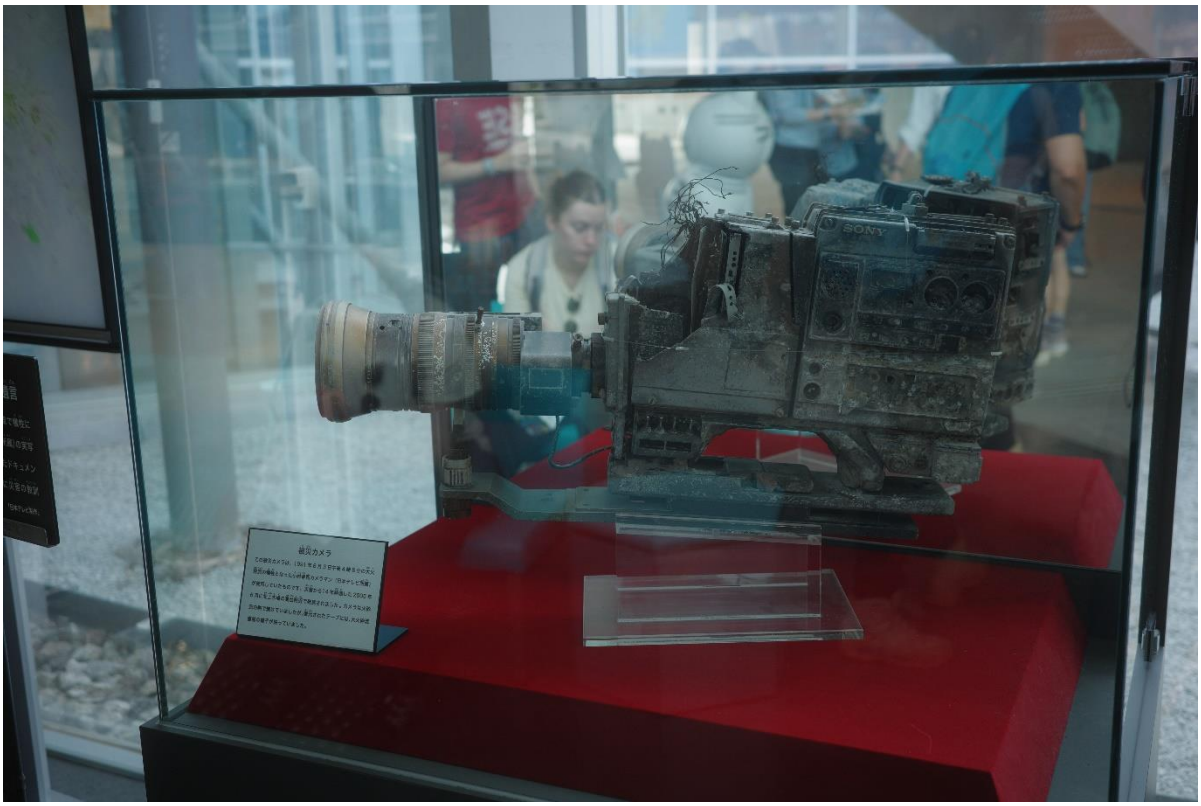


圖 11、小村幸司於罹難當時所使用的攝影機。

4. 克拉夫特夫婦（Katia and Maurice Krafft）

克拉夫特夫婦在火山研究領域貢獻卓著，也是20世紀最具代表性的火山學家與紀錄者之一。自年輕時起，他們便投身火山的觀測與紀錄，也經常親赴活火山現場近距離拍攝熔岩流、火山爆發與火山氣體噴出等壯觀景象。他們的影像資料不僅啟發了後世無數火山學者，也讓世人以具體直觀的方式認識到火山災害的真實威力與危險。透過他們拍攝的影像與出版的書籍，人們對火山活動的了解大幅提升，也促使各國政府與研究單位更加重視火山監測與防災教育。

1991年6月3日，他們在日本雲仙岳觀測火山活動時，遭遇了突如其來的火山碎屑流，本次事件除了克拉夫特夫妻，同行的美國學者哈利・格里肯（Harry Glicken）也不幸罹難。消息震撼全球學術界，許多科學家與媒體稱他們為「以生命探索火山真相的先驅」。為表彰克拉夫特夫婦在火山研究與防災教育上的卓越貢獻，該館特別設置此紀念專區，展示他們的影像、著作及遺留器材，讓參觀者了解他們的研究歷程與精神。此外，他們的故事也被拍成多部紀錄片與電影，其中最為人熟知的《火山摯戀》（Fire of Love），該片也在第95屆奧斯卡金像獎獲得最佳紀錄片提名。

圖 12、克拉夫特夫婦與為紀錄片《火山摯戀》的海報。

（二）　雲仙岳災害紀念碑

在結束紀念館的參觀行程以後，我們驅車前往位於雲仙岳東麓水無川北堤、北上木場町的紀念碑。這個地點因為能夠清楚觀察到火山活動，成為平成大噴發期間記者、學者與消防人員常駐的觀測區域（即前面所提到的「定點」），也因為1991年6月的火山碎屑流事件造成多人罹難。此紀念碑的設置地點不僅是追悼之所，更是後人反思自然災害與人類關係的見證之地。

紀念碑的造型以雙手合十為意象，兩手相合的掌心中央留有一處空隙，正對著平成新山，除了象徵對罹難者的追思與祈禱，也包含著對自然的敬畏（圖 13）。碑旁陳列著當年記者們近距離觀測火山時所乘坐的汽車殘骸，這些車輛在火山碎屑流的猛烈衝擊下幾乎被完全摧毀，僅剩鏽蝕扭曲的金屬結構（圖 14），成為災害下最具震撼力的見證。

圖 13、雲仙岳災害紀念碑。

本區域亦是當年北上木場農業研修所的所在地，該研修所在災害發生期間曾作為當地消防團的臨時指揮與警戒據點，許多消防團員也在事件當下不幸被火山碎屑流所吞沒，壯烈殉職。對地方居民而言，這裡是充滿悲傷回憶的地方，也是永遠無法忘懷的歷史現場，現地仍保存著當時被火山碎屑流所摧毀的消防車以及研修所的建築基礎。

當天，紀念館的解說員也陪同我們一同前往，並詳細說明了當年火山爆發時的狀況與殉職者的事蹟。當解說結束後，我們在紀念碑前默哀片刻，為罹難者致上哀思。站在平成新山對面的紀念碑前，凝視著象徵祈禱的雙手，我們深深感受到大自然的力量與無常，也更加體會到在災害面前人類的渺小。

圖 14、受火山波及的車輛。

圖 15、地藏菩薩雕像，據解說員表示毛線帽為罹難者家屬所織。

（三） 土石流受災家屋保存公園

平成大噴發後，由於大量火山碎屑物以不穩定的形式堆積在火山下方低谷（尤其是水無川），因此在地震或是大雨的作用底下便容易發生土石流，土石流淹沒了低處的房屋，本保存公園就展示了這些被土石流所掩蓋的房屋。

如果觀察這些土石流的堆積物，可以發現有許多直徑在20公分以上的石塊，這些石塊的圓度不佳，約為次稜角狀（subangular），而這些石塊的周圍被更細小的礫石（比硬幣小，如圖）與粉砂所包圍，是典型土石流堆積層常見的基質支持型態（matrix-supported），但現場只有能看到表面的沉積物，沒有剖面的展示。

圖 16、土石流受災家屋保存公園展示，右圖為沉積物型態，圖中銀色圓形為硬幣。

（四） 防砂未來館

如前所述，大量鬆散且不穩定的火山碎屑物堆積在山麓低谷，成為土石流潛在隱患。為降低後續土石流對居民生命財產的威脅，日本國土交通省遂於本處推動一系列的防砂工程，包括興建攔砂壩、固床工以及導流堤等設施，藉此攔截並引導土砂流向，降低土石流所造成的威脅。

本防砂未來館除了提供展示與教育功能外，同時也是災害監測與防災應變的重要據點。本館位於水無川旁的高位河岸上，能直接眺望平成新山與下方河谷地形，具備良好的視野條件，非常適合作為觀測火山與土石流動態的據點。

另一方面，水無川河谷內仍殘留大量砂石堆積物，若不適時清理，將降低前述防砂工程的效能。然而，由於河谷仍存在一定風險，作業人員直接進入作業極為危險。因此當地採用無人化施工技術，透過遙控方式操作挖土機、鏟裝機等重機具，以進行清淤與砂石整理，而本館亦同時作為遠端操作的據點。

圖 17、館內職員為我們講解防砂工程內容。

（五） 大野木場小學校舍遺跡

本校舍遺址坐落於防砂未來館旁，於1991年9月15日受火山碎屑流的熱風侵襲所重創，校舍的窗戶玻璃幾乎全毀，窗框也發生變形，但建築主體因為是混凝土，所以結構還能保留，只是外牆有些斑駁，而周遭木質物則因為700度的熱風而碳化（圖 19）。

所幸火山碎屑流發生的當下因為正好非上課時間，人員也都疏散，所以沒有造成傷亡。操場旁的有一顆於1943年（昭和18年）種植的銀杏樹（圖 20），跟據說展板說明此樹當下也被燒傷，但因為銀杏樹的耐火性高，所以隔年就長綠色的新芽，本次造訪可以看到這棵樹長滿了綠葉仍十分有活力，這棵樹也被當地人當作重生的象徵。

圖 18、大野木場小學校舍遺跡。

圖 19、被火山碎屑流高溫碳化的木質物。

圖 20、銀杏樹。

（六） 平成新山自然中心

平成新山自然中心位於平成新山東側半山腰的平坦台地上，除了作為展示與教育空間外，也設置有火山觀測站及火山碎屑地層保存區。可惜造訪當日恰逢中心休館，只能參觀戶外的觀測設施與地層保存區，不過仍足以感受到此地作為火山觀測與教育據點的重要性。

1. 雲仙岳垂木台地火山觀測施設

本次參訪的雲仙岳垂木台地火山觀測站，是距離平成新山最近、可直接監測火山活動的一線觀測站之一（*圖 21*）。由於觀測站本身位於雲仙天草國立公園的範圍內，所有建築外觀皆需遵循日本國立公園的相關規範，因此外牆特別以棕色系塗裝，使設施得以在景觀中隱於環境，避免突兀，也展現出日本國立公園強調「景觀融合」的管理理念。

此觀測站隸屬於日本國家防災科學技術研究所（NIED）所建置的「V-net 基礎火山觀測網」（Fundamental Volcano Observation Network[3]）。V-net 的建立目的在於透過全國火山的高品質且即時的資料收集與共享，提升國家整體的火山預警能力。這些連續且高解析度的數據不僅能提供災害防救單位進行監測判斷，也支援學術界進行火山物理、噴發機制與地殼變動等研究，形成科學與防災兼具的整合型觀測系統。

V-net 的一大特色是測站配備高度多樣且互相校正的儀器。垂木台地觀測站內整合的設備包含：設置於深約 200 公尺的井下地震儀與井下傾斜儀、位於地表附近的寬頻地震儀，以及 GNSS/GPS、氣壓計與雨量計等環境修正用儀器。相較於傳統測站往往僅具備單一或少數觀測設備，V-net 藉由多參數整合，不僅能互相驗證資料，還能修正溫度、降雨與氣壓等外界因素造成的誤差，使監測結果更為可靠。

其中，井下地震儀是 V-net 最具代表性的設備之一。因深埋地下、遠離地表車輛、風或人為活動造成的震動干擾，加上地層溫度變化較小，使其能偵測到地表儀器難以捕捉的微小震波細節。此外，鑽孔安裝儀器時取得的岩心樣本亦具有高度研究價值，能提供過去火山噴發的沉積資訊，協助學者比對古代與現代火山活動之間的差異。這

[3] Tanada, T., Ueda, H., Nagai, M., & Ukawa, M. (2017). NIED's V-net, the fundamental volcano observation network in Japan. Journal of Disaster Research, 12(5), 926-931.

些資料都讓研究人員能更全面掌握火山的過去與現在，有助於推估未來的可能發展。

可惜的是，本次參訪因井蓋無法開啟，未能實際看到井下儀器的構造與配置，但透過研究人員的介紹，我們仍對其運作方式與重要性有更深入的理解。整體而言，垂木台地觀測站不僅是雲仙岳的重要監測據點，也展現了日本在火山防災科技上的規模與高度專業性。

圖 21、雲仙岳垂木台地火山觀測站。

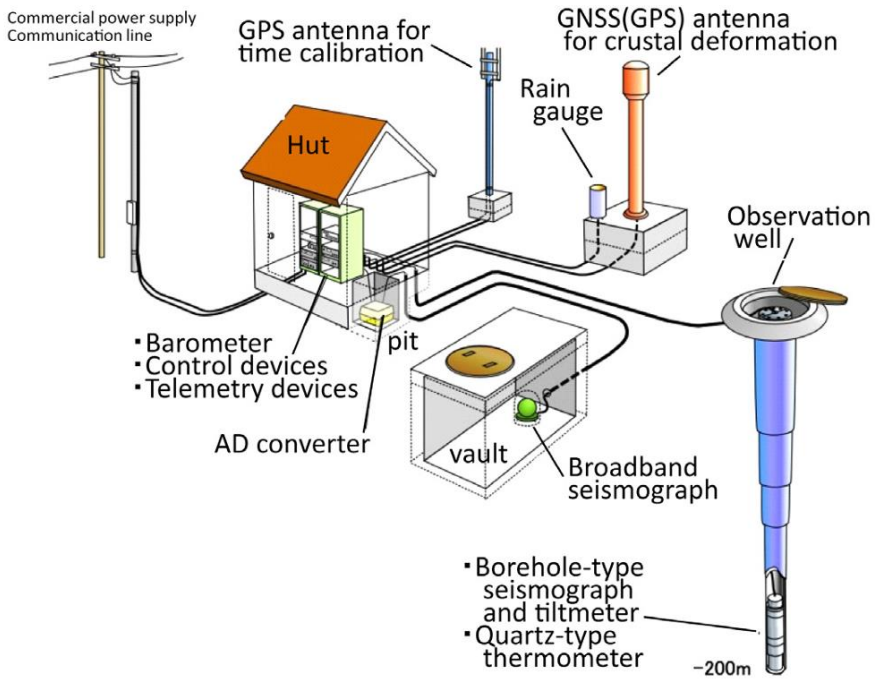


圖 22、V-net 測站概念示意圖。

2.　火山碎屑地層保存區

本保存區位於平成新山自然中心旁的小道邊，主要展示平成大噴山的火山碎屑堆積層，因為本區為平坦台地，因此可以保存來自火山的堆積物不被沖刷。這邊的地層大致能夠細分為7層（圖 23），其中下方與上方的2層為土壤層，為非噴發期間由土壤化育作用緩慢形成之土壤層，內含植物根系與腐植質。夾在土壤層之間的5層則為火山噴發事件所堆積的火山碎屑流（pyroclastic flow）、火山碎屑浪湧（pyroclastic surge）與火山灰堆積物，記錄了1991至1993年之間的火山活動。此特殊地景，管理單位也是非常小心地保護的，可以看到一旁有告示請大家共同維護（如圖 24左下），並禁止採集與破壞行為。

仔細觀察這些火山碎屑物的樣貌，可以發現火山灰的顆粒較細，而火山碎屑浪湧次之，火山碎屑流最粗，主要和這些沉積層的搬運形式有關，另外1991年9月15日與1993年6月23日兩次較大規模的噴發都在這裡留下較厚的沉積層。

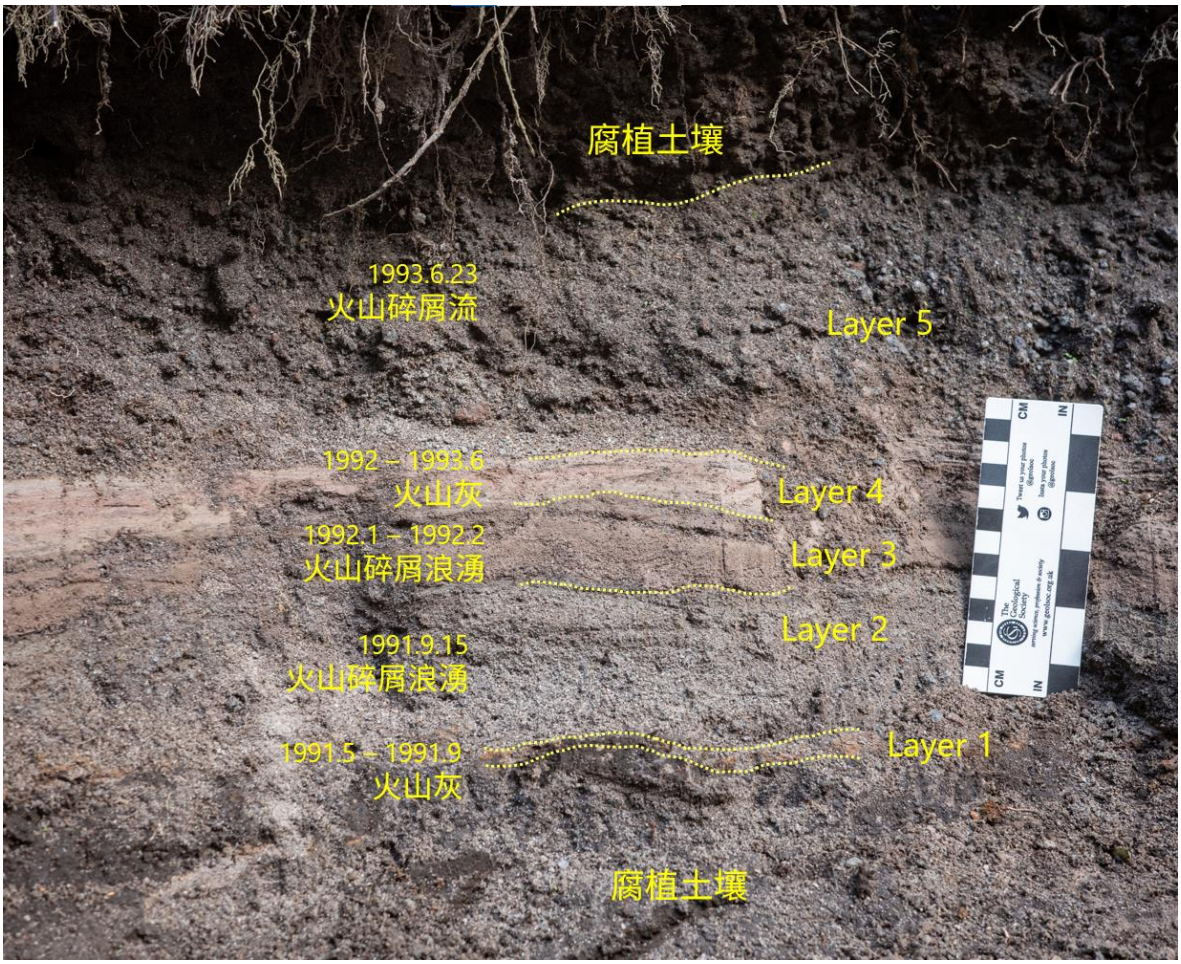


圖 23、平成大噴發的地層紀錄。

圖 24、解說員為我們介紹火山碎屑地層保存區。

（七） 交流活動

為增進各會員國之間的交流，本次主辦單位為我們安排了交流活動，為體驗當地和蠟燭產業的活動。

1792年島原地區發生的大規模山體滑坡（島原浩劫肥後動亂），造成大量死傷，也對當時的島原藩造成巨大衝擊。為了恢復生氣，領主開始鼓勵栽培野漆樹，並從野漆樹的果實中提取蠟製作和蠟燭。雖然在面對電氣化的衝擊，又加上平成大噴發期間大量野漆樹遭到摧毀了，和蠟燭的榮景已經不再，但本多木蠟工業所依舊採用古法萃蠟，試圖傳承傳統技術。

到達工作坊後，先由主人為我們介紹和蠟燭的基本知識與歷史，再放映一段介紹影片。雖然主人的英文不太好，但能感受到他對待這項產業的熱情，不斷地向我們介紹相關知識。而本次安排的交流活動為蠟燭彩繪，主辦單位提供每人一支空白的蠟燭，我們再使用壓克力顏料進行彩繪。現場亦有提供畫譜做參考，多為傳統的樣式，也能夠依照自己的想法進行設計。

圖 25、繪製完畢的和蠟燭。

三、 野外考察第 2 日

（一） 雲仙地獄

「地獄」在日本除了指宗教上的地獄之外，也代表著飄著裊裊熱氣與冒著滾燙溫泉的地熱景觀。由於雲仙岳地區的火山活動依舊旺盛，因此充滿許多地熱景觀。這裡的景觀相似本園硫磺谷與龍鳳谷，都由受到熱液換質的安山岩組成，還有溫泉與噴氣孔等地熱景觀。而本處同樣也進行著包含地溫、水質或氣體等火山監測。當日遇見了來自肯亞與日本當地大學的學者共同進行採樣工作，肯亞與日本同樣坐擁豐富地熱資源，如東非大裂谷即位於該國境內，對於火山觀測與地熱資源開發同樣是該國重點項目之一，因此派出學者進行交流。

比較特別的是溫泉飯店就緊鄰著這些地熱景觀附近，且部分溫泉池有覆蓋著一層帆布做為保溫（圖 27）。本處雖然位於國立公園範圍內，但由於日本的溫泉文化歷史悠久，因此有許多溫泉飯店的歷史是早於國立公園成立前的，因此這些舊有的開發得以保留。另外值得一提的是雲仙地區在20世紀初期，因為鄰近許多外國人居住的長崎，因此當時也是許多人外國人或富人的渡假的聖地。鄰近的雲仙高爾夫球場在1913年即興建完成，是日本最老的一座高爾夫球場，也是早於1934年所成立的雲仙國立公園，因此得以看到位於國立公園內的高爾夫球場如此的特別景象。

圖 26、雲仙地獄。

圖 27、溫泉被覆蓋帆布保溫。

（二） 仁田嶺雲仙纜車

雲仙纜車自仁田嶺出發，可一路搭乘至妙見岳山頂附近，是眺望雲仙地區四季景緻的最佳路線。春天可見杜鵑盛放、夏季有四照花點綴山林、秋季紅葉遍山、冬天則能欣賞銀白雪景。本次造訪時，正逢夏秋節氣交替，四照花已結果，葉片則尚未轉紅，山景為一片綠意。但能看到零星仍在開花的杜鵑。本地的杜鵑為九州杜鵑（又稱深山霧島，學名：*Rhododendron kiusianum*），無論葉片或花朵都十分細小，葉面可見些許細毛。值得一提的是，陽明山國家公園早年引進的久留米杜鵑（*Rhododendron* × *obtusum*）即為九州杜鵑與其他杜鵑雜交而成，因此也呈現類似的小葉特徵。

由山下搭乘纜車至妙見岳車站約需五分鐘，從車站步行至妙見岳山頂則僅需十分鐘。天氣晴朗時，可在此遠眺普賢岳與平成新山。可惜造訪當日雲霧濃厚，無法見到山頂樣貌。不過隨行的老師仍利用海報向我們說明山頂的地形變化與相關監測方式，使我們在未能目睹實景的情況下仍能了解此處監測的布置。

本區亦設有登山步道通往普賢岳，但平成新山路線因安全顧慮為封閉狀態，僅開放學術團隊進入。監測團隊大約每兩個月會登上平成新山一次，主要工作包括資料收集與設備電池更換。由於山頂測站沒有電力供應，只能依靠電池運作，加上無法使用網路即時傳輸資料，因此必須由研究人員定期親自前往維護。

圖 28、九州杜鵑。

圖 29、四照花的果實。

圖 30、纜車站。

圖 31、雲仙纜車。

（三） 小濱歷史資料館

小濱為雲仙岳西方的一個町，屬於雲仙市轄內。本區同樣受雲仙岳火山的影響具有豐富地熱資源，排水溝都飄著裊裊的蒸氣。由於鄰近長崎市，又具備豐富的溫泉，從早期就提供傷殘軍人與民眾作為水療的場所。

小濱歷史資料館由老宅所改造，主要展示小濱地區的地方歷史。從早期就開始鑽取溫泉使用，也因為有在汲取溫泉的緣故，售票處提供溫泉的副產物－石灰華塊，供遊客作為紀念品免費索取。石灰華為泉水中的二氧化碳因為減壓逸出，使碳酸鈣溶解度降低因而沉澱。如果不處理的話可能會堵塞管路，因此他們將石灰華去除後作為紀念品供遊客索取是很有趣的作法。

圖 32、小濱歷史資料館內戶外空間。

圖 33、雲仙國立公園海報。

圖 34、供遊客索取的石灰華塊。

（四） 千千石觀景台

本觀景台位於千千石斷層線崖的西側高地，可以鳥瞰整個因為受千千石斷層錯動影響而產生的地形落差。整個島原半島大致為3個地塊所組成的地塹，並且不斷地向南移動，但因為南側地塊與北側地塊的移動速度不同，南側地塊相較於北側地塊每年移動速度快了一公分，這樣的速度差導致彼此互相遠離，也因為千千石斷層是向南傾斜的緣故，因此在遠離的過程，同時伴隨著下地塊的下陷，每年下陷約1.5毫米。經過長時間的下陷形成地形落差，本處可以觀察到大約200公尺的落差，而斷層東側可觀察到最大地形落差則可達到450公尺。

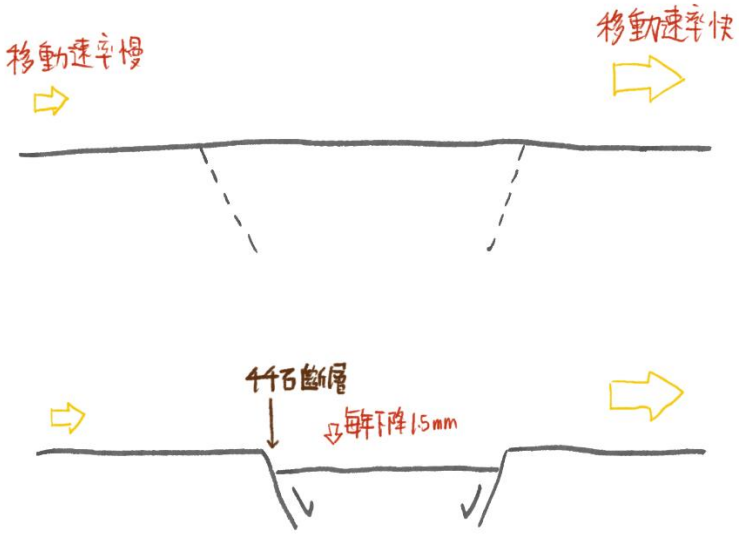


圖 35、千千石斷層與島原地區構造示意圖。

圖 36、由千千石觀景台鳥瞰地形變化。

伍、心得與建議

本次火山訓練營針對島原地區火山的型態特性、災害應變管理體系及防災教育模式進行了深入研習，除強化對活火山的系統性理解外，也深刻體會日本在面對嚴峻自然威脅時所累積的實務經驗與治理智慧。這些觀察與啟示，對我國火山防災策略具有重要參考價值。以下以主題分類心得與建議：

（一） 災害應變管理的持續精進與研究交流之維繫

本次訓練營為本處第2次參與，本處於112年亦曾受大屯火山觀測站邀請，參加第5屆火山訓練營。由於大屯火山位於陽明山國家公園範圍內，本處與大屯火山觀測站長期保持密切合作。大屯火山鄰近臺北都會區，潛在風險不容忽視，因此持續且密集的監測極為必要。本處應與大屯火山觀測站維持穩定合作，推動火山監測、預警與防災教育等相關事務，並在行政面提供協助，以防災為首要目標。

此外，亦需持續掌握國際防災新知與監測技術。以本次參訪為例，日本位處火環帶，長期面臨火山、地震、海嘯與複合式災害的威脅，其災害管理逐步形成「與災害共存」的核心思維，此思維已深植國民心中，以提升整體韌性為目標，在無法完全避免災害的前提下，盡可能降低生命與財產損失。

大屯火山目前僅在地層中觀察到噴發紀錄，並未被歷史文字所記載，使得臺灣在面對火山災害的經驗相對不足。但透過雲仙岳的案例可見，日本透過大量數據與專業模擬分析，評估熔岩流、火山碎屑流與碎屑浪湧等不同災害形式，並據以劃定疏散區域公告周知，這些結果來自大量的研究累積與跨單位合作。因此本處作為園區的管理單位，應持續協助園區內防災研究的推動，全力支援相關監測與科學研究，進一步強化國家整體火山預警能力。

（二） 火山與防災教育之深化推廣

本園內擁有多樣的火山地景，包括溫泉、噴氣孔與火山作用下所形成的各種岩石與礦物，堪稱天然的地質教室。然而，這些景觀也反映著火山潛藏的風險，因此如何提升民眾火山知識與降低不必要的恐慌是一件重要任務。本處目前於各遊客中心及菁山自然中心皆展示火山與防災等相關主題，但隨研究不斷發展，內容的持續更新也是

必要的，因此針對展場內容應定期審視與修改。若未來規劃新展示內容，可參考本次參訪經驗，如偏光顯微鏡展示岩石構造、島原大變劇場中擬人化火山的呈現，都是很令人印象深刻的範例。

在戶外的部分，本園擁有許多極具特色的地質景觀。建議可以先對各類地景與露頭進行盤點，並依其地質的特殊性、保護需求與安全風險進行分類與評估，再據以採取適當措施。例如大油坑區不僅具備壯觀噴氣孔，也承載著陽明山採硫歷史，同時兼具地質與人文的展示價值。然而該區因高溫噴氣與有害氣體，目前為本處所公告為具潛在危險區域。因此未來如要規劃相關展示與教育內容，就能先以細部的地質調查為本區劃定風險分級地圖，精準界定警戒範圍，在教育展示的同時兼顧遊憩安全。

附　　錄

Date: September 26, 2025

Certificate of Attendance

Presented to

Shao-An CHENG

The 8th field camp of Asian Consortium of Volcanology

September 23 – 26, 2025
Shimabara, Japan

Professor Emeritus Masato Iguchi
President, Asian Consortium of Volcanology

EARTH OBSERVATORY OF SINGAPORE
NIED 防災科研
Department of Science and Technology PHIVOLCS Philippine Institute of Volcanology and Seismology
Taiwan Volcano Observatory - Tatun TVO
香港大學 THE UNIVERSITY OF HONG KONG
Volcano Specialized Research Center

Nagasaki Prefecture

SHIMABARA-HANTO UNZEN-ONSEN-KYO

島原半島 雲仙温泉郷

Round Tour! Tourist Map

島原半島 雲仙温泉郷 UNZEN

unesco Global Geopark

島原半島ジオパーク

N

Omohama Beach (pyroclastic flow deposits from the Mt. Aso volcano)

Mizuho Gyokyo Fisherman's Market

Taira Port

Tairagane (blue crab)

Nagahama Beach

Kojiro (Nabeshimatei-mae)

Saigo

Taira

Ariake Ferry To Nagasu Port, Kumamoto Prefecture

Mizuho Onsen "Sennen-no-Yu"

↑ To Isahaya City

Historical Museum, Kunimi Hall

Kojirokuji, Nabeshima Former Residence 26

Awashima-jinja Shrine (miniature *torii* gate)

Taisho

Recreation Hostel "Yugakunosato Kunimi"

Isahaya Bay Reclamation Dike Road (Unzen Tara Sea Line)

Kobe

Unzen Green Road (Large-Scale Agricultural Road)

Yasai-kobo Nonohana (farmer's market)

Poppoya Tea (Unzen Tea Farmer's Market)

Yamanoeki Vege Dream (farmer's market)

Ariakeyue

Ariake Onsen "Bijin no Yu"

Onobaru Site Exhibition Hall "Jomon-no-sato"

Omisaki Station (the train station closest to the ocean in Japan)

Omisaki

←To Nagasaki City

Azuma (Unzenshiyakusho-mae)

Furusato Fureaikan (farmer's market)

Matsuo

Kamanohana

Abozaki

Unzen City Hall

Giant Camphor Tree of Ariake (Matsuzaki)

Shimabara road

Yamada Castle Park

Maitake no Sato (farmer's market)

Ariake Sea

Isahayahigashikoko

Unzen Domannaka (Unzen Akane Pork Farmer's Market)

Mizuho-no-Mori Park/ Waterwheel Village Iwato Stream Park

7 Ariake no Mori Flower Park

Isahaya City

Aino

City of Unzen

Hyakkadai Park

Mie

Ganba (Blowfish)

Nagasaki Prefecture Kennan Livestock Market

25 Iwado Shrine

City of Shimabara

2 Former Samurai residences

Okitanawate Historic Battlefield

Ranch "Bokujo no Sato, Azuma"

Tashirobaru Trail Center and Campground

Maitake Springhead

1 Shimabara Castle

Chijiwa Observatory (Chijiwa Fault)

Maitake Fureai Road 8888

Shimabara Station Tourist Information

Aino Observatory

Mt. Azuma-dake ▲870 m

Mt. Maitake ▲703 m

6 Shimabara Hibaruyamahana Flower Park

Shimabara

Shimabara City Hall

←To Nagasaki City

Mt. Torikabuto ▲822 m

Sen'otoshi-no-taki Falls

Organic Farmer's Market "Taneto"

Tachibana-jinja Shrine

Kamabuta Castle Site

5 Spring Water Garden "Shimeiso"

"Yutoroi no Yu" Onsen

4 Seiryutei

Reikyukoentaiikukan

Mt. Kusenbu-dake ▲1062 m

Senbongi Observatory

Ginsui (Hamanokawa Spring)

21 New Mt. Fugen-dake Trail

Mt. Mayuyama ▲819 m

Shirachiko Lake

Shimabarafunatsu

Yamasa Kaiun To Miike Port, Omuta City, Fukuoka Prefecture

Former Obama Railway tracks

Mt. Kunimi-dake ▲1347 m

Mt. Heisei-shinzan (Lava dome) ▲1483 m

3 Shimabara Onsen

Shimabarako

Heisei-shinzan Nature Center

Shimabara Port Terminal Shimabara Port Tourist Information

Kyusho Ferry Kumamoto Ferry To Kumamoto Port

Terraced Paddy Field Observatory

Mt. Fugen-dake ▲1359 m

Mt. Myoken-dake ▲1333 m

Nitadanchi Daiichi Park

Green Tunnel

Rokkaku Well

Unzen Ropeway

Tachibana Bay

Shimizu Terraced Paddy Fields (Chosen as one of the 100 most beautiful terraced paddy fields in Japan)

Chichibugaura Park

Tomitsu Benten Park

Unzen Golf Links

9 Kyushu Olle Shimabara Course

Jacaranda (one of the world's three largest flowering trees) Best viewing: Around early June

Obama Onsen Tourist Information

Oshidori-no-Ike Pond

Shimabara Disaster Recovery Arena

Unzen Destination Service (Tourist Information)

20 Nita Pass

Mt. No-dake 1142 m

8 Gamadas Dome

Unzen Vidro Museum

19 Unzen Jigoku

Fukae-cho, Minamishimabara City Gift Shop and Farmer's Market

Mt. Ya-dake ▲940 m

Nita Pass 2nd Observatory

Mt. Kinugasa 870 m

Shirakumo-no-ike Pond

Unzen Visitor Center

Jacaranda Road

Hot Foot 105 Foot Bath 23

18 Unzen Onsen

24 Honda Yudayu Former Residence (Obama Historical Museum)

12 Former Onokoba Elementary School Disaster Site Onokoba Erosion Control Museum

Hot Spot 105 Tourist Information Center

22 Obama Onsen

Mt. Takaiwa 881 m

13 Roadside Station "Himawari"

Landslide Disaster Preservation Park Information Center (Tourist Information)

Tawaraishi Observation Area

Fukae Town Gyokyo (Tiger prawn fisherman's market: November through February)

Yuhi-no-oka Park

Ayugaeri-no-taki Falls

Eco Park Ronshobaru Campsite

Arie Tawaraishi Nature and Sports Park

Futsu Onsen Yurari

Tonosumi Park/Tonosumi-no-taki Falls

Histrical Museum Minamikushiyama Hall

Kunisaki Peninsula

Arima Spring Hotaru no Sato

City of Minamishimabara

Unzen Suwanoike Pond Visitor Center

Suwa-no-ike Pond

Harayama Dolmen Cluster (National Historic Site)

Unzen Green Road

(Town of Somen noodles)

Arie (Town of traditional storehouses)

Terraced Field Observatory

Omonashibashi Bridge

Site of Arima Seminary

Hinoe Castle Ruins (National Historic Site)

Minamishimabara City Hall

Marine Park Arie

Futagoiwa Rock

Koshi no sato Park

Site Arima River Martyrdom

Tatsuishi Seashore (Origins of Mt. Unzen)

Christian Tombstone (National Historic Site)

Hanafusa Observatory

St. Mary Kannon Hara Castle

Kyushu

Fukuoka City

Kyushu Expressway

Dazaifu IC

Tosu JCT

Shintosu

Nagasaki Expressway

Kurume IC

Yame IC

Miyama-Yanagawa IC

Nankan IC

Kikusui IC

Ueki IC

Kumamoto IC

Isahaya IC

Shin-Omuta

Shintamana Kumamoto

From Nagasu Port to Tsuta Port by ferry

From Kumamoto Port to Shimabara Port by ferry

From Oniike Port to Kuchinotsu Port by ferry

Kagoshima Chuo

Seibo Park/Seibo Memorial Museum 14

11 Arima Christian Heritage Museum

Kazusa Auto Campsite

Dolphin Watching

Harajou Onsen "Masago"

Tanimizu Terraced Paddy Fields (Chosen as one of the 100 most beautiful terraced paddy fields in Japan)

Nodahama Campsite

10 World Heritage site Hara Castle Ruins (National Historic Site)

Hashiri octopus

Iwatoyama Tree Grove

Minamishimabara City Tourist Association (Tourist Information)

Meshima

Maehama Beach

(Pyroclastic flow deposits from the Mt. Aso volcano)

Hirakida Park (site of European ships landing)

Minamishimabara Dolphin Watching 15

16 Kuchinotsu Dolphin Watching

Lithothamnium Reefs (white sandbars)

Shirahama Beach Campsite

Kuchinotsu Port Terminal

Kuchinotsu Museum of History and Folklore (branch) (Located inside Kuchinotsu Port Terminal)

Ficus wightiana Colony

Shimatetsu Ferry (to Oniike Port, Amakusa, Kumamoto Prefecture)

Sezumezaki Lighthouse

17 Kyushu Olle Minamishimabara Course

Hayasaki Seashore (Hayasaki Basalt Rock / Origins of the Shimabara Peninsula)

Arakabu (scorpion fish)

Unzen Onsen Town Search

About the Shimabara Peninsula ⬅ Scan to learn more

What's a geopark? ⬅ Scan to learn more

Geopark destination

World Heritage site

Christian site

0 5km

Nagasaki Prefecture

Location of Shimabara in Kyushu

25 min. 12.7 km — Isahaya IC — 30 min./17.5 km — Aino — Taira

30 min. 18.5 km

25 min. 15.5 km — Chijiwa — 20 min. 15 km — Nita Pass — Shimabara

15 min. 9 km — 20 min. — Obama — Unzen — 30 min. 19.2km

25 min. 14.2 km — 30 min. 15.4 km

35 min. 22.7 km — 40 min. 25.7 km — 30 min. 19.4 km — Kuchinotsu — Nishiarie

20min. 15 km

1 Shimabara Castle

Shimabara Castle was built over the course of seven years starting in 1618. A reconstruction of the tower's interior houses exhibits on topics including Christian history and local history. Cherry blossoms (in spring), irises (in early summer), and lotus flowers (in summer) can be seen around the moat. You can also enjoy hospitality and dance performances by Shimabara Bushoutai, a group whose members dress as military commanders to promote tourism.

Shimabara Tourism Bureau (Shimabara Castle)
Tel. 0957-62-4766

2 Former Samurai Residences

These residences of lower-level samurai can still be seen in the area near Shimabara Castle. Three houses with thatched roofs remain standing and convey the atmosphere of times long past. A waterway in the center of the road carrying spring water for domestic use has been carefully maintained over time.

Shimabara Tourism Section, City of Shimabara
Tel. 0957-63-1111

3 Shimabara Onsen

The neutral-pH waters of this hot spring are gentle on the skin, and they're said to be beneficial in the treatment of chronic skin diseases, cuts, and burns. The hot spring water, which is also potable, is also considered beneficial in the treatment of chronic digestive system diseases, diabetes, gout, and liver disease. In addition, there are drinkable springs in seven locations throughout the city.

Shimabara Tourism Section, City of Shimabara
Tel. 0957-63-1111

Koi-no-Oyogumachi The Town of Swimming Carp

Springs flow along the city's streets to create a nostalgic atmosphere, and you'll see colorful carp. Destinations like Seiyutei, where you can find tourist information, and Spring Water Garden Shimeiso are typical of Shimabara, which is known as a community that's been shaped by water over its long history.

4 Seiryutei Tourism Exchange Center

Seiryutei Tourism Exchange Center
Tel. 0957-64-2450

5 Spring Water Garden Yusui Teien Shimeiso

Yusui Teien Shimeiso
Tel. 0957-63-1121

Flower Park

6 Shimabara Hibaruyamahana Flower Park

Types of flowers
Field mustard, cherry trees, weeping cherry trees, poppies, cosmos, and sunflowers

Shimabara Hibaruyamahana Flower Park
Tel. 0957-62-3986
(Shimabara Tourism Bureau)

7 "Ariake no Mori" Flower Park

Types of flowers
Field mustard, cherry trees, salvia, and cosmos

Shimabara City Commerce Promotion Section
Tel. 0957-62-8111

8 Gamadas Dome Mt. Unzen Disaster Memorial Hall

Gamadas Dome (Mt. Unzen Disaster Memorial Hall), which features hands-on exhibits about geology and volcanoes, recently reopened after a renovation. New attractions include new content being shown at the facility's The Great Heisei Eruption Cinema; Kids' Geopark, where young visitors can enjoy hands-on attractions modeled on Mt. Fugen-dake; and Wonder Lab, where visitors can have fun learning about volcanoes and disaster preparedness.

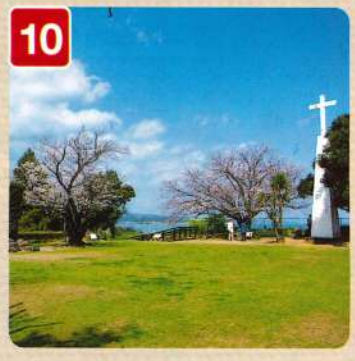
Gamadas Dome Mt. Unzen Disaster Memorial Hall
Tel. 0957-65-5555

9 Kyushu Olle Shimabara Course

Hike 10.5 kilometers in 3.5 to 4 hours while gazing at Mt. Heisei-shinzan, Japan's newest mountain.

Shimabara Tourism Section, City of Shimabara
Tel. 0957-63-1111

10 Hara Castle Ruins World Heritage site



It is here that the Shimabara-Amakusa Rebellion, which broke out in 1637, came to an end. The Edo shogunate adopted a policy of completely closing off the country from outside contacts in response to the uprising, leaving underground Christians no choice but to continue in their faith on their own. Archaeological excavations have unearthed numerous human bones along with implements of faith such as medals and crosses from inside the castle, where the rebels barricaded themselves.

Minamishimabara City Tourist Association
Tel. 0957-65-6333

11 Arima Christian Heritage Museum

This museum features easy-to-understand exhibits that trace the history of Christianity in Minamishimabara, from the arrival of religion to its heyday, including the Hinoe Castle ruins; the Hara Castle ruins, site of the Shimabara-Amakusa Rebellion, which forced Christianity underground; and other Christian sites in the city, such as Christian tombstones and the seminary. There are also exhibits of artifacts excavated from historic sites and replicas of relics.

Arima Christian Heritage Museum
Tel. 0957-85-3217

12 Former Onokoba Elementary School Disaster Site Onokoba Erosion Control Museum "Miraikan"

This volcano-themed museum introduces the damage caused by the Heisei eruption and subsequent reconstruction, which primarily involved erosion control measures. The museum preserves the former Onokoba Elementary School, which was destroyed in a fire caused by the volcano's pyroclastic flow, as it appeared following the disaster.

Onokoba Erosion Control Museum
Tel. 0957-72-2499

13 Roadside Station "Himawari"

Roadside Station Himawari
Tel. 0957-61-0771

14 Seibo Park/Seibo Memorial Museum

Seibo Memorial Museum
Tel. 0957-85-2922

Dolphin watching

About 200 bottlenose dolphins live in the Hayasaki Strait between the Shimabara Peninsula and Amakusa, and you can watch them as they swim. *It depends on weather and other factors, but it's likely you'll see some dolphins if your boat leaves port.

15 Minamishimabara Dolphin watching

This company's smiling staff members are eager to ensure everyone in your family has a good time, starting with small children.

Minamishimabara Dolphin watching
Tel. 0957-87-4640

16 Kuchinotsu Dolphin watching

Located 2 minutes towards Shimabara from Kuchinotsu Port by car. It's extremely likely you'll encounter some dolphins.

Kuchinotsu Sightseeing Boat Operators Association
Tel. 0957-86-4433

17 Kyushu Olle Minamishimabara Course

This trekking area was certified in November 2015. The scenic, moderately-pitched course is rich in things to see, including a colony of *Ficus wightiana* and Sezumezaki Lighthouse. The 10.5-kilometer route can be walked in three to four hours.

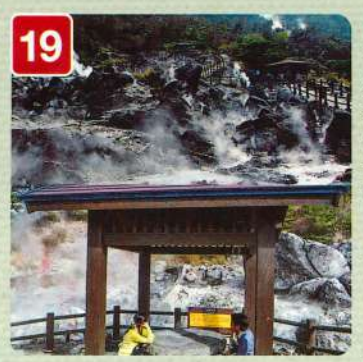
Shimabara Tourism Section, City of Shimabara
Tel. 0957-73-6633

18 Unzen Onsen

Originally, Unzen was written using the kanji characters for "onsen" (meaning "hot spring") but pronounced "unzen." It was designated as Japan's first national park due to its combination of seasonal natural beauty and hot springs, and it became a sightseeing area that attracted numerous foreigners who were eager to escape the summer heat during the Meiji and Taisho periods. The strongly acidic hot springs are high in sulfur content, making them effective at disinfection, good for the skin, and beneficial for the treatment of various skin conditions.

Unzen Destination Service
Tel. 0957-73-3434

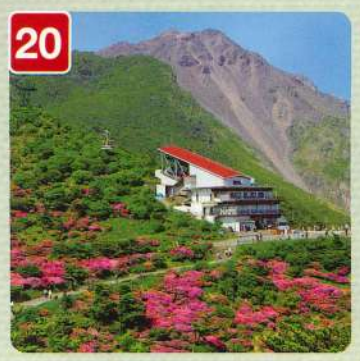
19 Unzen Jigoku



This major sightseeing destination in Unzen Onsen consists of more than 30 scalding water springs called "Jigoku", including Daikyokan Jigoku and Oito Jigoku. There are also new benches that let you experience the geothermal heat, for example by cooking dishes in pots heated by the steam.

Unzen Destination Service
Tel. 0957-73-3434

20 Nita Pass (Ropeway)



The Nita Pass Observation Area and Second Observation deck offer panoramic views of scenery formed by the volcanic eruptions of Mt. Unzen. On clear days, you can see as far as Aso, Amakusa, and Kirishima, creating some of the most picturesque landscapes on the peninsula.

Unzen Ropeway
Tel. 0957-73-3572

21 New Mt. Fugen-dake Trail

This trail, which opened in May 2012, offers close-up views of Mt. Heisei-shinzan, Japan's newest mountain. By promising encounters with the living Earth and the area's rugged, beautiful plants, it's enjoyable in every season.

Unzen Destination Service
Tel. 0957-73-3434

22 Obama Onsen

Obama Onsen, which has a long enough history that it was mentioned in the *Hizen Fudoki*, an account of the area written in 713, is a seaside hot spring where you can enjoy the salty fragrance of the sea and sunsets seen through wisps of steam rising from the water. It achieved a reputation during the Edo period for its springs' effectiveness in treating illness.

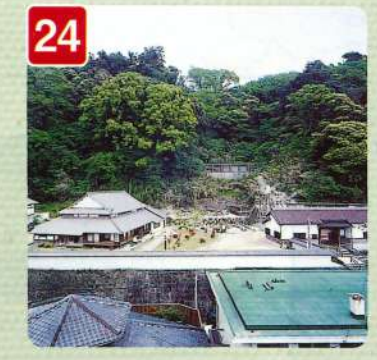
Obama Onsen Tourist Information
Tel. 0957-74-2672

23 Hot Foot 105 Foot Bath

At 105 meters in length, this foot bath, which is visited by 200,000 people every year, is Japan's longest. You can also enjoy vegetables and other foods cooked in pots over hot spring steam.

Obama Onsen Tourist Information
Tel. 0957-74-2672

24 Honda Yudayu Former Residence (Obama Town Historical Museum)



This museum is located at the site of the residence of the Honda Yudayu, who for generations laid the foundation for the growth and development of Obama Onsen starting in 1614. "Yudayu" is the name of the official who was entrusted by the Shimabara domain with the management of the hot spring. The museum features numerous exhibits exploring topics including the accomplishments of officeholders and materials related to the history of Obama Onsen.

Honda Yudayu Former Residence
Tel. 0957-75-0858

25 Iwado Shrine

Surrounded by huge cypresses and cedars more than 300 years old, the watershed forest is filled with tranquil and peaceful atmosphere.
The Iwado shrine muffled in thick green world has been familiarized by local people for a couple of thousand years, enshrining the cave, where it's been said Jomon people (ancient Japanese) had lived, as the object of worship.

Tourism and Local Products Section, City of Unzen
Tel. 0957-38-3111

26 Kojirokuji, Former Nabeshima Residence

This town was built by the Nabeshima clan, which ruled the Kojiro district of the Saga Nabeshima domain. The Kojirokuji area around the Nabeshima stronghold and residence has been designated an Important Traditional Building Preservation District by the Japanese government. The site evokes the atmosphere of the Edo period.

Kojirokuji, Unzen City History and Culture Park/ Nabeshima Residence
Tel. 0957-61-7778

Inquiries

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*For more information about the attractions featured in this pamphlet, please scan the QR Code for each.

December 2023, Shimabara Peninsula Tourism Federation

CITIES ON
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Shimabara 2007
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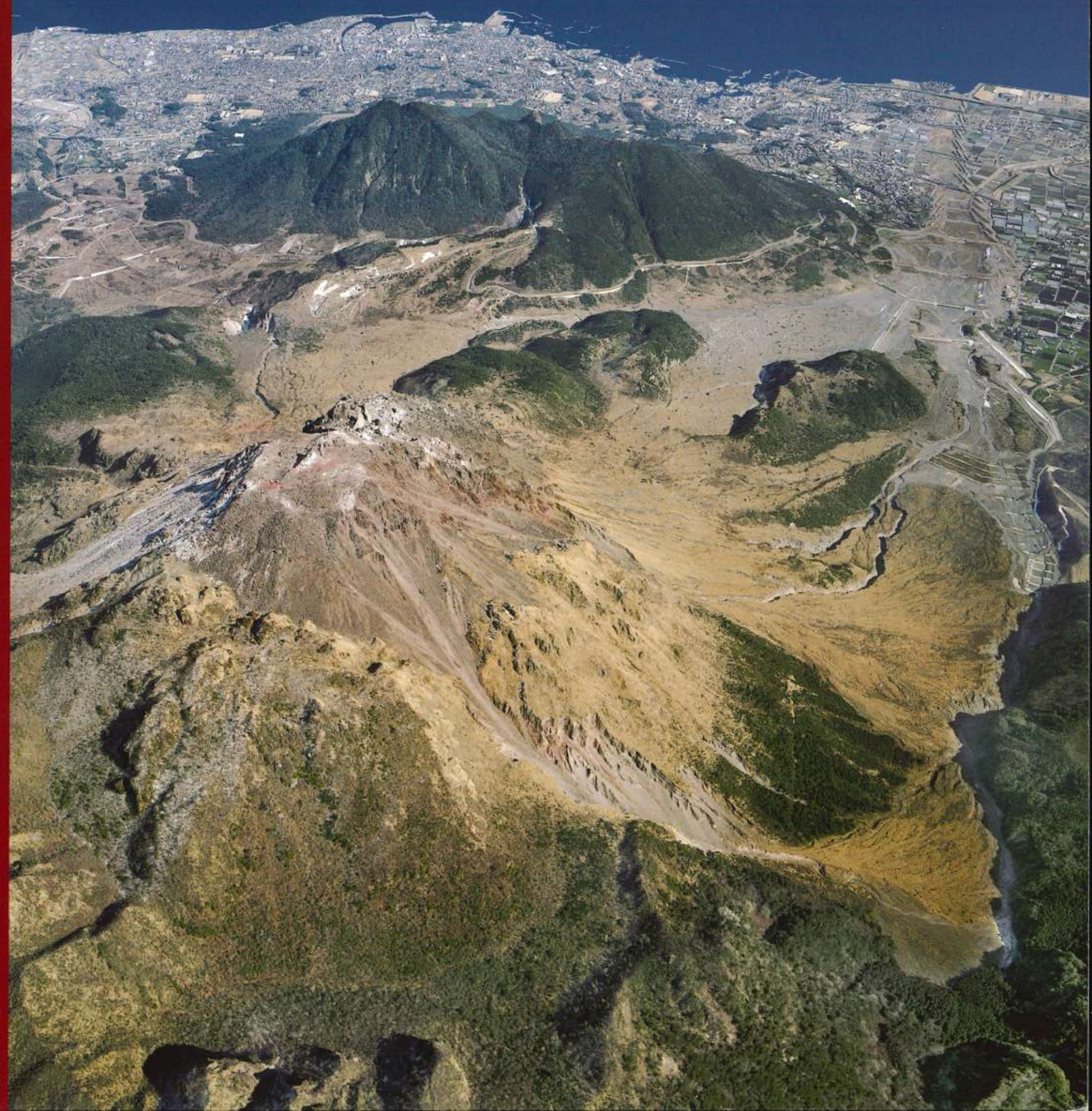
INTRA MEETING EXCURSION

UNZEN ERUPTION

DISASTER AND RECOVERY



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CITIES ON VOLCANOES 5 CONFERENCE

INTRA-MEETING EXCURSION **NOV.21, 2007**

UNZEN ERUPTION DISASTER AND RECOVERY

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Front cover photo produced by MLIT (Ministry of Land, Infrastracture and Transport), Japan

Purpose of the trip

Shimabara City and its environs were damaged by repeated pyroclastic flows and lahars during the 1990-1995 eruption of Unzen Volcano. This field trip focuses on the disaster of the eruption and the recovery from it. We will visit the devastated areas and look around the ruins of the eruption. Local residents, Kataribe, who lost their houses and relatives, will relate the disaster and their experiences. We will also lean about the reconstruction works from the volcanic devastation and several other lahar control projects. Moreover we visit an elementary or junior-high school and look at an activity relating the experiences of the volcanic disaster to younger generations.

(Hiroshi Shimizu)

Outline of tectonic setting and geology

Geological basement in Kyushu

Geological structure of the Kyushu Island is characterized by the Inner and Outer zones which are divided by the Median Tectonic Line, the Usuki-Yatsushiro Line in Kyushu, running in NE-SW from the central Honshu to Kyushu (Fig. 1). The structure in which geological units are distributed parallel to this principle zoning results from the accretion mainly of oceanic deposits due to both plate subduction and the related volcanism-metamorphism since the late Paleozoic. A pair of metamorphic belts contact in the Median Tectonic Line, low-T/high-P (Sanbagawa belt) in south and the northern high-T/low-P (Ryoke belt, north) in north, although the pair becomes less evident in Kyushu. The Paleozoic formation in the Inner Zone was intruded by the Mesozoic granitic plutons (Ryoke belt) and was overlain by the Mesozoic to Cenozoic island-sea sedimentary rocks. On the other hand, the late Paleozoic to early Cenozoic sedimentary rocks are arranged with younger geological units in south, and are intruded (extruded in part) sporadically by small granitic plutons of the middle Miocene.

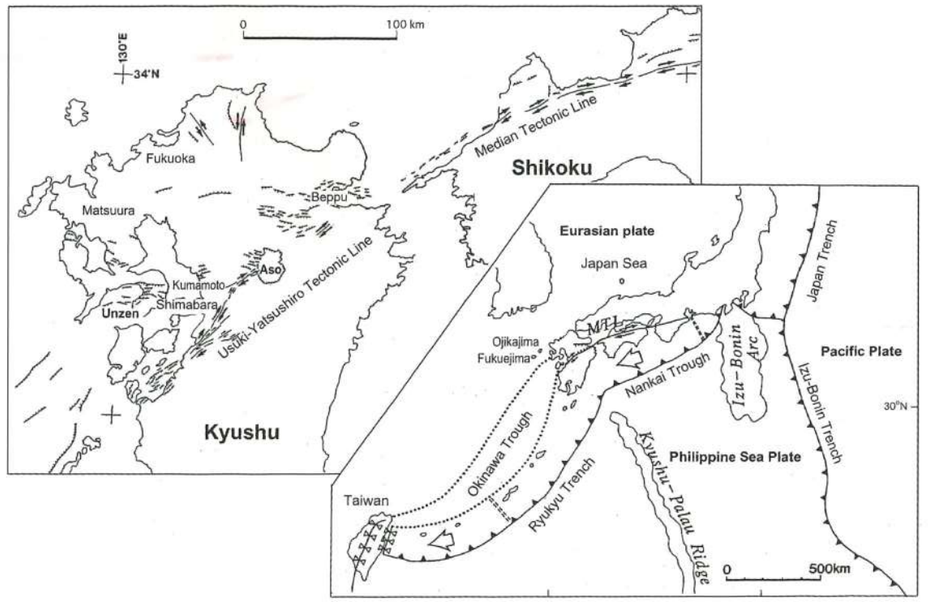

Fig.1 Map showing the tectonic frame work in Kyushu and Japan (modified from Kamata and Kodama, 1994)

Volcanic Front and volcanic activity in Kyushu

Late Cenozoic volcanic activity in the central and southern Kyushu resulted from the subduction of the Philippine Sea Plate which started about 7 Ma. The present volcanic front, the West-Japan Volcanic Belt, which starts from Daisen Volcano in the western Honshu, thorough central Kyushu toward the Ryukyu Arc, was established about 2 Ma (Fig. 2). Extensive plateaus of large-scale pyroclastic flow deposits are distributed around the gigantic calderas in central and

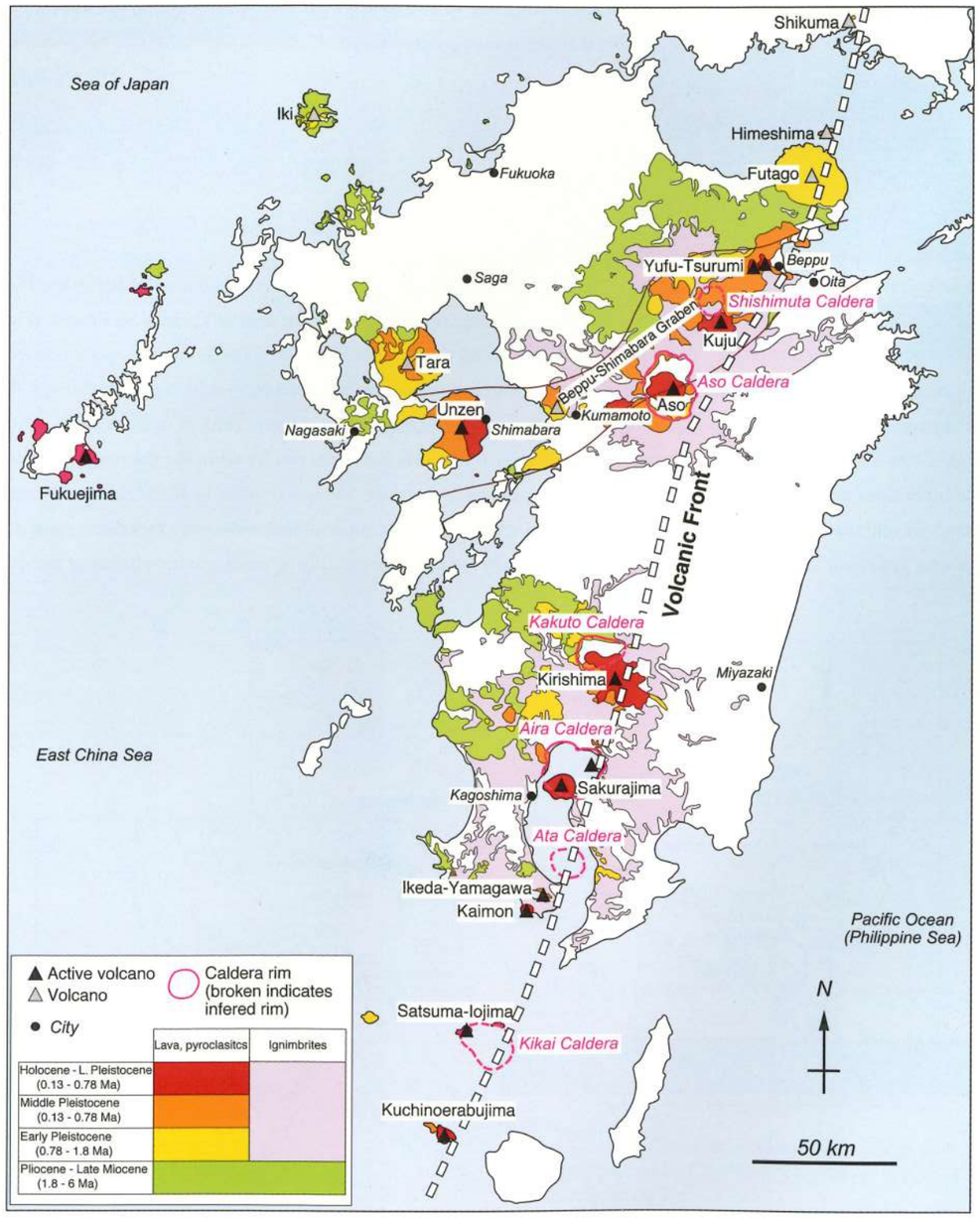

Fig. 2 Map showing distribution of volcano in Kyushu and the volcanic front (Hoshizumi, 2006)

southern Kyushu, which nest on the volcanic front (Aso, Aira, Ata, Kikai, etc). Back-arc spreading behind the volcanic front is active presently near the south of Ryukyu Arc, called Okinawa Trough, and the topographical manifestation of the spreading can be traceable northward. However, it is not clear whether the northern extension rides on the Shimabara Peninsula or furthermore goes to the north. In the back arc side of the northern Kyushu, the within-plate (hot-spot) type basaltic volcanism had continued since 11 Ma in the back arc side in Kyushu. The basaltic volcanism formed small plateaus of the Matsuura and Higashi-Matsuura. Fukuejima and Ojikajima islands are recently active volcanoes of this type. Unzen locates at the southern periphery of this basaltic volcanism, and the basement rocks of Unzen include both alkaline and tholeiitic basalts.

Tectonics in the central Kyushu

The narrow region extending from near Beppu City to Shimabara Peninsula is characterized by abundant normal and strike slip faults roughly trending EW to NE-SW. This region was proposed as the Beppu-Shimabara Graben (Matsumoto, 1979). Shallow earthquake swarms sometimes occurred in this region, especially Beppu and Aso areas and Shimarabara Peninsula. Tada (1985) proposed an active rifting system for the Beppu-Shimabara Graben, where the geodetic data for the past 100 years shows the NS extension at the average rate of 1.4 cm/year and subsidence at 2.5 mm/year. However, recent geological lines of evidence do not support the existence of such an extensive rift zone. Instead, the following tectonic model was proposed. Oblique subduction of the Philippine Sea Plate against Kyushu (Eurasian Plate) generates right lateral movement of both sides of the Median Tectonic Line. Shearing of the Inner Zone against the Outer Zone formed en-echelon rhombic basins (pull-apart basins); that is, small and irregularly spaced grabens aligned NE-SW behind the Median Tectonic Line (Tsukuda, 1993; Kamata and Kodama, 1994). Recent gravity data in the central Kyushu clearly indicate negative anomalies in basins aligned within the Beppu-Shimabara Graben. Unzen is a volcano that has developed within one of these active basins (Unzen Graben).

(Setsuya Nakada)

Geology and eruptive history

The volcanic products of Unzen Volcano cover a wide area, spanning about 20 km from the east to the west and 25 km from the north to the south with many lava domes, thick lava flows, and pyroclastic deposits of hornblende andesite and dacite. The northern and southern boundaries of the Unzen Graben are not clear because volcanic rocks have almost entirely filled the depression (Fig.3).

Unzen Volcano began to grow at 0.5 Ma above the Pre-Unzen pyroxene andesite of the same age (Watanabe and Hoshizumi, 1995; Hoshizumi et al, 1999). Unzen volcanics are characterized by abundant (>25 vol.%) large (>3 mm) phenocrysts of hornblende and plagioclase whose composition and appearance are similar throughout most of the history. Unzen Volcano has been divided into three volcanic edifices, Older (0.5-0.3 Ma), Middle (0.3-0.15 Ma) and Younger Unzen (0.15-0 Ma) (Fig.4) by results of geological survey and flank drillings of Unzen Scientific Drilling Project (USDP).

Products of the Older Unzen (0.5-0.3 Ma) either form volcanic fans extending northwards and southwards outside of the Unzen Graben, or are buried beneath the younger deposits inside the graben. The deposits overlying the pre-Unzen volcanics along the southern slope of the volcano consist of pumice-rich pyroclastic flows, block and ash flows, and associated volcaniclastic debris flows. The north-dipping fan spread outside of the graben and is sharply cut by E-W trending fault. Inward extensions of these two volcanic fans inside the graben and their sources are inferred to be located far above the skyline of the current summit area of Unzen Volcano. This suggests that Unzen Volcano grew rapidly in the first 200,000 years of its history and formed a conical volcanic edifice with the central vent area being more or less at the position of the current summit area. Because the growth rate was higher than the rate of subsidence of the graben,

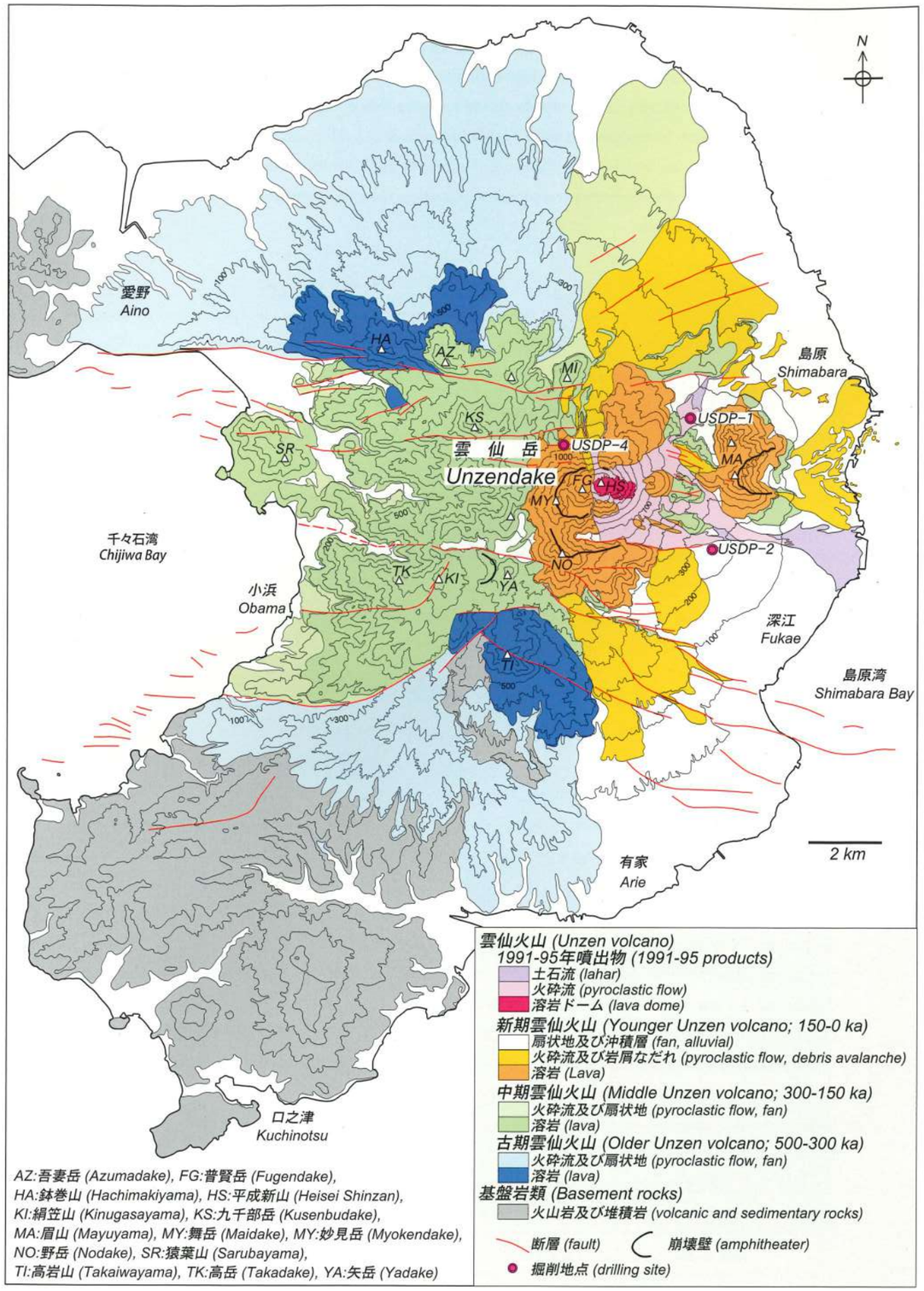

Fig.3 Geologic sketch map of Unzen volcano with age data

the volcano was able to supply pyroclastic and volcaniclastic deposits and some lava flows north and south of the graben. However, the materials ceased to flow against the boundary faults at 0.3 Ma, possibly because the subsidence rate of the graben overcame the supply rate.

Among the Middle Unzen (0.3-0.15 Ma) volcanic products, lavas that flowed west and east are quite different. In the western half of Unzen Volcano, thick lava flows are widespread inside the Unzen Graben. Pyroclastic flows and related debris flow deposits are almost absent from the surface exposures. Lava flows of 0.2-0.26 Ma are also exposed in the eastern half of the volcano as sporadic outcrops.

Products of Younger Unzen stage is composed of four volcanic edifices, Nodake, Myokendake, Fugendake and Mayuyama, all locate in the eastern half of Unzen Volcano. As high ridges west of these volcanic edifices have acted as topographic barriers, no volcanic products of this stage have been supplied to the western half of Unzen Volcano. Continuous subsidence of the Unzen Graben without the supply of materials from the vent area resulted in flooding by seawater coming from Chijiwa Bay to the west. On the other hand, continuous supply of volcanic materials, either block-and-ash flow deposits or related debris flow deposits, to the eastern flank of Unzen Volcano exceeded or balanced the subsidence rate of the graben, resulting in continuous development of volcanic fans throughout the history of Younger Unzen Volcano.

Nodake is the oldest volcanic center of the Younger Unzen stage. A poorly preserved horseshoe-shaped scar, which is open to the north, appears to be overlain by Myokendake, suggesting that the northeastern part of Nodake Volcano collapsed prior to the formation of the Myokendake Volcano. Nodake is composed mainly of thick lavas and pyroclastics with debris avalanche deposits, erupted about 70 to 120 ka.

Myokendake comprises a primary volcanic edifice consisting of pyroclastic deposits. The edifice is little dissected except for a horseshoe-shaped scar ("Myoken Caldera"), 1.5 km across, and open to the east. Some K-Ar age data for the main

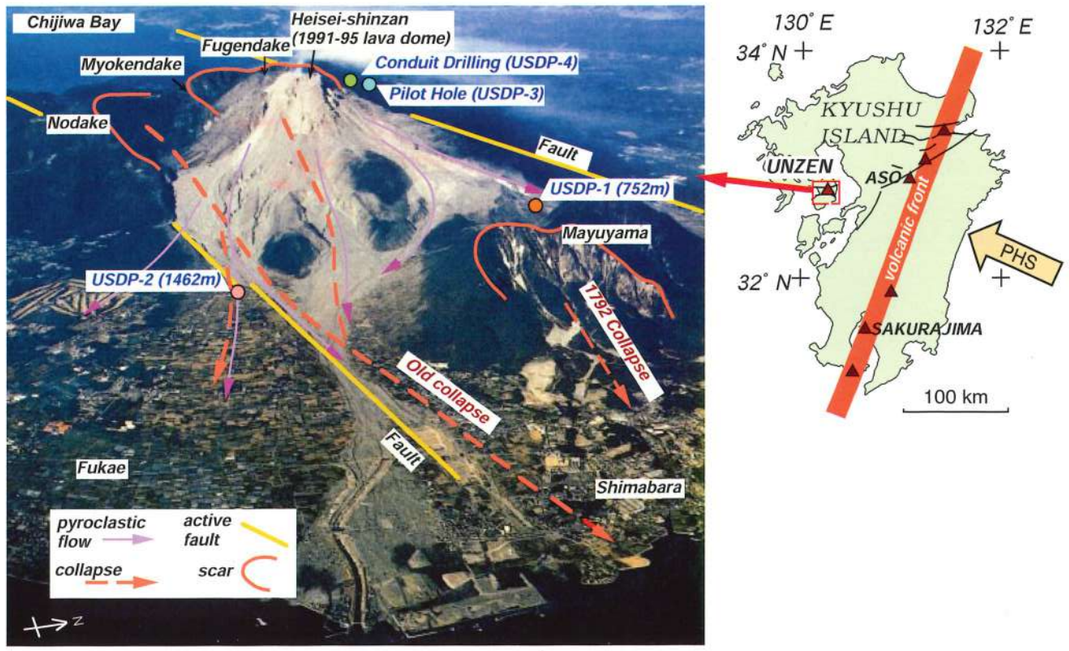

Fig. 4 Southeastern view of Unzen Volcano and drilling sites (USDP), modified from Watanabe and Hoshizumi, 1995 and Hoshizumi et al., 1999

volcanic edifice range between 20-30 ka. No deposit related to the collapse of Myokendake has been found on the surface, but such deposits are found in flank drillings of USDP. Fugendake is developed both inside and outside of the Myokendake scar. This volcanic center consists of many lava flows, lava domes, pyroclastic flow deposits, and debris-avalanche deposits. Located in the easternmost part of Unzen Volcano, Mayuyama comprises two huge lava domes. The Mutsugi pyroclastic flow deposit dated at about 4 ka is a block-and-tash flow deposit derived from the northern part of the Mayuyama dome.

Fugendake has been historically active. Eruptions in 1663 and 1792 produced lava flows, and the most recent eruption, in 1991-95 produced lava domes. The 1663 lava, Furuyake lava, is olivine-bearing basaltic andesite, which erupted from a vent within the Myokendake scar and flowed down slope for a distance of 1 km. The 1792 eruptions produced the Shin-yake dacite lavas that flowed northwards for a distance of 2 km. One month after this event, Mayuyama collapsed causing a large-volume debris avalanche. This debris avalanche devastated the central area of Shimabara City before entering the sea to generate a deadly tsunami, which struck the opposite shore of the Shimabara Bay. The events killed about 15,000 people. Many small islands collectively named Tsukumojima, meaning 99 islands, scattered off Shimabara City are large blocks transported by the debris avalanche.

(Hideo Hoshizumi)

Petrology

Products of Unzen Volcano range in composition from olivine -pyroxene -hornblende andesite to biotite-hornblende dacite (SiO_2: 59-67 wt. %), in contrast to the pre-Unzen volcanic rocks that are dominated by pyroxene andesite and olivine basalt (SiO_2: 47-63 wt. %). Except for products in the earliest stage, the Unzen volcanic rocks are characterized by the presence of large and abundant plagioclase and hornblende phenocrysts, whose sizes are larger than 3 mm in length, sometimes reaching 20 mm, and the total abundance of phenocrysts is more than 25 vol. %. The earliest Unzen products (K-Ar ages: 0.44-0.50 Ma; unpublished GSJ age data), commonly found in the USDP-1 and -2 drilled cores, are dacite (SiO_2: 64- 68 wt. %) with smaller (1-2.5 mm) and less abundant (15-25 vol. %) phenocrysts. Meanwhile, volcanic rocks of pre-Unzen stage (K-Ar ages: 0.47-0.52 Ma) are andesite (SiO_2: 55-60 wt. %) which also contains smaller amounts (< a few vol. %) of hornblende phenocrysts.

The difference in chemical composition between the Unzen and Pre-Unzen volcanic rocks is obvious, though the volcanic activity was continuous from the Pre-Unzen stage to the Unzen stage. Major and trace element variations against MgO wt. % are shown in Fig. 5, where chemical compositions of Pre-Unzen and Unzen volcanic rocks are compared. Note that the Pre-Unzen volcanic rocks are plotted on curved trends, while the Unzen volcanic rocks are plotted on straight lines. The curved chemical variation trends may result from fractional crystallization, while linear variation trends may be from mixing between mafic and felsic magmas. Mixing of the Unzen volcanic rocks are proposed by many investigators (e.g., Nakamura, 1995; Nakada and Motomura, 1999). The presence of aphyric mafic enclaves commonly found in the Unzen volcanic rocks is one of lines of evidence suggesting hybridization or mixing between aphyric basalt and phenocryst-rich dacite magma in various ratios (Sugimoto et al., 2005; Browne et al., 2006). The estimated mafic endmember for the mixing is an evolved basalt with MgO = 5.5 wt. %. This is identical to the most evolved one in the Pre-Unzen basalt. Temporal change in magma system from fractional crystallization-operated to magma mixing-operated coincides with the start of the activity forming stratovolcanoes in the Shimabara Peninsula.

(Takeshi Sugimoto and Setsuya Nakada)

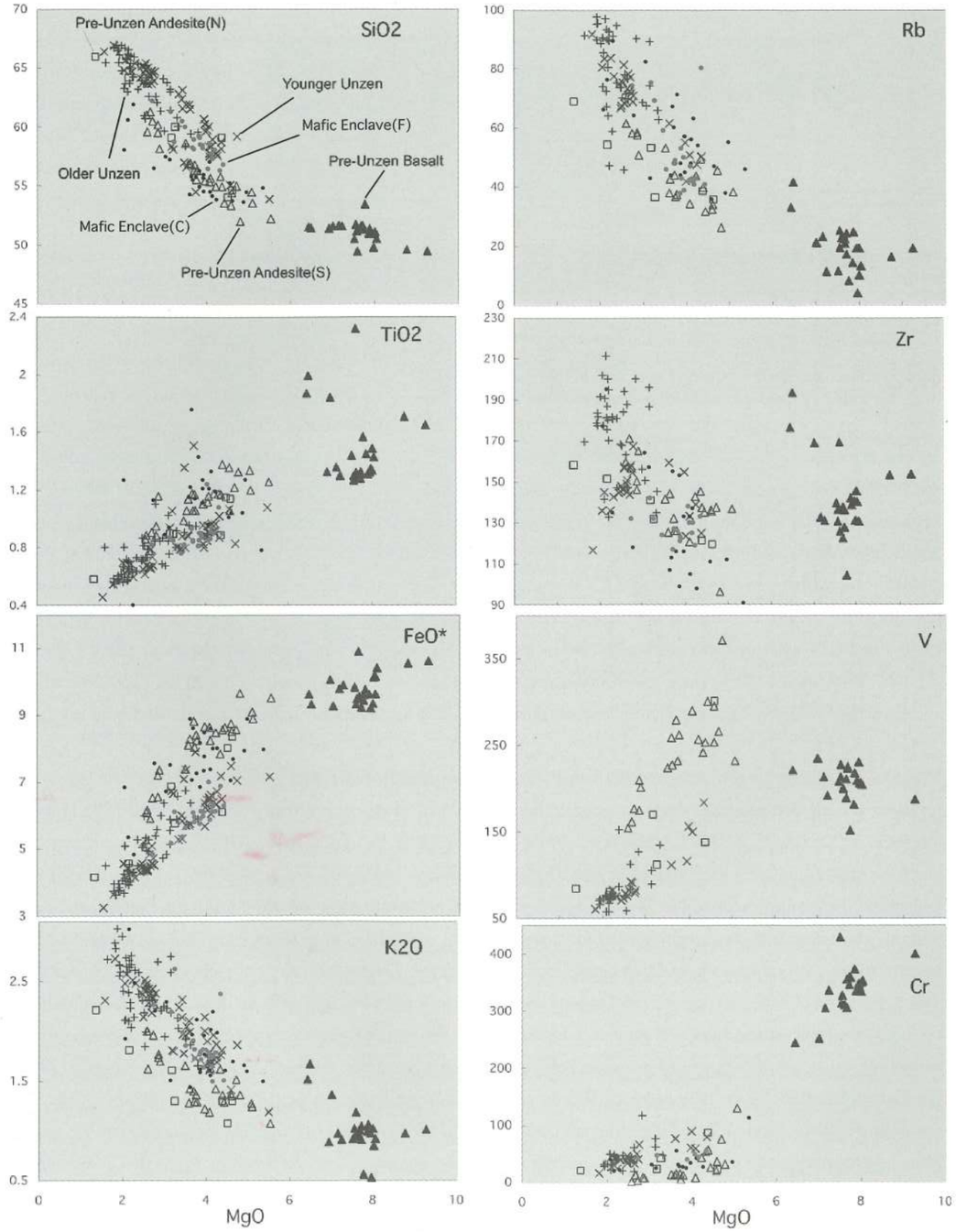

Fig. 5 Major and trace element variation diagrams for Unzen and Pre-Unzen volcanics. S: South of Unzen, N: North of Unzen, F: Fine, C: Coarse

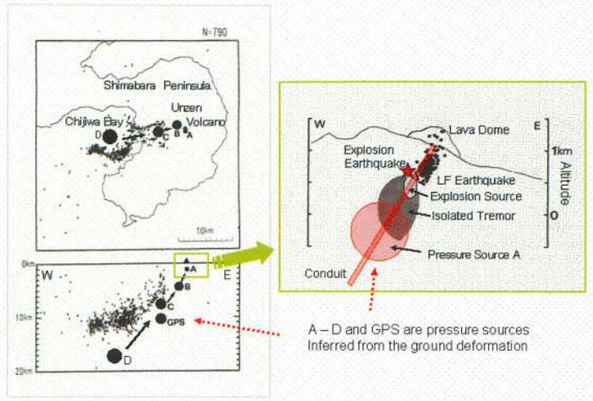

Fig. 6 Location of seismic events and pressure sources associated with the 1990-1995 eruption of Unzen Volcano (Shimizu et al.,2006)

Geophysics

Intensive geophysical observations were carried out cooperatively by the national universities and institutes in Japan during and after the 1990-1995 eruption of Unzen Volcano (Shimizu, 1992). These observations provided us information regarding magmatic activity and structure of the volcano.

Magma transport system inferred from seismic activity and ground deformation

Volcano-tectonic earthquakes were very active in the period beginning one year before the eruption and continuing up to the start of the lava dome extrusion. The hypocenters were mostly distributed within a 12 x 20 km area on the western side of the volcano, and shallow eastward toward the summit (Umakoshi et al., 1994; 2001)(Fig. 6, left). A remarkable feature of the hypocenter distribution is the possibility that it is delineating a ring-fault corresponding to the caldera wall in Tachibana Bay (Chijiwa Bay). Another notable feature is alignment of hypocenters in the Shimabara peninsula; the focal area is divided into northern and southern parts by a seismic-gap. Focal mechanism solutions of those earthquakes suggest a pressure source located beneath the seismic -gap. Deflation-inflation sources (sources A-D in Fig. 6) detected by leveling surveys and GPS measurements are situated below an inclined seismic -aseismic boundary (Ishihara, 1993; Kohno et al., 2007; Nishi et al., 1999). These results shows that a deep magma reservoir is located at 15-20 km depth beneath the Tachibana Bay (Chijiwa Bay), and that the magma ascends obliquely eastward with an inclination of 40-50 degrees.

Magmatic activity in and around the uppermost conduit inferred from geophysical observations

Various seismic-and geodetic-events occurred in the shallow part of volcanic edifice during the 1990-1995 eruption (Shimizu, 1992; Saito et al., 1993; Uhira et al., 1995; Yamasato, 1999; Umakoshi et al., 2002)(Fig. 6). The epicenters of low frequency earthquakes were located in and beneath the growing lava dome at a depth 0-0.5 km below the surface. Sources of the ground deformation associated with vulcanian explosions were located 0.6-0.9 km beneath the crater bottom. The diameter of the pressure sources for these explosions is estimated to be about 40 m. Isolated tremor occurred beneath the summit caldera, whose depth ranged from 0.5 to 2.0 km. The source regions of these events incline westward with a dip angle of about 60 degrees; this suggests that the magma ascended in an oblique conduit. On the other hand, the high frequency earthquakes and ground deformation just before the lava dome appearance can be interpreted by a combination of upward growth of a magma column and lateral intrusion of a dike (Yamashina and Shimizu, 1999). The horizontal extent of the dike exceeded 400 m, and the thickness finally reached about 13 m. The top of the dike was estimated to be about 130 m deep, although the bottom has not been fully constrained. The diameter of the magma column is obtained as 40 m, consistent with that of the explosion sources. Seismic tomography shows that a low velocity region exists at sea level beneath the summit caldera (Nishi, 2002). The region extends about 1 km in both horizontal and vertical directions, which corresponds both with the source region of isolated tremor and with a high conductivity zone (Kagiyama et al., 1999). This low-Vp region probably represents the extent of the hydrothermal system sustained around the conduit (Hashimoto, 1997).

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Introduction

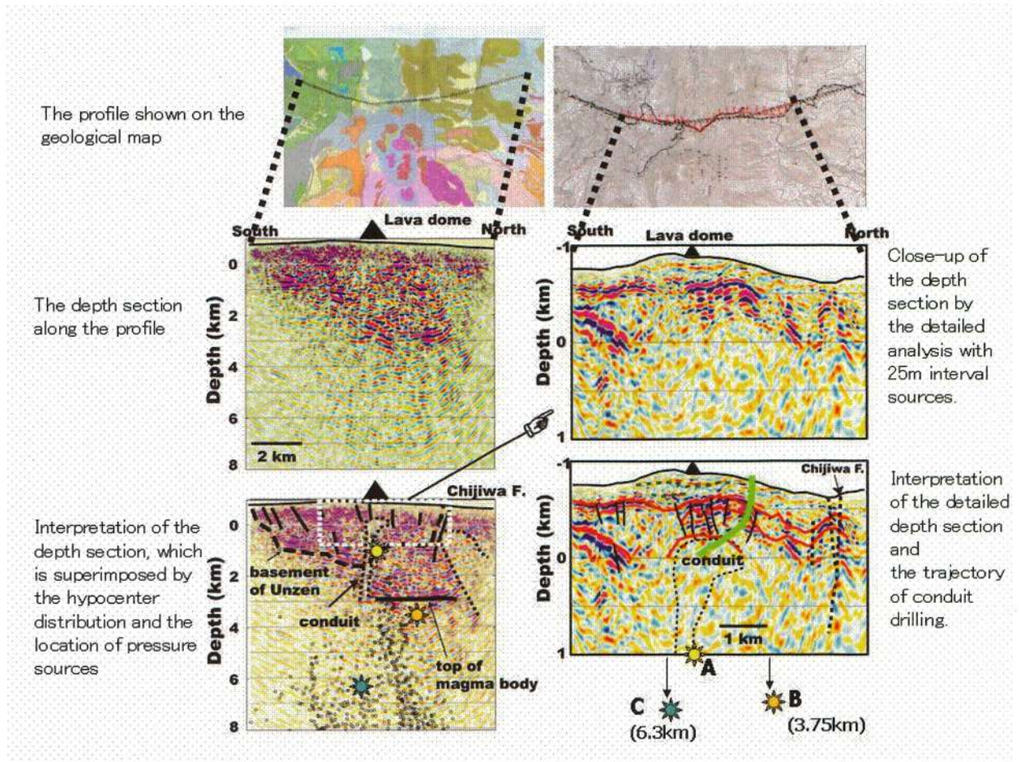


Fig. 7 N-S cross section of the subsurface structure of Unzen Volcano deduced from the seismic reflection experiment (Shimizu et al., 2005)

The seismic reflection experiment

In order to reveal the subsurface structure of Unzen Volcano and to detect the volcanic conduit, a seismic reflection experiment was conducted using vibratory energy sources (VIBROSEIS) in December 2001 as a program of the Unzen Scientific Drilling Project (Shimizu et al., 2002). About 580 receivers, each consisting of 9 geophones, were deployed at intervals of 25 m along a N-S survey line on the western flank of the volcano. The survey line crosses the Unzen Graben and the magma ascent path inferred from geophysical observations. In the experiment, three VIBROSEIS vehicles vibrated at about 280 source points on the survey line at intervals of 25-100 m. Because the source energy of the VIBROSEIS is not enough to penetrate the volcanic edifice, 3-100 sweeps of the vibration signals were stacked to improve the S/N ratio of the data.

The reflection analysis revealed the distribution of structural discontinuities in the N-S cross section of the volcano (Fig. 7). The depression structure of the Unzen Graben is clearly recognized in the cross section. The strong reflection at a depth of 3 km is consistent with the location of the pressure source B inferred from geodetic measurements, which probably corresponds to the upper boundary of a magma reservoir. On the other hand, the narrow area, in which the strength of reflection is extremely weak, extends almost vertically from sea level down to the pressure source B. Volcanic earthquakes occur along a narrow area. Thus the area is interpreted as the volcanic conduit or dike intrusion below the western flank of Unzen Volcano.

(Hiroshi Shimizu and Takeshi Matsushima)

Fig. 8 Southwesterly view of new lava dome, filling the Jigokuato Crater near the summit of Unzen Volcano. Taken by Setsuya Nakada on May 23, 1991

Overview of the 1990-95 (Heisei) eruption

The chronology of the latest eruption was summarized in Nakada and Fujii (1993) and Nakada et al. (1999).

After 198 years of dormancy, Unzen Volcano erupted on November 17, 1990. Small ash emission (phreatic eruption) started in both the Jigokuato and Kujukushima craters. Preceding this eruption, earthquake swarms occurred under the Tachibana Bay (Chijiwa Bay), western of the volcano, in November 1989, and the hypocenters had migrated toward the summit. Isolated tremor events were first observed in July 1990, and researchers of the Shimabara Earthquake and Volcano Observatory (SEVO, present Institute of Seismology and Volcanology of Kyushu University) and national universities strengthened monitoring the activity of this volcano. The number of isolated tremor events increased in late-January, 1991, and stronger ash explosions take place in the Byobuiwa Crater just west of the Jigokuato Crater in February 1991. After this, the eruptive activity increased with time. Juvenile particles that were recognized first in the ash of the February 1991 eruption increased in both abundance and size with time. Ash emission suddenly stopped on May 12, 1991 and intense swelling and strong demagnetization of the crater area began. Then, a lava spine like an onion head protruded within the Jigokuato Crater on May 20, 1991. The next day, the spine was broken into several blocks, and the Jigokuato Crater had been filled with lava blocks by May 22, such that older, reddish-surfaced lava blocks were pushed away by fresh, dark lava blocks extruded in the center of heap of lava blocks (lava dome) (Fig. 8). Collapse of the lava dome started on May 23, 1991 and the first pyroclastic flow was witnessed on the morning of May 24. As the Jigokuato Crater located at the eastern shoulder of Mt. Fugen (previous summit), the lava dome became unstable as it grew, and the crater rim too due to its load. Partial collapse of lava dome had been repeated during the growth of lava dome, and major pyroclastic flows were generated by collapses of large portions of the dome including the basement (crater walls).

Dome growth

The lava dome complex that was formed in the last eruption has the dimension of 1.2 km long (E-W), 0.8 km wide and 0.45-0.25 km thick, and the volume of about 100 million m^3 (about half of the total volume of 3 erupted lavas; 210 million m^3 as DRE) (Fig. 9). The eastern half of the dome complex hanging over the eastern slope of Mt. Fugen is the part mainly grown exogenously and the western part covered by lava blocks with a relatively flat top is the part grown endogenously.

The lava dome had grown almost continuously throughout the eruption but the growth can be separated into two periods

Fig. 9 Northeasterly view of the lava dome complex at Unzen. The eastern part hanging on the slope (left) grew exogenously, while the western part with ceat top (center) grew endogenously. Degassing occurred above the former Jigokuato Crater covered thickly with lava dome (endogenous part). A arc-like wall surrounding new and old lava dome complexes (right) is the Myoken Caldera. Taken by Setsuya Nakada on February 28, 1994

of 20 and 25 months with different supply rates, where the maximum effusion rate was about 400,000 m^3/day (5 m^3/s) in September 1991 (Fig. 10). The lava dome first grew unstably over the eastern edge of the Jigokuato Crater (Fig. 11), and partial collapse of lava dome occurred from its moving front. The dome increased its dimension with time. It grew mainly exogenously when the effusion rate was high, and endogenously when the effusion rate low. The exogenous part madwase up of 13 discrete lava lobes, was most of which had been active for several months. Typical dimensions of the individual lobes are 300-400 m long, 200-300 m wide and 50-100 m thick, except for lobe 11 with the argest dimension. The moving speed of lava was up to 50m/day near the vent, and decreased toward the lobe front, where the lava was cooled during flowage. After lobes reached over 350 to 400 m in length from the vent, new lobe started growing within the spaces near the vent, which were not occupied by previously lobes. The birth of new lobes was clearly detected by elevated activity of near-surface low-frequency earthquakes. During exogenous dome growth, deformation of the crater floor was minor, while it was substantial showing the dome complex in the early and later stages of the last eruption at Unzen (Nakada et al.,1999) during endogenous growth. By the beginning of the main endogenous growth event in late November 1993, the eastern half of the dome complex had been occupied by piles of lava lobes up to 200-300 m thick. The growth of the endogenous dome was proposed by Nakada et al. (1995) to be similar to that of pillow lava or pahoehoe lobes. Growth of lava dome was ended with intrusion of a spine into the center of endogenous part, just above the Jigokuato Crater) (Fig. 11). The spine started its grown in October 1994, being associated with relatively strong earthquakes swarmed within the dome above the Jigokuato Crater. The dimension of the spine is about 40 m wide by 100 m long.

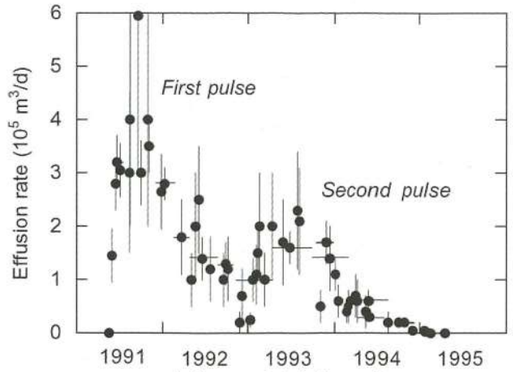


Fig. 10 Temporal change of daily lava effusion rate at Unzen during 1991-1995 (Nakada et al., 1999)

Fig. 11 Schematic plain views showing the dome complex in the early and later stages of the last eruption at Unzen (Nakada et al., 1999)

The exogenous dome part consists complexly of multiple massive lobes, which extended from the vent located in the upper part. The interior of the dome complex is exposed in the southern vertical cliff that was eroded deeply by successive collapses of lavas. The interior consists of alternation of strongly sheared parts and massive parts. The morphology observed on the surface of the present exogenous part was formed during the growth of Lobe 11 (March-October 1993). Lobe surfaces are generally waved and convex, reflecting deformation during the growth. The surface rock is glassy and the inner rock is generally vesiculated in higher extent. The endogenous dome part is covered mostly with polygonal boulders up to a few m

across. Boulders showing strong shear structure, like cataclasite, are scattered around the spine. Large continuous massive lava parts, except the spine, are observed sporadically on the endogenous dome top. They represent the crust parts of multiple endogenous domes activated in different periods (Nakada et al., 1995). The interior of the endogenous dome part is exposed in the upper southern and northern cliffs. Finely jointed, massive lava is covered by boulders layer of about 50 m thick. On the broken surface of the spine, inner massive lava is surrounded by brecciated margins.

After the end of dome growth (February 1995), the dome complex began shrinking slowly at a constant rate. The deformation has still continued as of 2007. Fumarolic activity started from the foot of the spine soon after its birth, and the temperature is as high as 220 °C of the middle 2007.

(Setsuya Nakada, Hiroshi Shimizu and Toshitsugu Fujii)

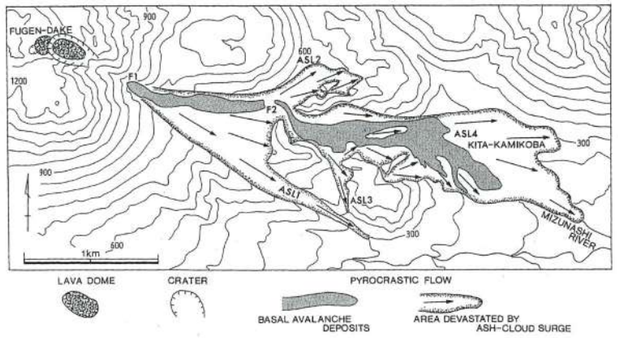


Fig. 12 Distribution of the June 3, 1991 Pyroclastic flow deposit (Yamamoto et al., 1993). Arrows are the flow direction of the ash-cloud surge as indicated by blown-down trees. F1 and F2 indicate steep slopes along the Mizunashi River. ASL: ash-cloud surge lobe

Pyroclastic flows and lahars

Pyroclastic flows

More than 9400 Merapi-type pyroclastic flows (block-and-ash flows) occurred from lava dome collapse at Unzen Volcano during the 1991-95 eruption. A new lava dome (Heisei Shinzan) formed at the Jigokuato Crater on May 20, 1991. The dome continued to grow on May 23 and juvenile blocks began falling from its margins down the steep eastern slopes. On May 24, a reddish-brown ash-laden plume was observed above the eastern flank of Fugendake as a portion of the lava dome collapsed, producing the first pyroclastic flow that traveled about 1 km down the flank. Growth and collapse of the new lava dome continued, generating pyroclastic flows from collapse events. Major pyroclastic flows, including those on June 3 and 8, September 15, 1991, and June 23 and 24, 1993, occurred during exogenous growth when the effusion rate was very high (Nakada and Fujii, 1993). Descending directions of pyroclastic flows were controlled by the growing direction of the lava dome.

A series of pyroclastic flows descended the Mizunashi River at 16:08 on June 3, 1991 (Fig. 12). The runout distance was about 3 km and the volume of this event was about 0.5 million m^3 in DRE (Nakada et al., 1999). An ash-cloud surge associated with the pyroclastic flow killed 43 people, including Maurice and Katia Krafft and Harry Glicken in Kita-Kamikoba area. Co-ignimbrite ash fall was distributed more than 100 km away from Shimabara (Watanabe et al., 1999). Totally 147 houses were burned or destroyed. Estimated speeds of the early stage pyroclastic flows were up to 150 km/h (Takarada et al., 1993b). An explosive pyroclastic flow event was coeval with a vulcanian explosion. On June 8, a landslide including the basement of the lava dome occurred that caused a sudden pressure reduction in the lava dome and conduit, resulting in explosive eruptions (Fig. 13). The pyroclastic flows descended 5.5 km and had a flow volume of 0.7 million m^3(Nakada et al., 1999). Totally 175 houses were burned or destroyed. On June 11, a similar explosive event occurred, but no large-scale pyroclastic flows were observed.

The largest pyroclastic flows occurred on September 15, 1991, caused by a large-scale collapse of the northern part of the dome complex. Multiple pyroclastic flows starting at 16:44 and successively at 17:59, 18:42, and 18:54 cascaded down

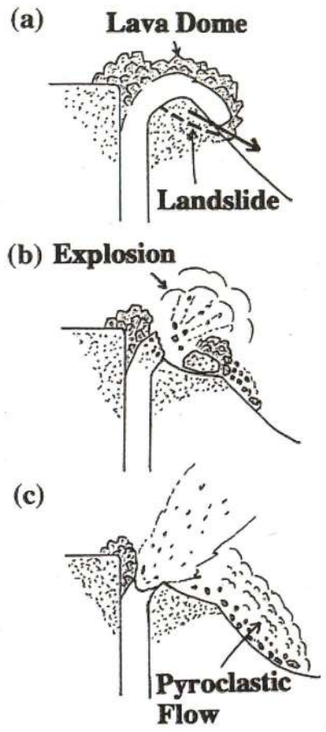


Fig. 13 Initiation mechanism of vulcanian explosion and pyroclastic flow on June 8, 1991 (Takarada et al., 1993a). (a) landslide triggered the collapse of lava dome, (b) vulcanian explosion due to sudden pressurereduction of the lava dome and the conduit, (c) pyroclastic flow generated by broken up materials of the lava dome and basement

the Oshigadani Valley (Fig. 14). Estimated speed of the first flow was 200 km/h (Miyahara et al., 1992). Their flows descended along the Oshigadani Valley and reached the Mizunashi River, following the topographic low. However, pyroclastic surges rushed straight from the exit of the Oshigadani Valley and damaged the Onokoba Elementary School. Totally 218 houses and buildings including the Onokoba Elementary School were burned or destroyed. The runout distance of the pyroclastic flows was about 5.5 km. The volume of the largest flow was ~ 1 million m^3, while the total volume of this event was about 2.4 million m^3 (Fujii and Nakada, 1999).

On June 23 and 24, 1993, a series of pyrolcastic flows descended the Nakao River. Pyrolcastic flows starting at 2:52 and successively at 11:14 on June 23, and 5:25 on June 24, 1993, cascaded down the gorge in the Nakao River. One person who entered in the evacuation area was killed by a pyroclastic surge associated by the second flow. Totally 211 houses were burned or destroyed. The runout distance was about 4 km and the volume of each flow was approximately 0.5 million m^3. The total volume of this event reached about 2.1 million m^3. In total, 800 houses were burned by pyrolcastic flows/surges during the 1991-95 Unzen eruption (Ohta, 1997).

Pyroclastic flow/surge deposits

The pyroclastic deposits comprise >10 flow units. Lobes (<10 m wide) and levees (<2.5 m wide) were sometimes developed on the occasionally display several 10-25 cm thick, reversely graded depositional subunits (DSU) (Fig. 4). Clasts (5-20 cm) are aligned at the top of each DSU. The layer 2a (<20 cm thick, <5 cm size clasts) unit usually occurs at the base of the flow unit. Massive to laminated ash-cloud surge beds (<20 cm thick) are observed infrequently between flow units. Ash-cloud surge beds lack the coarser and finer fractions that are often observed in pyroclastic flow deposits (Fig. 15). The large reversely graded, subangular to subrounded blocks and basal layer 2a suggest that interactions between blocks occurred during the depositional stage. Night video image taken by the Self Defense Force shows

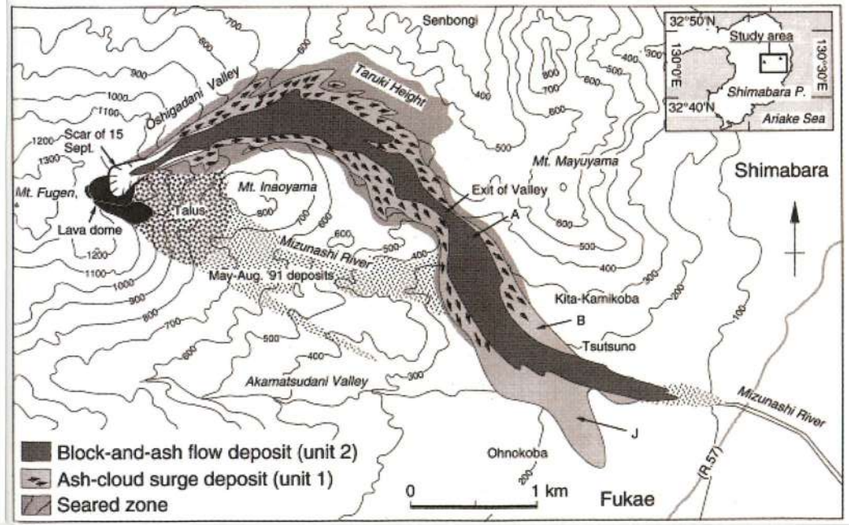


Fig. 14 Distribution of the Sep. 15, 1991 pyroclastic flow deposit (Fuji and Nakada, 1999) Arrows in ash-cloud surge deposit represent the current direction as indicated by toppled trees

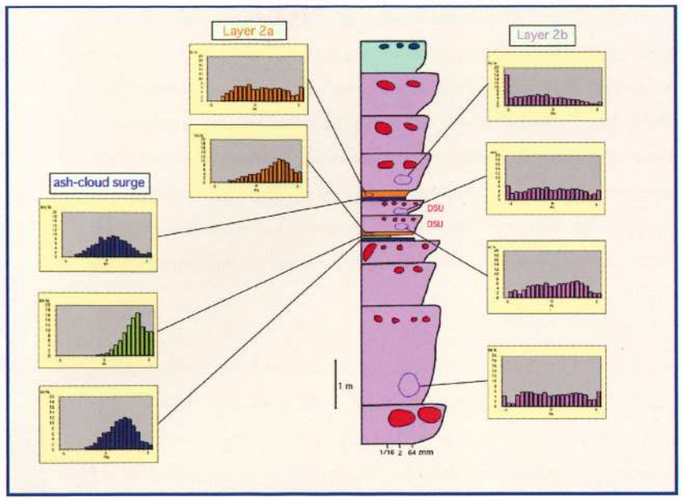


Fig. 15 Columnar section and grain-size distributions of block- and -ash flow and ash-cloud surge deposits in the Oshigadani Valley (Takarada and Melendez, 2006)

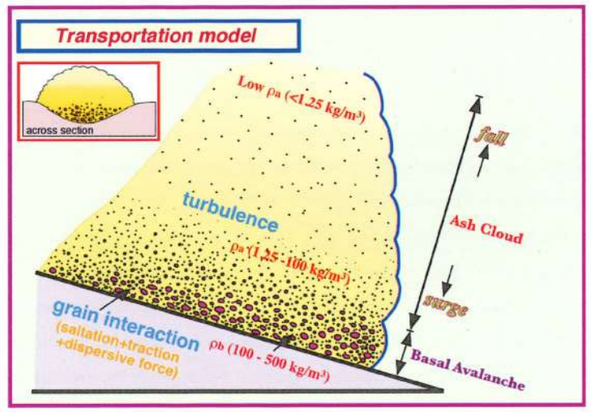


Fig. 16 Transport and depositional model of the 1991-95 Unzen pyroclastic flow (Takarada and Melendez, 2006)

large blocks rolling and saltating suggesting turbulent transport of pyroclastic flows (Fig. 16). Large blocks accumulate at the bottom of turbulent flow due to variations in slope angle and channel width. Slow -speed lobate high-density grain flows developed at the base of a relatively high-speed turbulent pyroclastic flow. The 5-25 cm thick DSUs in the flow units suggest that blocks and matrix forming basal lobate grain flows accumulated through successive aggradation. The basal grain flows ceased when the shear stress in the flow became lower than the yield strength of the matrix.

Lahars

The first lahar (debris flow) occurred on May 15, 1991 in the Mizunashi River (Hirano et al., 1992). Large lahar occurred in the Mizunashi and Yue Rivers on June 30, 1991. More than hundreds of houses were destroyed by the lahar. Lahars frequently flooded along the Mizunashi River on Aug. 1992. Lahars also occurred along the Nakao and Mizunashi Rivers between the end of Apr. and Aug. 1993. A bridge on the Mizunashi River was lost and the Route 57 was closed by the lahar on June 18, 1993. The Route 251 on the Nakao River was closed by the lahar on July 4,1993. A lahar occurred at the Mayuyama and the center of the Shimabara town was inundated on Aug. 20, 1993. Totally 1,692 houses were destroyed by the lahars during the 1991-95 eruption. The lahar deposits contains up to few m size (sometimes 10 m size), reversely graded, subrounded blocks and boulders. The deposits show partly stratified or laminated, usually fines-depleted, clast to matrix supported depositional features.

(Shinji Takarada, Daisuke Nagai and Takeshi Matsushima)

Disaster details and the damages

Casualties of the Heisei eruption

Most of the casualties in the Heisei eruption were caused by the pyroclastic flow on June 3, 1991. A pyroclastic surge claimed the lives of 43 people: fire brigade members, the press with taxi drivers, police officers, volcanologists, and local residents (Table 1). The others were one injured by the pyroclastic flow on May 26, 1991, one injured by the debris flow on June 30 in the same year, one killed by the pyroclastic flow on June 23,1993, and one injured by the debris flow in the same year (Table 2).

Casualties of the Heisei eruption

(1) dead: 44 people
(including missing 3 people)
(2) injured: 12 people

Table1. Casualties on June 3, 1991

Occupation	dead	injured	Occupation	dead	injured	total
Fire brigade	12		press pepole	16	2	dead 43
policeman	2		volcanologist	3		injured 9
taxi driver	4		local resident	6	7	

Nagasaki Prefecture (2000)

Table.2 Casualties of the Heisei eruption

date	disaster	dead	missing	injured	total
1991.5.26	Pyroclastic flow			1	1
6. 3	Pyroclastic flow	40	3	9	52
6.30	Debris flow			1	1
1993.6.23	Pyroclastic flow	1			1
8.20	Debris flow			1	1
Total		41	3	12	56

Shimabara City (2002)

Damaged houses total 2,511
Occupied: 1,399 Unoccupied: 1.112

(1) Damages by debris flow: 1,692 houses
(2) Damages by pyroclastic flow: 808 houses
(3) Damages by volcanic bomb and cinder : 11 houses

Table 3. Damaged houses of the Heisei eruption

date	disaster	houses	unoccupied	total	Disaster area
May 15, 1991	DF		1	1	Mizunashi River
June 3	PF	49	130	179	
June 8	PF	72	135	207	
June 11	VC	11		11	
June 30	DF	64	87	151	Mizunashi R.
June 30	DF	34	17	51	Yue R.
Sept. 15	PF	53	165	218	
Aug. 8, 1992	PF	5	12	17	
Aug. 8-15	DF	164	80	244	Mizunashi R.
Apr.28-May.2, 1993	DF	372	207	579	Mizunashi R., Nakao R.
June 12-16	DF	48	33	81	Mizunashi R., Nakao R.
June 18-19	DF	135	72	207	Mizunashi, Nakao, Mayuyama
June 22-23	DF	49	29	78	Mizunashi R., Nakao R.
June 23-24	PF	92	95	187	Nakao R.
July 4-5	DF	18	7	25	Mizunashi R., Nakao R.
July 16-18	DF	63	20	83	Mizunashi R., Nakao R.
Aug.19-20	DF	170	22	192	Mizunashi, Nakao, Mayuyama
Total		1,399	1,112	2,511	

PF: pyroclastic flow DF: Debris flow VC: volcanic bomb and cinder from vulcanian explosion

Shimabara City (2002)

Table 4. Total amount of damages of the Heisei eruption

subjects	Directed damage (thousands yens)	Indirected damage (thousands yens)	total (thousands yens)
Agriculture,Fisheries	18,026,150		18,026,150
Civil work	33,073,677		33,073,677
Animal husbandry	20,881,498		20,881,498
Commerce,Industry	16,810	153,726,960	153,743,770
Other	2,754,238	1,462,641	4,216,879
total	74,752,373	155,189,601	229,941,974

Shimabara City (2002)

Evacuations

The first evacuation advisory was issued to the residents on May 15, 1991. Eight facilities (five in Shimabara city, three in Fukae town) such as regional meeting places and school gymnasiums were utilized as the refuges from the debris flow. After the serious disaster on June 3, 1991, the evacuation warning area was designated for the disaster prevention against pyroclastic flows. As the evacuation warning area was expanded, the number of refuges increased up to eighteen (ten in Shimabara, eight in Fukae). The number of the users totaled 166,718 from May 29 to November 27, 1991.

In order to relieve physical and mental stresses of the evacuees and to respect their privacy, Nagasaki prefectural government provided inns and hotels for them. A total of 161,327 evacuees made use of these 53 facilities. Besides the hotels and inns, a passenger ship was used as a refuge because the capacity of the former facilities was not sufficient for the evacuees.

The evacuations seemed to be extended over a long time. Therefore, 1,455 temporary houses were built and the disaster victims started to move in on June 22, 1991. The temporary housing had been used for four and a half years till December 25, 1995, and at its peak (November 30, 1991) 5,669 people used 1,444 houses.

Forest damages

A total of 2,640ha forests were damaged by the Heisei eruption. Among them private forests extended 480ha: pyroclastic deposit 75ha, forests burned down 90ha, forests withers 85ha, leaf fall, burnt 222ha, and land collapse + debris flow deposit 8ha. The most serious devastation area was in and around Mizunashi River where pyroclastic flows repeatedly ran down. The forest damages spread out along Nakao River, Yue River, Fukae River, Arie River, and Chijiwa River.The leaf discoloration by volcanic gas was widespread along the rivers mentioned above and Kojiro River, and the cornic area from the Heisei-shinzan peak to halfway down.

The damage to the educational facilities

On June 11, 1991, cinders smashed the roofs and the windows at Orihashi branch school of Dai-yon (4th) Elementary School, the roofing slates of the practical training building at Shimabara Technical High School, and the window pane of the greenhouses at Shimabara Agricultural High School. Furthermore volcanic ash damaged farm products and livestock at the agricultural school. On September 15, 1991, Onokoba Elementary School was burnt down by the pyroclastic surge.

Because of the repeated debris flows and pyroclastic flows in May and June in1991, 'hazard zone' was established in Shimabara city and Fukae town. The schools in the zone were closed and the residents were ordered to evacuate. Many students were obliged to change their schools. School education was seriously affected by the eruption.

(Shinichi Sugimoto, Daisuke Nagai, Hiroshi Shimizu)

Fig. 17 Pyroclastic flows moving down the flank of the Mt.Fugen

Recovery and Risk Reduction

The start of the sabo works in Unzen area

A large amount of unstable sediment has thickly deposited on the flank of the Mt. Fugen during the eruption. Then the rain caused debris flows frequently, and finally the

debris flows have reached the seashore 7.5 km distance from the summit of the Mt. Fugen. This area including Shimabara City directly and indirectly has suffered serious damage by the debris flows.In view of such serious damage, the sabo works in Unzen area has been started as the national project by the Ministry of Construction (at that time), Japan in 1993.

Fig. 18 The view of serious damage by debris flows

The current condition of the sabo works in Unzen

The sabo works in Unzen by the MLIT (Ministry of Land, Infrastructure and Transport) has been carried out in three basins, or the Mizunashi River, the Nakao River and the Yue River. And more than 80% of the master plan for the sediment control has completed on Mar. 2007 that protects the traffic network, farmland and residential areas against the debris flows.

In the lower reaches of the Mizunashi River, 30 training dikes have constructed that are designed to prevent the overflows of the debris flows. The check dams and the ground-sills have been completed in the upper reaches, and several ground-sills are planned to be set.

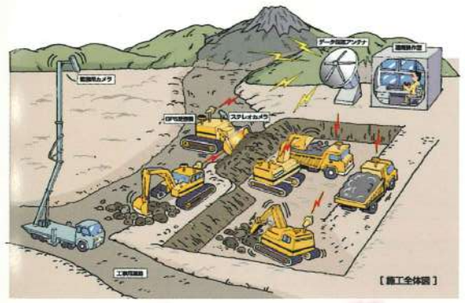
Fig. 19 The sediment control system against debris flows

Fig. 20 The devastated area and the sabo works at Mt. Unzen

Fig. 21 Lava dome and the current condition

The current condition of the lava dome

During this eruption a large lava dome has formed at top of the Mt. Fugen. The dome consists of dacite and its volume is estimated at about 100 million m^3. The volcanologists think that the lava dome can collapse due to the force of earthquakes.



The unmanned construction method

The unmanned construction method is the new technology that the construction machines are operated by radio control system for the safety of the construction workers in hazardous entry-restricted areas . This technology has been making progress day by day. For instance, it used to be difficult for the unmanned construction method to form a precise soil slope, but now it has become possible to do the precise work by the development of the unmanned construction system with the GPS sensors on the several parts of the heavy construction machines. Nowadays many kinds of construction works can be carried out by the unmanned construction method.

(Koji Hata)

Fig. 22 New technology for the sabo works. "the unmanned construction method"

Education and Outreach

Now that 16 years have passed since the latest volcanic disaster, Shimabara area has made its remarkable revival. At the same time, numerous relics of volcanic hazard have been preserved for lessons, and several facilities for preventing volcanic disaster have been established. As these relics and facilities are instructive resources, they are collectively considered as a field museum. It is named "Heisei Shinzan Field Museum", and often called "Heisei Shinzan Ganbaland" as a nickname.

Fig. 23 Field trip to learn about volcanic products on Taruki Height struck by eruption

Each facility arranges instructive events and workshop to foster consciousness of disaster prevention and to share the knowledge of coexistence with volcanism. For example, at Heisei Shinzan Nature Center, which is on Taruki Height struck by the eruption, provides field trip to observe the vegetation and to study volcanic products (Fig. 23). At Mt. Unzen Disaster Memorial Hall you can attend the 'kitchen volcanology' laboratory and the field excursion with volunteer storytellers who have experienced the disaster. In the laboratory participants can enjoy experimentation of volcanic and natural phenomena with familiar materials such as food (Fig. 24). During the field excursion participants learn about the disaster by listening to storytellers in the devastated area.

Fig. 24 Kitchen volcanology laboratory: Experiment of chocolate lava flow on a pudding volcano

Beside these facilities, school education contributes to introduce the volcanic disaster to younger generations. June 3, when the pyroclastic flow caused devastating disaster, is 'the praying day' for Shimabara people. For the day, students have activities to learn about the disaster. At Onokoba Elementary School, whose facilities were destroyed by the pyroclastic flow on November 15 in 1991, pupils give presentations at 'the Onokoba Memorial Day' Meeting in order not to forget the distress forever.

However, it will be possible that the more the years pass, the fewer children know about the volcanic disaster of Mt. Unzen. Therefore, it is responsible for the adults to keep on telling about the menace of the natural disaster and to pass the record of what they have learned to the future generations.

In this way, each organization and facilities is trying to offer awareness program for volcanic disaster prevention to pass on the lessons to more people longer and longer.

Every year the Institute of Seismology and Volcanology, Kyushu University promotes field trip to Heisei Shinzan peak to explain about the current condition of the volcano and to enhance risk awareness. People from the organizations for countermeasures against disasters, self-defense force, the press, etc. attend the project.

(Daisuke Yoshida, Daisuke Nagai, Hiroshi Shimizu)

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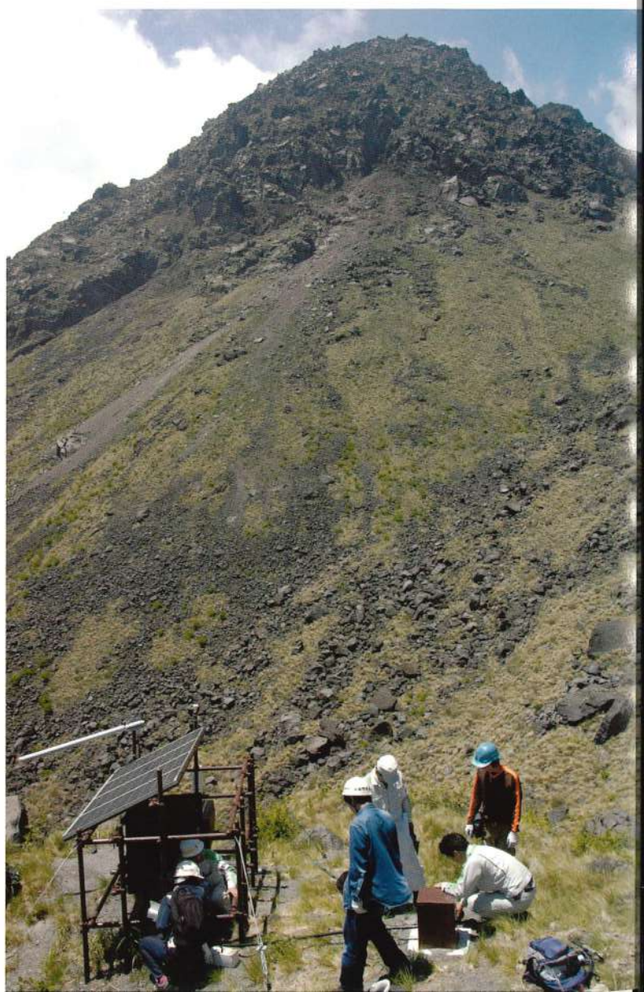


Field Excursion Stops

STOP 1. Nita Pass View point

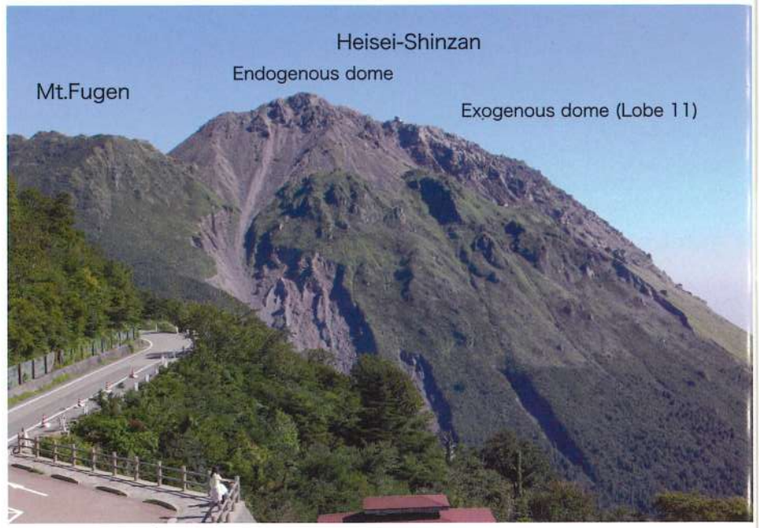


Fig. 25 Southern view of lava dome (Heisei-shinzan). The endogenous dome is on the left (1,480 m in altitude). The previous peak (Mt. Fugen 1,359 m) is also the spine of older lava dome

Unzen is one of the oldest national parks in Japan, settled in 1934. A one-way toll road leads to the summit parking. In the viewpoint, the Heisei-shinzan lava dome is in front (north) (Fig. 25). The western (left) part of the lava dome complex is the endogenous part formed during 1993-1995. The top of the endogenous dome is occupied by a spine that was extruded during late 1994 to early 1995. The eastern (right) part is the dome grown exogenously. The slope of the pyroclastic flow deposits is developed at a steep angle from the foot of the dome onto the coastal area which was also damaged by debris flows generated from the pyroclastic flows. Scarps of active faults can be observed to the south. Fan deposits of Younger Unzen volcano are cut by these active faults (Akamatsu-dani, Fukae and Futsu Faults). The opposite shore (beyond the Ariake Sea) was attacked by the tsunami caused by the collapse of Mayuyama in 1792. The mountains left of the Kumamoto city are relatively old volcano (Kimbo). When a visibility is good, volcanoes of Aso, Kuju and Kirishima can also be seen from here.

(Setsuya Nakada)

Fig. 26 Pyroclastic flow that was generated at 5:25 JST on June 24,1993 moving down the Senbongi district. Taken by Setsuya Nakada

STOP 2. Minami-Senbongi District: the town devastated by the June 1993 pyroclastic flows

The Senbongi area was attacked by pyroclastic flows and debris flows in 1993, when the growing direction of lava dome at the summit changed to the northeast (Nakada et al.,1999). Small collapses on May 21-26 generated minor pyroclastic flows, some of them reached within 200 m of Senbongi. The debris flows also occurred and damaged 63 houses in the middle part of Senbongi on May 2 and June 12-13, 1993. On June 23-24, 1993, three major pyroclastic flows cascaded down the cliff in the Nakao River, causing a wider spread of the pyroclastic surges downstream (Endo et al., 1996). The June 23 pyroclastic surges rushed straight on out of the valley and knocked down trees and destroyed houses. The June 24 pyroclastic flow was controlled by topography and extended farther downstream at speed about 70-140 km/h (Fig.26), (Ishikawa and Yamada, 1996). 187 houses were destroyed by the pyroclastic flows and surges (Fig.27). One person who entered in the evacuation area was killed by a pyroclastic surge on June 23. We can look over the Shinyake lava flow erupted in 1792 behind the devastated area in Senbongi. This point is also located near the drilling site for the Unzen Scientific Drilling Project (USDP-1).

The June 23-24 1993 pyroclastic flow/surge deposits

Unit #1, Pyroclastic surge deposit at 2:52 on June 23, 1993, consists of fresh fragments of lava and crystals in lapilli -coarse ash fraction. The layer is 2-20 cm thick, often normal graded and baseward lack of fine materials. The thickness shows local variations laterally. Small fragments of charred wood are sometimes seen. It is covered by a thin ash layer, which contain accretionary lapilli.

Fig. 27 Photographs showing the Senbongi districts, which was devastated by the June 1993 pyroclastic flows/surges rushed straight toward NE direction (left). Taken by the Ground Self-Defence Force on June 24,1993

Unit #2, Pyroclastic surge deposit at 11:14 on June 23, 1993, is similar with the unit 1. It is well-sorted coarse ash, 2-12 cm in thickness. It is covered by a 5 mm thick thin ash layer.

Unit #3, Block-and-ash flow deposits at 5:25 on June 24, 1993, are poorly sorted, consists of lava fragments in block-fine ash fraction. These deposits are about 2 m thick. Charred wood with a diameter of about 15 cm are frequently found in the deposits. The deposits become reddish upward for oxidation. The basal contact is partly unconformable. These deposits consist of two flow units. Each flow directions depend on how the channel gradient evolves. The lower unit has reached to the NE about 750 m from the cliff in the Nakao River. The upper unit has split into two or more directions, reached to the north about 1.5 km from the cliff. We can observe the terminus of the lower unit in the cross section (Fig. 28).

(Daisuke Nagai, Shinji Takarada)

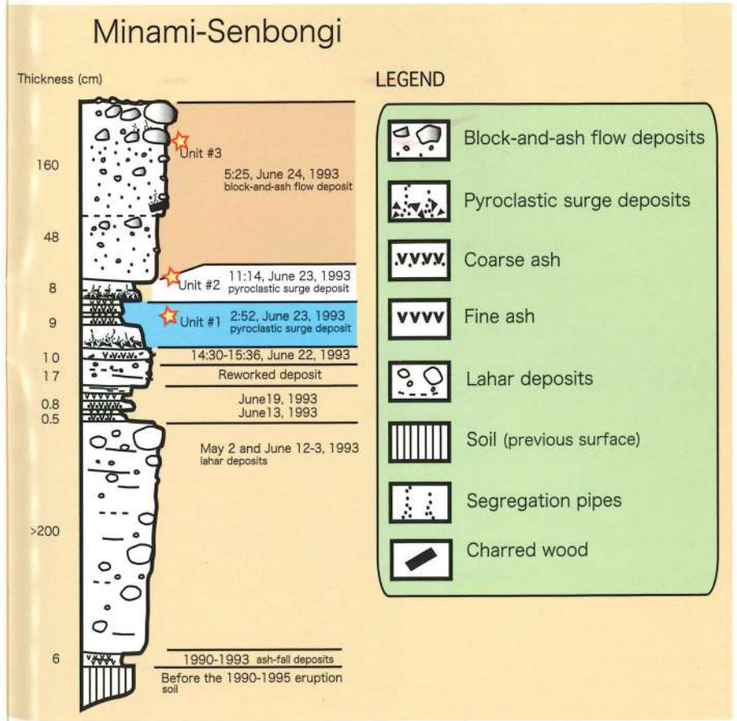


Fig. 28 Straitgraphic column of the 1990-1995 eruptive products at NE flank, Unzen Volcano

STOP 3. Taruki Height (Heisei Shinzan Nature Center)

The Taruki Height (550-570 m in elevation) is located at about 2.3 km ENE of the 1991-1995 lava dome (Heisei-shinzan) of Unzen Volcano (Fig. 1). Since the height was a topographic barrier,

main body of pyroclastic flows could not traverse the height until 1992. Thereafter, pyroclastic flows started cascading down northeast into the Nakao River in May 1993 after debris completely filled the upper reach of the Oshigadani Valley. Between 23 and 24 June 1993, three large pyroclastic flows and associated ash-cloud surges, which passed through the Taruki Height and reached a point 4.5 km northeast from the lava dome, killed one person and destroyed many buildings in the Senbongi area (Endo et al., 1996). The total thickness of the 1990-1995 eruption deposits, which are composed mainly of ash-fall and ash-cloud surge deposits, at the Taruki Height ranges from 1 to 2 m. Strong currents that accompanied ash-cloud surges blew down most trees parallel to flow direction at the height (Fig. 2). Zones of trees seared by hot ash clouds were identified at the eastern part of the height. Thus, forests located in the Taruki Height were severely damaged by pyroclastic flows and accompanied ash clouds during the 1990-1995 eruption. However, natural vegetation recovery in the area has been observed since the beginning of 1996 (Miyabuchi et al., 1999).

Fig. 29 Aerial photograph of the 1991-1995 lava dome and the Taruki Height. The photo was taken on 10 November 2002

Fig. 30 Trees blown down by ash-cloud surges in the Taruki Height. The photo was taken in January 1996

The Taruki Height area has been designated as a volcanic monument in order to understand natural recovery processes after volcanic eruptions. The Heisei Shinzan Nature Center was constructed by Ministry of the Environment in February 2003. The Nature Center introduces Unzen Volcano and its environment using video and many interpretative displays. A long-term monitoring site for recovery process of ecosystem and soil formation process was installed by Kyushu Research Center of Forestry and Forest Products Research Institute and Nagasaki Prefectural Government in 2000 (Sakai et al., 2006).

(Yasuo Miyabuchi)

STOP 4. Onokoba Sabo Mirai Museum

Onokoba Sabo Mirai Museum has been established to show the visitors the actual condition of the devastation caused by the 1990-1995 eruption. Here you can look at some exhibitions as follows…

The ruin of the Onokoba Elementary School

The building of the Onokoba Elementary School that was burnt by the pyroclastic flow on September 15, 1991. The school building was burnt into flame in a moment and the horizontal bars in the school ground were badly twisted by the heat of the pyroclastic flow.

Fig. 31 The Onokoba Elementary School before the disaster. Pyroclastic flows on June 3, 1991 passing behind in the Mizunashi River and the ash plume spread over the school

Fig. 32 Close-up view of The Onokoba Elementary School attacked by pyroclastic flow on September 15,1991. A ash-cloud surge detached from the main flow and devastated Onokoba area and building.

Observatory and exhibition of the disaster

Visitors can see the photographs of pyroclastic flows, debris flows and current condition of the 1991-1995 lava dome at the top of the Mt. Fugen in Onokoba Sabo Mirai Museum. On the third floor, there is the observatory where you can observe the Mt. Fugen and the pyroclastic flow deposits.

The pyroclastic flow on September 15, 1991

The Onokoba Elementary School was burnt by the pyroclastic flow on September 15, 1991. This pyroclastic flow travelled down along the "Oshigadani Valley" into the main river course of "MIzunashi River". Although the main body of the pyroclastic flow down along the river course, the surge (accompanied the pyroclastic flow) has run down straight toward the right side of the Mizunashi River where the Onokoba hamlet was located(Fig. 33). Onokoba Elementary School has been burnt by the pyroclastic surge, but there was no fatality because all the teachers, pupils and residents had evacuated from the Onokoba area.

Fig. 33 Aerial view of the devastated area on September 15,1991

The maidenhair tree burnt by the pyroclastic flow

The maidenhair tree which planted in the playground of the Onokoba primary school was burnt by the pyroclastic flow, too. But this maidenhair tree put forth new green leaves in the following spring showing its power of life. So the vitality of this tree has encouraged many people in this area who were badly depressed by the damage of the prolonged disaster.

Though all of the building of the Onokoba Elementary School was burnt, the new school was constructed in the place nearby. And now, we can hear cheerful pupils voices from the new Onokoba Elementary School.

(Koji Hata)

Fig. 34 A symbol tree (Maidenhair tree) showing the recovery from the disaster

STOP 5. Memorial Park of Houses Destroyed by Debris Flows

11 houses have been left and displayed in the park in the same condition as they were after the debris flows rushed down the Mizunasi River and hit them in August, 1992.

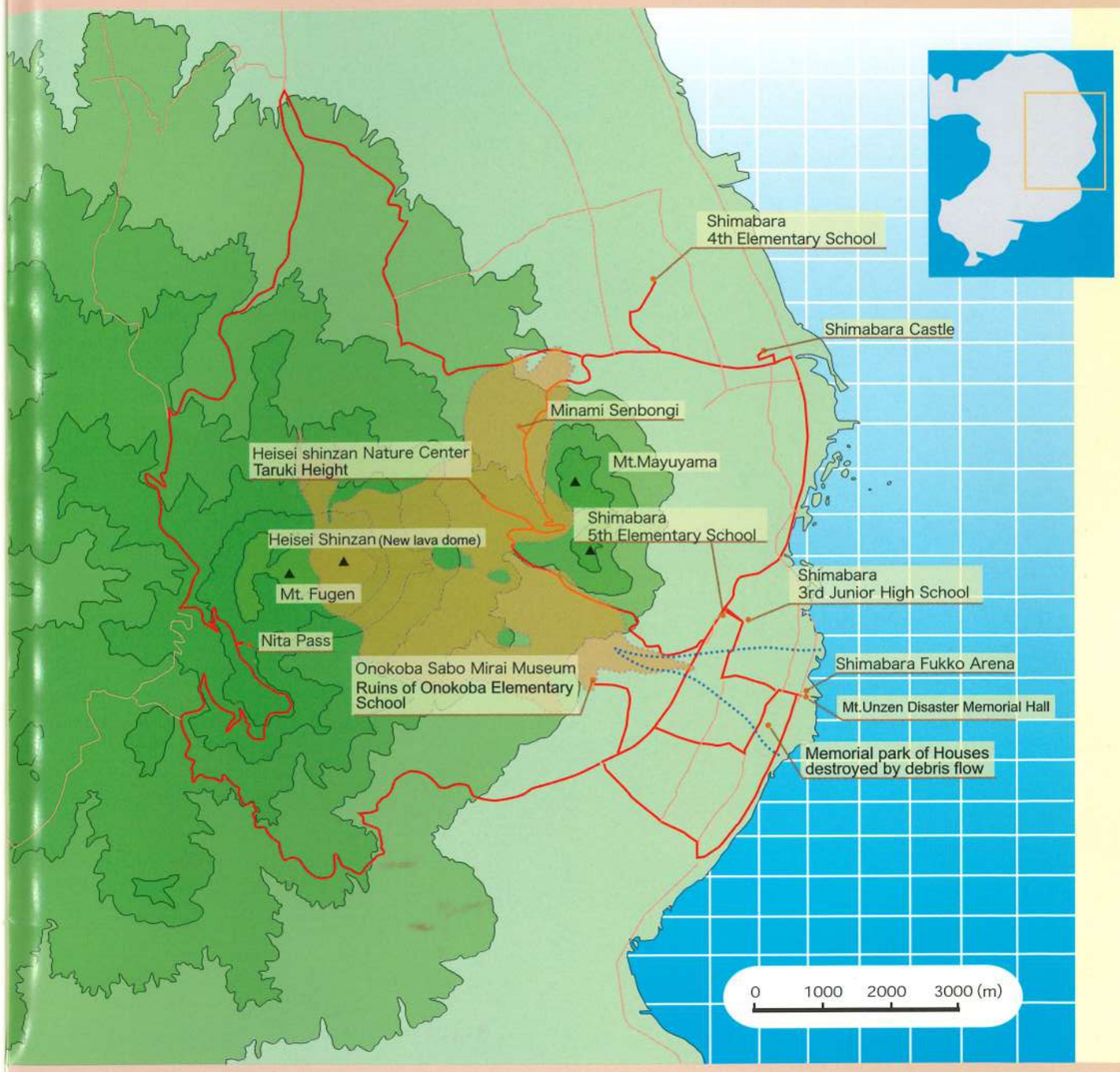
These houses are buried in deposit of an average 2.8 meters thick. Three houses in relatively good condition among 11 were coated and placed to be preserved semi-permanently in the exhibition area (Fig. 35).

Fig. 35 A house buried by the debris flow

The debris flow caused by heavy rains is the phenomenon of water, pyroclastic materials and volcanic ash, flowing quickly down the mountain with great force. Sometimes they travel at speeds of more than 50 km/h, carrying rocks and trees into the flow. The flow is so strong that it can move easily house-size rocks, destroy concrete bridges, overflow banks and rip houses from their foundations. Unfortunately the volcanic ash of Mt. Fugen is powdery and resists percolation with water, so even a small rain caused a debris flow. One debris-flow event swallowed hundreds of houses at a time. Houses of 1,692 in total were damaged by the debris flows during the 1990-1995 eruption.

(Eiji Matsushita)

B1 The Stops of Intra-meeting Field Excursion



GROUP A

1. Nita Pass
2. Minami Senbongi (new outcrop of lahar and pyroclastic flow deposits)
3. Heisei shinzan Nature Center (revegetation after destruction)
4. Memorial park of Houses destroyed by debris flow
5. Onokoba Sabo Mirai Museum and Ruins of Onokoba Elementary School, burned by pyroclastic surge on Sept. 15, 1991
6. Shimabara 5th Elementary school
7. Shimabara Castle

GROUP B

1. Memorial park of Houses destroyed by debris flow
2. Onokoba Sabo Mirai Museum and ruins of Onokoba Elementary School, burned by pyroclastic surge on Sept. 15, 1991
3. Nita Pass
4. Minami Senbongi (new outcrop of lahar and pyroclastic flow deposits)
5. Shimabara 4th Elementary school
6. Shimabara Castle

GROUP C

1. Minami Senbongi (new outcrop of lahar and pyroclastic flow deposits)
2. Nita Pass
3. Onokoba Sabo Mirai Museum and ruins of Onokoba Elementary School, burned by pyroclastic surge on Sept. 15, 1991
4. Memorial park of Houses destroyed by debris flow
5. Shimabara 3rd Junior High School
6. Shimabara Castle

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— Technological Development at Mizunashi Sediment Control Dam No.1—

1. Frequent Attacks of Pyroclastic flows and Debris flows on Housing Areas

The volcanic eruption of Mt. Unzen-Fugen caused serious damage to people and structures. A total of 44 persons were killed by pyroclastic flows and a large number of houses and lifelines such as a railway and roads were seriously damaged by pyroclastic flows and debris flows. Overall, there were 2,511 houses damaged, and almost 70%,i.e. 1,692 houses were damaged by debris flows.

Debris flows were particularly frequent during the rainy season of 1993 because of heavier rain than usual. These debris flows not only filled up the entire channel of the Mizunashi River but also flooded out of it and reached up to the sea. Sediment accumulated as much as 4-5m at some locations and gave devastating damage to the Annaka area **(Photos 1, 2 Damage due to debris flows)**

Photos 1, 2　Damage due to debris flows

Stunned by the overwhelming damage, local people who had been opposed to the sabo works master plan proposed by the Ministry of Construction (presently, the Ministry of Land, Infrastructure and Transport) began to strongly desire the construction of training dikes and the Mizunashi River Sediment Control Dam No.1 to prevent further damage. Of the proposed structures, training dikes were able to constructed by workers just like the construction of ordinary structures. But, it was impossible to construct the Mizunashi River Sediment Control Dam No.1, a core facility for disaster prevention, in the same manner as ordinary structures, because its construction site was located in the hazard area where entry was prohibited. Pyroclastic flow (Photo 3 Pyroclastic flow) might reach to the site in case of an eruption, and therefore construction by usual manner was impossible **(Fig.1 Mizunashi River Sediment Control Dam No. 1 and the hazard area)**.

As emergency measures, Nagasaki Prefectural government attempted manned construction of embankments and sheet piles conducted by the Self-Defense Forces to prevent expansion of damage. But, their effects were limited, and construction of a large-scale sediment control dam within the dangerous hazard area became the highest priority.

Photo 3　Pyroclastic flow

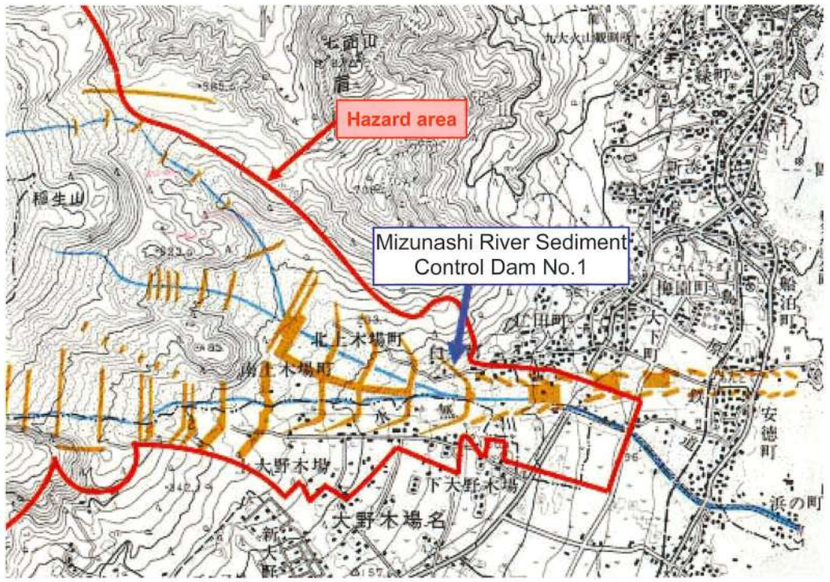


Fig. 1　Mizunashi River Sediment Control Dam No.1 and the hazard area

2. Removal of Sediment by Unmanned Construction Technique

— History of World First Technological Development —

To prevent and mitigate further damage, it was necessary to dig and carry away the deposited sediment as quickly as possible every time a debris flow occurs. But, these works should be carried within the hazard area under the threat of pyroclastic flow.

In 1993, the Ministry of Construction decided to solicit from the private sector a construction technique that can dig and carry away safely the deposited sediment from the hazard area at risk of a pyroclastic flow. The technical requirements imposed were all related to the operability of a given technique under the pyroclastic flow conditions **(Table 1)**.

	Technical Aspect	Technical Criteria
1	Digging and carrying-away of unstable gravel and sediment with occasional crushing.	Able to crush gravel 2-3 m in diameter.
2	Usable in the ambient temperature and humidity at the site.	Operable even in the conditions of 100℃ and 100% humidity temporarily.
3	Construction machines must be remote-controllable.	Remote control from 100 meters away must be possible.

Table 1 Technical requirements of the public offering

The Ministry of Construction evaluated the technical feasibility of submitted techniques and selected one technique presumed to have high applicability. The selected technique was the unmanned construction technique that can complete all the sediment removal work by remote control, from collection of sediment by bulldozer, digging and loading by backhoe, to carrying-away by dump truck.

To verify its applicability to the actual site, the Ministry of Construction conducted a field test of the selected construction technique in 1994. As a result, its applicability was verified and began to be adopted for full-scale world first sediment removal work, such as removal of sediment from a sand pocket, in the middle of the hazard area at risk of a pyroclastic flow **(Photo 4 Removal of sediment by unmanned construction technique)**.

Photo 4 Removal of sediment by unmanned construction technique

3. Further Improvement of Unmanned Construction Technique - Application to the Mizunashi River Sediment Control Dam No. 1

The sediment removal work showed a certain effect as the emergency measures for preventing and mitigating damage from debris flows. However, a strong desire for the early construction of the Mizunashi River Sediment Control Dam No. 1 as the fundamental measures against debris flows still remained. The planned construction site of this dam was located within the hazard area at risk of a pyroclastic flow and hence its construction by workers was virtually extremely difficult. A working committee consisting of experts and academics even discussed an idea of manned construction while securing an evacuation route by installing airport-type hot air shield fences or old bulldozers and tractors on the mountain side, or extending corrugated pipes from a safe place. Serious discussions continued on other ideas, such as carrying prefabricated reinforcements and tetrapods to the construction site by helicopter and dropping dry consistency ready-mixed concrete over them.

After comparing various ideas, it was decided to introduce the unmanned construction technique originally developed for sediment removal work to the construction site of the Mizunashi River Sediment Control Dam No. 1, and detailed studies for this mission began.

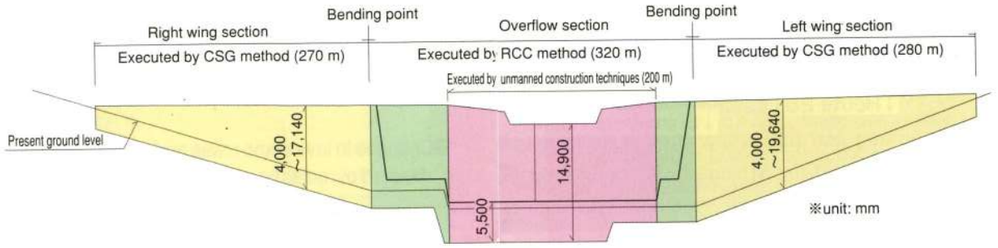
<<Selection of Construction Method>>

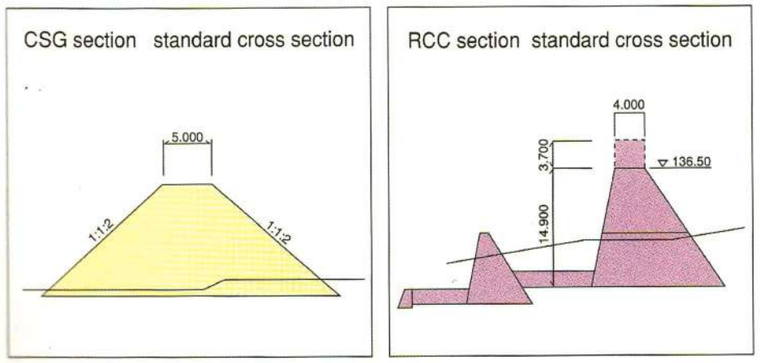
The following four conditions were established as the basic conditions for selecting a construction method for the Mizunashi River Sediment Control Dam No.1.

[1] Use of an unmanned construction technique to secure safety of workers.
[2] The structure must be safe against debris flows.
[3] The construction period must be short and show an effect as early as possible.
[4] Enormous volcanic deposits existing around the site must be utilized effectively.

Based on the overall deliberations of these conditions, it was determined to adopt the RCC (Roller Compacted Concrete) method using purchased aggregates for the dam body section, and the CSG (Cemented Sand and Gravel) method using on-site sediment for the wing sections which are not directly hit by a debris flow **(Fig. 2 Front view and side view)**. The RCC method is to transport extremely stiff consistency concrete containing a small amount of cement by dump truck, to spread and level it by bulldozer, and to compact it to a thickness of 50 cm per layer with vibration roller **(Photo 5 RCC method by unmanned construction)**.

Photo 5 RCC method by unmanned construction





Specifications

Dam height	Dam length		Dam volume	
14.9m	870m	Overflow section (RCC)320m Right bank wing section (CSG)270m Left bank wing section (CSG)280m	233,500㎥	Overflow section (RCC) 70,500cubic meters Right bank wing section (CSG) 51,000cubic meters Left bank wing section (CSG) 114,000cubic meters

specified concrete mixture for RCC method

maximum size of coarse aggregate Gmax (mm)	half cycle of VC value (sec)	range of air content (%)	water/cement ratio W/C (%)	percentage of fine aggregate S/a (%)	units (kg/cubic meter)						
					water W	cement C	fine aggregate S	coarse aggregate 80~40	coarse aggregate 40~20	coarse aggregate 20~5	admixture
80	20±10	1.5±1	72.5	33	87	120	736	543	621	388	0.30

specified mixture for CSG method

maximum size of coarse aggregate Gmax (mm)	units (kg/cubic meter)			water content after addition of cement (%)
	cement C	water W	aggregate	
150	80	194	1,770	10±2

Fig. 2 Front view, side view and specifications

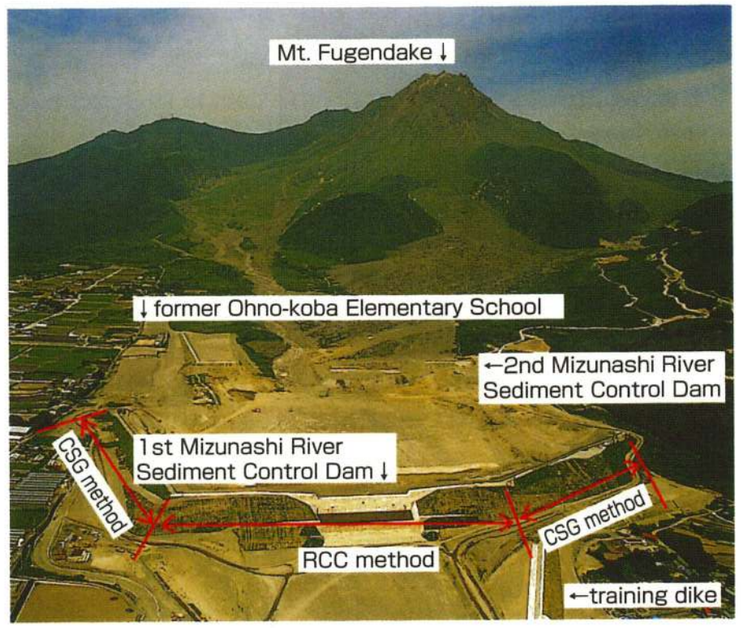


Photo 6 Bird's eye view of No.1 Sediment Control Dam (Photographed on May 1,998)

The CSG method is to carry the mixture of cement and on-site sediment (debris flow deposit) by truck up to the construction site, spread it by bulldozer, and compact it by vibration roller, so as to construct a banked-up multilayer structure. Therefore, the RCC and CSG methods are similar in their construction methods but differ in the construction materials used. The former uses the purchased aggregate and the latter uses debris flow deposits obtained at the site. But, both of them could successfully secure the strength more than expected.

4. Necessity is the Mother of Invention! A bizarre idea came out.

— Development of Sediment Forms—

The construction method of conventional forms for concrete dams is complicated and hence they were not suitable for the unmanned construction technique. In addition, the materials for the RCC and CSG methods were rather like sediment and they were to be spread by bulldozer and compacted by vibration roller. Therefore, if forms like those of ordinary concrete were used, construction work at the positions close to the forms would become difficult.

Therefore, by reversing an approach, we came up with an idea to use banked-up sediment as the forms for the RCC method, which was named the sediment forms (Fig. 3 Sediment forms). With the introduction of these forms, it became possible to construct the peripheral areas of the dam by the unmanned construction technique. They were also effective for the prevention of fall of bulldozers and vibration rollers at those areas.

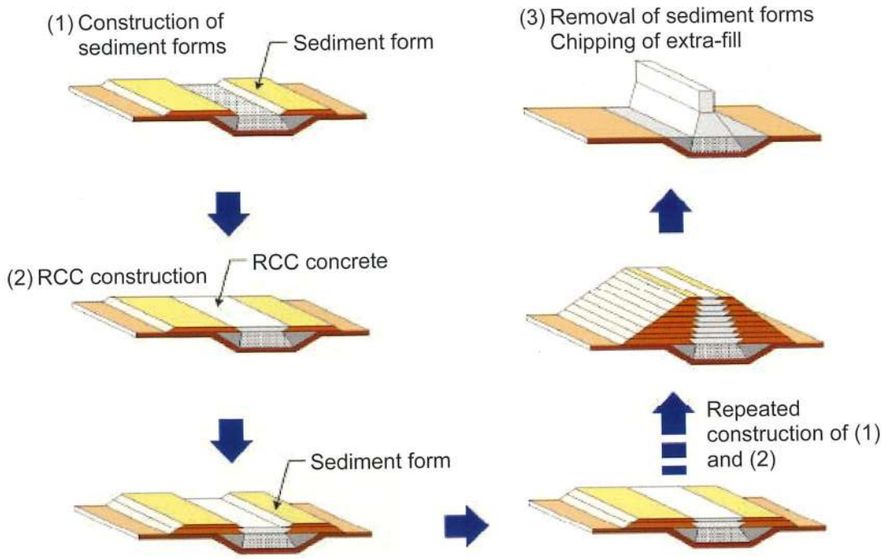


Fig. 3 Sediment forms

Sediment forms were banked up concurrently with the construction of RCC concrete.

This construction method made it possible to construct RCC concrete using the unmanned construction technique originally developed for sediment removal work, which consists of delivery of sediment by dump truck and its spread by bulldozer.

With the development of these innovative forms, construction of a sediment control dam became possible even in the middle of the hazard area at risk of a pyroclastic flow. It gave an impetus to the construction of sediment control facilities which had been much desired by the community.

Sediment forms placed at the flowing section needs to be removed after completion of the dam. But, the forms placed at the both end sections are to be used as landscaping. Sediment forms were not used for the construction of the wing sections by the CSG method. Instead, a large amount of excavated sediment was utilized to create a large cross-section with a reduced gradient on both upstream and downstream sides.

5. GPS as the Main Player

— Construction Procedure of RCC Concrete by Unmanned Technique Using Sediment Forms —

Using the innovative sediment forms, RCC concrete was constructed in the following order. Remote-control cameras were placed for traffic of construction vehicles. GPS, which is familiar to us used in car navigation systems, were utilized for spreading materials at the dam body. This made it possible to compact the concrete with an accuracy of "cm" order.

1) Delivery and unloading of RCC concrete

Photo 7 Delivery and unloading

2) Spreading（spread to 50 cm thickness per layer by bulldozer）

Photo 8 Spreading

3) Compaction （A 50 cm layer is compacted by vibration roller）

Photo 9　Compaction

4) Construction of sediment forms （use of excavated sediment as forms）

Photo 10　Delivery of sediment and spreading　（1 layer: 50 cm）

Photo 11　Shaping of sediment for use as forms

5) Construction Control Utilizing IT Technology

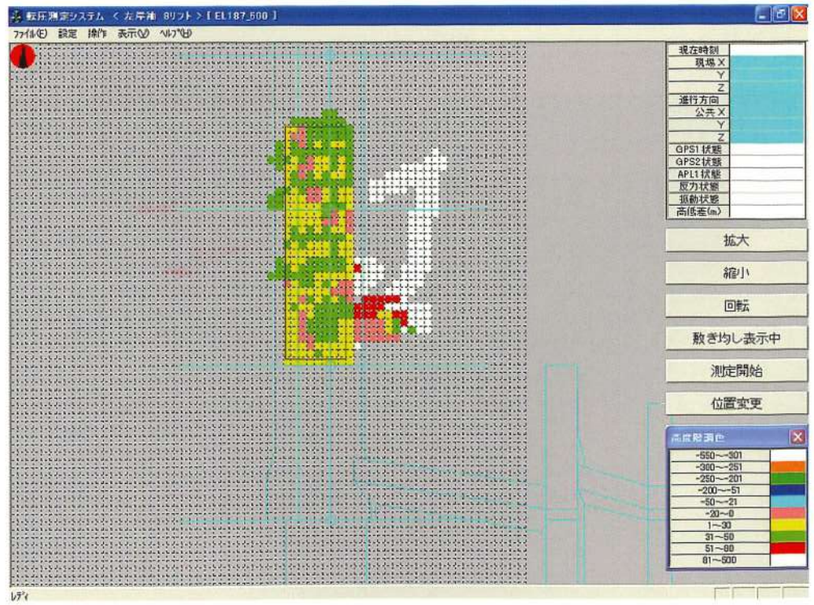


Photo 12　Control of spreading thickness using GPS (1 layer: 50 cm)

Utilizing GPS data, the spreading thickness was controlled by displaying thick and thin areas in different colors on the monitor screen.

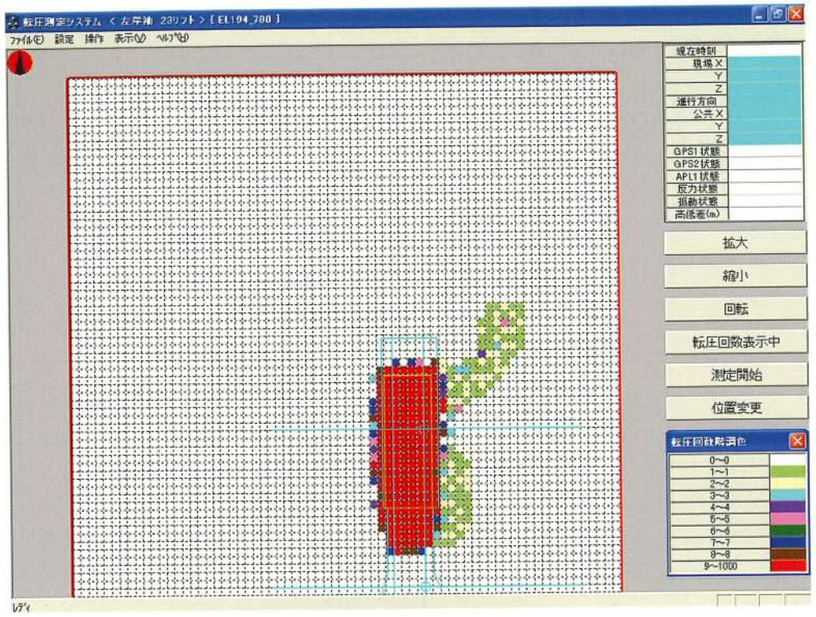


Photo 13　Control of rolling times using GPS

Utilizing GPS data, completion of the required rolling times was indicated by red color.

6) Completion

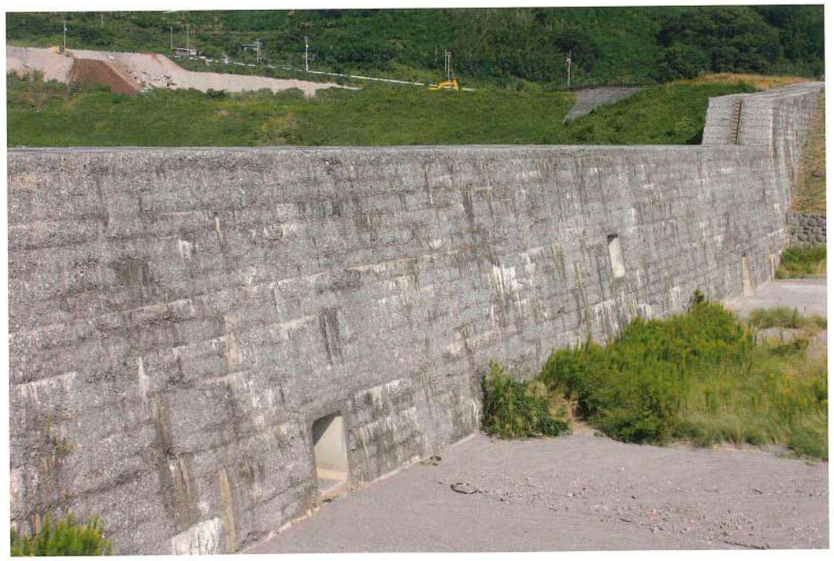


Photo 14　Completion (present situation, taken Oct. 2007)

The Mizinashi River Sediment Control Dam No. 1 was started its construction in

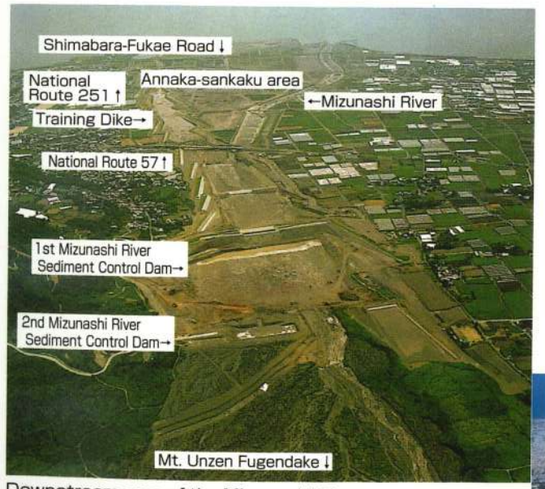
September 1995 and completed in February 1998. With the completion of this dam, the safety in the downstream area of the Mizunashi River increased significantly. This dam is located at the most downstream side among the several sediment control dams planned for the upstream area of the Mizunashi River. This dam, 870 m long and 14.5 m high with a sand storage capacity of 1 million m^3, is one of the largest among the sediment control dams in Japan.

6. Sediment Control Works in the 'Remote Control' Age

—Technological Progress of Unmanned (Remote Control) Construction Technique—

The unmanned construction technique developed at the disaster site in Unzen has since been applied to other volcanic disaster sites, such as the sites of Mt. Usu eruption and Miyake Island eruption in 2000. In recent years, its use has been extended to not only the volcanic disaster sites but also other dangerous work sites where manned work should be avoided for safety.

Even at Unzen, this construction technique has since been significantly improved, as seen in the application to complex construction processes, such as conveyance and installation of steel structures by remote control. It is hoped that the unmanned construction technique will be further improved and utilized for the mitigation of sediment-related disasters in Japan and overseas.



Downstream area of the Mizunashi River
(photographed on May 27, 1998)

Taken 5th, Jul. 2006

Editor and Production

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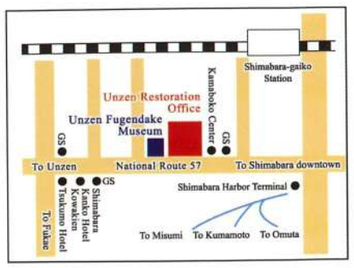


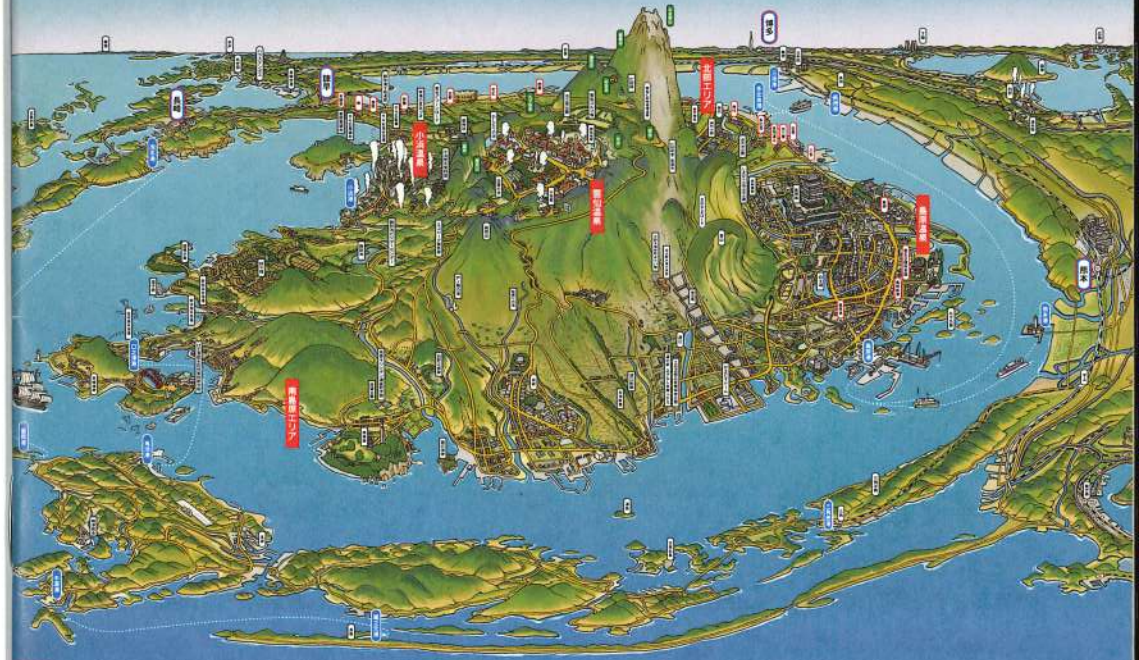
Nagasaki Prefecture

Shimabara Peninsula

A Perfect Place to Visit

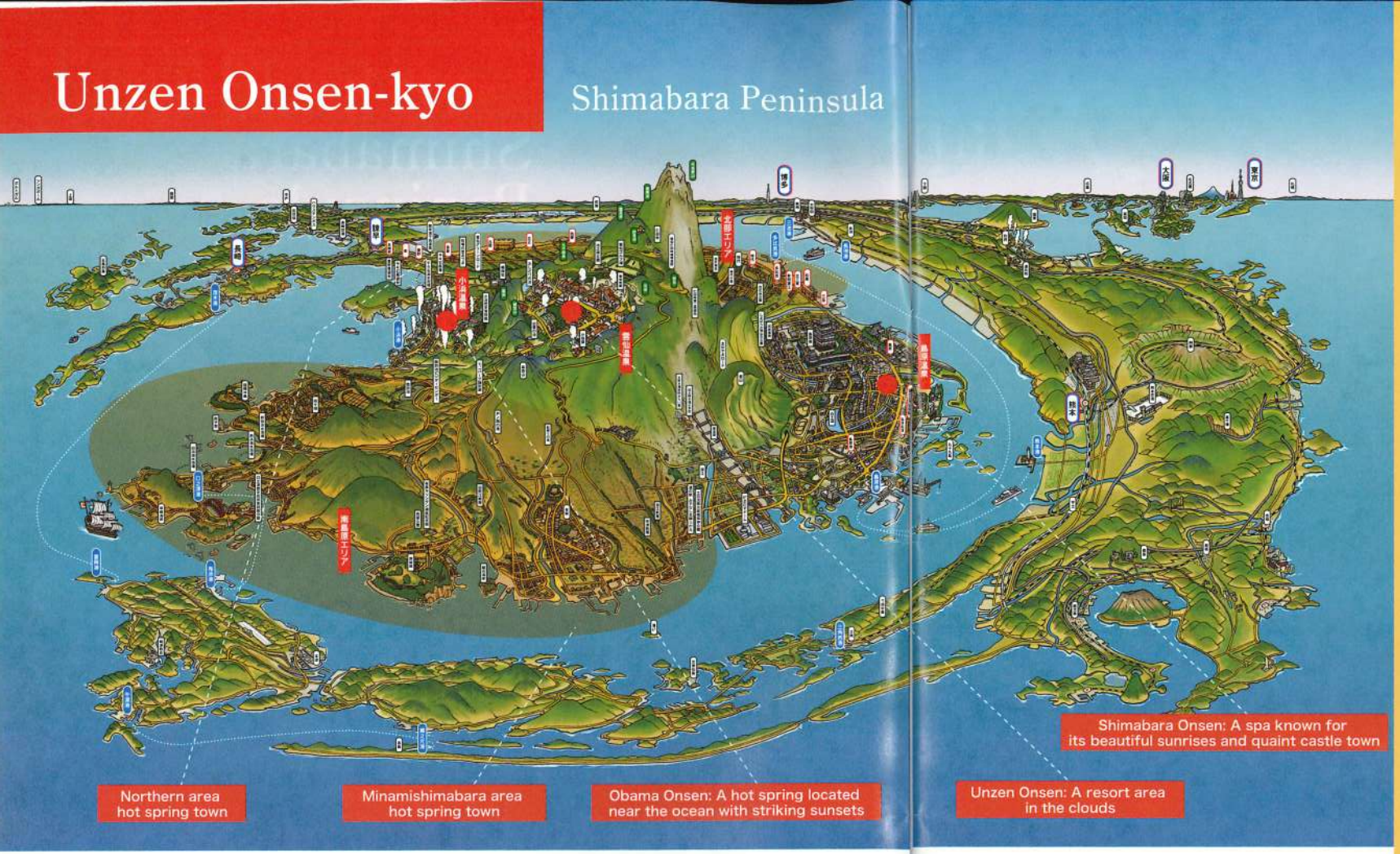
This is the land of fiery mountains emerged on the sea.
It might appear ordinary at first glance, but it offers special and unique landscapes created by volcanoes and people.

Unzen Onsen-kyo



Unzen Onsen-kyo

Shimabara Peninsula



CONTENTS

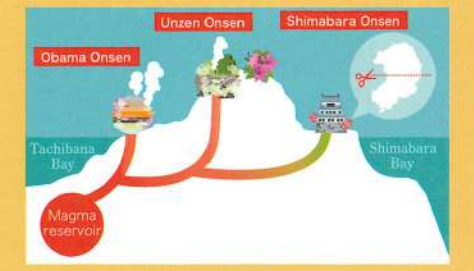
MC Map codes

Map codes are numbers that let you easily find locations on a map. You can find destinations by entering their code into a satellite navigation system, website, or other tool that supports map codes.

The Shimabara Peninsula, located in the southeastern region of Nagasaki Prefecture, has long been known as an "Onsen-kyo (hot spring resort)", with three major hot springs of different qualities - Obama Onsen, Unzen Onsen and Shimabara Onsen, stretching from west to east, as well as having hot springs in the northern and southern parts of the Peninsula.

It is one of the few areas in Japan where you can enjoy a variety of hot springs, not only in diverse settings, but also with different temperatures and efficacy.

It is the greatest blessing of the Unzen volcano, located in the center of the Peninsula, and is also called a miraculous Onsen-kyo.



The Shimabara Peninsula is collectively known as "Unzen Onsen-kyo." Differences in the concentration of volcanic gases from the magma reservoir and in distance from the reservoir have created hot springs with differing qualities, transforming the entire area into an appealing hot spring town.

Welcome to the Shimabara Peninsula

The Shimabara Peninsula is located in southern Nagasaki Prefecture on the island of Kyushu at the western edge of Japan. The peninsula, which consists of three cities (Shimabara, Unzen, and Minamishimabara), is surrounded by ocean. In the center sits Mt. Unzen.

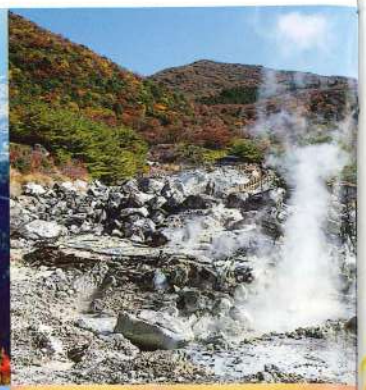
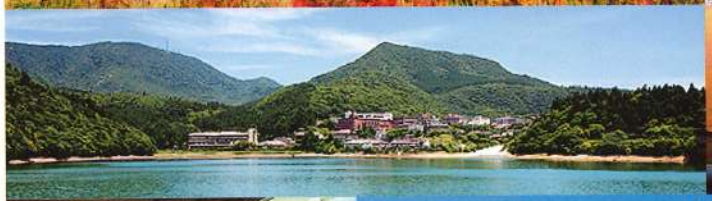
The northwestern part of the peninsula is home to the Unzen Mountains, which taper off into a series of gentle hills, as well as a plain that stretches along its coastal areas.

In the east, the land slopes down from the base of Mt. Unzen towards the sea, while the southern part of the peninsula is home to gently rolling land.

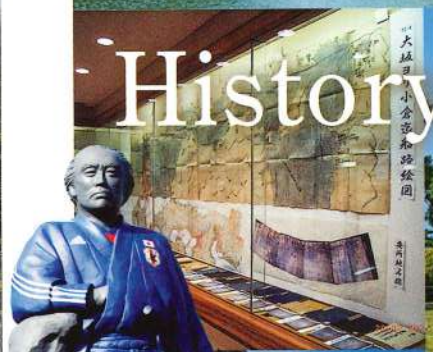
Ultimate fun

The Shimabara Peninsula juts out into the ocean between Tachibana Bay and Shimabara Bay. Obama Onsen is located along the peninsula's western coast, while Unzen Onsen can be found in the central mountains near Mt. Unzen. The city of Shimabara, a castle town on the peninsula's eastern coast that produced 70,000 koku of rice under the rule of the Matsudaira clan, features a quaint ambiance which still bears traces of the Shimabara domain. In addition to being famous for its rulers' efforts to suppress Christianity, Shimabara is home to Unzen and other areas that were designated Japan's first national park. This guide introduces noteworthy destinations on the Shimabara Peninsula, including the imposing grandeur of Mt. Fugen-dake, an active volcano, and sites where large volumes of transparent spring water gush forth from the ground.

Nature

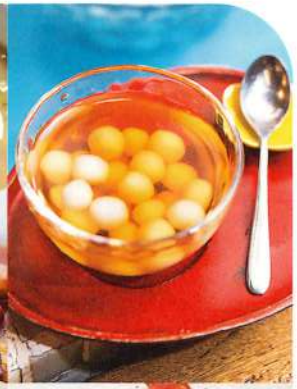

History



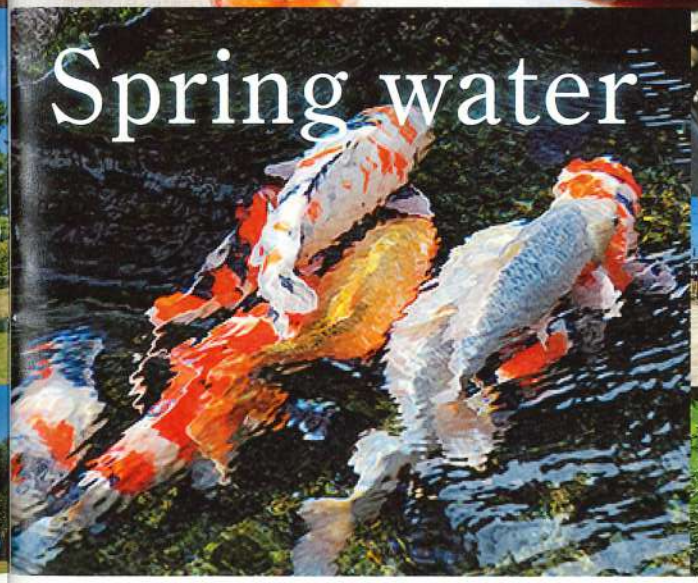


Food





Spring water




Visiting Natural Hot Springs with Healing Effects

How to visit recommended baths in the Unzen Onsen town

Enhance your beauty in the Unzen Onsen-kyo

Become beautiful along with the sun.

Morning

Shimabara Onsen: A spa known for its beautiful sunrises and quaint castle town

This hydrogen carbonate hot spring with cleansing effects will leave your skin feeling velvety smooth.

Shimabara's castle district, where carp swim in waterways, is a great place to enjoy the culture associated with the area's springs. Shimabara Onsen, which is located in the city, has hydrogen carbonate and neutral hot springs. It's recommended to visit the hydrogen carbonate hot spring first since it provides cleansing effects.

Afternoon

Unzen Onsen: A resort area in the clouds

This sulfur spring gives your skin a transparent sheen by facilitating the breakdown of melanin.

As you approach the hot spring town, you'll notice the smell of sulfur in the air! Unzen Onsen in Unzen Jigoku is a sulfur spring whose waters have powerful antibacterial effects. Conventional wisdom holds that sulfur hot springs help beautify the skin while facilitating the breakdown and elimination of melanin.

Evening

Obama Onsen: A hot spring located near the ocean with striking sunsets

By functioning like a salt pack, this chloride spring will leave you feeling warm and give your skin luster.

Located in a seaside setting known for its beautiful sunsets, Obama Onsen is a chloride hot spring that contains salt. Distinguished by a feeling of long-lasting warmth after bathing, this type of hot spring functions as a salt pack since the salt in the water prevents moisture in the skin from evaporating. As a result, it's recommended to visit this spring last when touring the area's hot springs. Facial pack products made using water from Shimabara Onsen, Unzen Onsen, and Obama Onsen are now available, making it easy to enjoy the benefits of each hot spring at home.

① Obama Onsen

Water from Obama Onsen's source spring is 105°C. Hot Foot 105, Japan's longest foot bath, is a popular destination. This seaside hot spring, where you can enjoy the salty fragrance of the sea and sunsets seen through wisps of steam rising from the water, offers a rich selection of gourmet dining, too, with dishes steamed in pots, seafood, and Obama champon noodles.

② Unzen Onsen

As you approach the hot spring town, you'll notice the smell of sulfur in the air!
In addition to Rhododendron kiusianum in the spring and colorful foliage in the fall, you won't want to miss nearby Jigoku district, where you can experience the heat of the earth. The spring's sulfurous waters, which have antibacterial effects, are considered to beautify the skin, too.

③ Shimabara Onsen

Shimabara Onsen, which is located near Shimabara Castle, where carp swim in roadside waterways, is a neutral spring that's easy on the skin. In addition to a foot bath that you can stop by as you walk through town, the city has seven spots where you can drink water from hot springs, which also have beneficial effects when consumed.

④ Harajou Onsen Masago

When you bathe in this seaside bath, you'll find yourself gazing out at a landscape that makes you feel as if you were sitting right in the ocean. The spring is known for leaving you feeling warm and toasty.
You can also visit the restaurant without taking a bath.

⑤ Mizuho Onsen Sennen-no-Yu

Located in Mizuho Sukoyaka Land, this facility makes it easy to enjoy a natural hot spring. The large bath area includes a range of amenities, including an open-air bath, a cascading bath, and a sauna. You can also visit the facility's dining hall without taking a bath.

⑥ Nami-no-Yu "Akane" Seaside Open-air Bath

This bath is operated jointly with Obama Onsen, which is located on Tachibana Bay. The open-air bath, which lets you soak while watching the sun sink below the horizon in a sunset that has been chosen as one of Japan's 100 most beautiful sunsets, is filled with hot spring water whose properties are as remarkable as the mood it will put you in.

⑦ Shimabara Onsen Yutorogi-no-Yu

This hot spring is located in the center of one of the city's shopping districts. You can enjoy a variety of different types of bath, including a large bath fed by water from the source spring, a medicated bath, a cold bath, and a sauna. The foot bath, which is free of charge, is popular with visitors, too.

⑧ Tour of Unzen Jigoku sites

Unzen Jigoku, one of Unzen Onsen's most popular tourist destinations, consists of more than 30 hot spring-influenced geological formations with names like Daikyokan Jigoku and Oito Jigoku that can be visited as you tour the area.

⑨ Hot Foot 105

This foot bath, Japan's longest, is 105 meters long (because the source spring is 105°C). In addition to sitting with your feet in the hot water, you can borrow a steaming pot to cook ingredients like vegetables or eggs and enjoy them at your very own picnic.

① Rhododendron kiusianum (spring)

When trees change into their green coats, the area's mountains are dyed pink by Rhododendron kiusianum flowers as Unzen welcomes a colorful season.

② Cornus kousa (Japanese dogwood) (summer)

This deciduous sub-canopy tree belongs to the dogwood family. From mid June to early July, groups of 20 to 30 small flowers form sphere-shaped flower heads on the branches. Those flower heads look like white petals, creating a beautiful sight as they color the mountains of Unzen white.

③ Mt. Unzen Fugen-dake fall foliage (autumn)

The fall foliage of Mt. Fugen-dake has been designated a natural monument by the Japanese government. The beautiful landscape, which is often described as a sea of fall color, will take your breath away.

④ Hanaboro: Hoarfrost on tree branches (winter)

With the coming of winter, fog and clouds come into contact with tree branches at or below 0°C and freeze onto them. Locals call the hoarfrost formations that are created in this manner hanaboro. The result are works of art that you can only see during the winter.

⑤ Shimabara Hibaruyama flower Park (spring to autumn)

The name of this flower park reflects the fact that it was used as a lookout when Mt. Fugen-dake erupted more than 200 years ago. Field mustard, cherry trees, and poppies bloom in the spring, while common cosmos and sunflowers blossom in autumn.

⑥ Jacaranda (June)

This flowering tree of the family Bignoniaceae, which is native to Central and South America, is adorned with beautiful purple flowers in June. Rows of Jacaranda in Obama Onsen delight locals and visitors alike. The shower of falling petals from enormous, 40-year-old Jacaranda trees is simply overwhelming.

⑨ Mt. Heisei-shinzan

This mountain, which grew as a result of lava eruptions that began on May 20, 1991, and lasted about five years, is Japan's newest mountain. It has become a symbol of the Shimabara Peninsula.

⑩ Flowers of Shimabara Castle

Around Shimabara Castle, plum and cherry trees bloom in the spring, while rhododendron and lotus flowers blossom in early summer, adding color to the chalk-white building.

Exploring the Seasonal Beauty of the Shimabara Peninsula

⑦ Sunflower fields in Minamishimabara (summer)

You can see sunflowers, the symbolic flower of Minamishimabara, everywhere in the city. In Minamishimabara, they bloom not only in summer, but even in the cold of winter.

⑧ Taiwan cherry trees at the Nabeshima stronghold and residence

The site of the Nabeshima stronghold and residence retains a historic atmosphere. A variety of seasonal flowers, including Taiwan cherry trees in winter and rhododendrons in spring adorn the dry-style landscape garden.

⑪ White sand bars (lithothamnium reefs)

Unusual lithothamnium reefs, which herald the coming of summer, can only be seen at three locations worldwide. Lithothamnium is one of the world's rarest plants, and the white sand bars it creates only show themselves at low tide several times a year. Overland viewing tours are planned to coincide with the dates on which these formations become visible.

Hiking the New Trails on Mt. Unzen Fugen-dake

Mt. Unzen Fugen-dake
Mt. Heisei-shinzan

Just 400 meters to the peak of the lava dome!

This scenic walking course will take you to within 400 meters of the peak.

Mt. Heisei-shinzan is Japan's newest mountain. Thanks to a newly built trail, you can view the mountain from an up-close vantage point, which wasn't possible until now.

Enjoy scenic views of a remarkable landscape that includes Rhododendron kiusianum around mid May, colorful fall maple foliage in autumn, and hoarfrost-encrusted tree branches in winter.

Panoramic scenery awaits you at an elevation of 1,359 meters. You'll experience the natural beauty and power of the Shimabara Peninsula.

Fun Ocean Activities Where You'll Encounter Nature

Encounter the natural expanse of the Shimabara Peninsula...

On the Shimabara Peninsula, which is surrounded by water, there are a multitude of ways to enjoy the ocean. Take a boat ride... Enjoy romantic views of the sea... What would you find fun?

① Dolphin watching

About 300 bottlenose dolphins live between the Shimabara Peninsula and Amakusa, and you can watch them as they swim.
*It depends on weather and other factors, but there's a 99% chance you'll see some dolphins when your boat leaves port.

② Viewing the ocean from the Shimabara Railway

This Shimabara Peninsula local line extends from JR Isahaya Station to Shimabarako Station. The Shiawase-no-Kiiroi Ressha ("happy yellow train"), which travels along the peninsula's northern coast, is ideal for sightseeing. The line also stops at Omisaki Station, which is said to be the station closest to the ocean in Japan, offering views of beautiful natural scenery from its windows.

③ Kojiro Nagahama Beach

MC 325 138 839

Located on the gentle waters of the Ariake Sea, this is the only beach in the northeastern part of the peninsula.

④ Maehama Beach

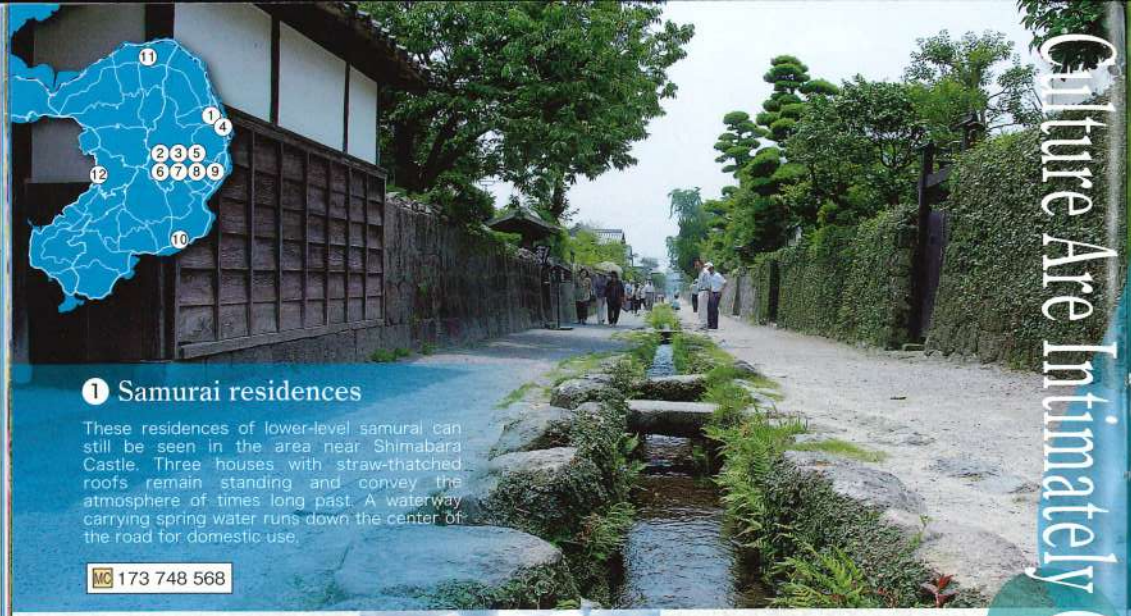
MC 173 125 423

This beautiful beach features white sand and pine trees. With clear water, gently sloping white sand, and cool pine forests, the beach is blessed with picturesque natural features.

⑤ Shirahama Beach

MC 173 066 431

With marine-blue water and beautiful white sand, this beach offers scenic views of the sun as it sets behind the Nagasaki Peninsula at dusk. It was chosen as one of Japan's 100 most beautiful beaches by the Ministry of the Environment on May 10, 2006.



Visiting a Castle Town Whose History and Culture Are Intimately Connected to Water

① Samurai residences

These residences of lower-level samurai can still be seen in the area near Shimabara Castle. Three houses with straw-thatched roofs remain standing and convey the atmosphere of times long past. A waterway carrying spring water runs down the center of the road for domestic use.

MC 173 748 568

⑤ Shimeiso Spring Water Garden

Among Shimabara's old residences are mizuyashiki-homes with gardens that make use of spring water. Shimeiso is typical of such residences. The pond in the garden, which is fed by a voluminous spring, is filled with slowly swimming carp.

MC 173 719 652

Example itinerary for a stroll through Shimabara

- ④ Shimabara Castle — 60 min.
- About 10 min. on foot
- ① Samurai residences — 30 min.
- About 15 min. on foot
- ③ Koi-no-Oyogumachi Town — 10 min.
- About 0 min. on foot
- ⑦ Seiryutei — 10 min.
- About 0 min. on foot
- ⑧ Shimabara Yusui-kan (Koi Cafe Yusui-kan)
- About 0 min. on foot
- ⑤ Shimeiso Spring Water Garden — 15 min.
- 10 min. on foot
- ⑨ Mizugashira no Ido — 10 min.
- 10 min. on foot
- ② Shirachiko Lake
- 15 min. on foot
- ⑥ Ginsui and Hamanokawa Spring

MC 173 719 218

② Shirachiko Lake

This lake was created during an eruption of Mt. Unzen that caused Mt. Mayuyama to collapse about 220 years ago. Even now, about 40,000 tons of spring water gush forth every day in the lake, which serves as a recreational spot for residents.

MC 173 719 712

③ Koi-no-Oyogumachi Town

Colorful carp swim freely in the clear spring waters that flow alongside roads in the town, delighting passersby. These waterways, whose beauty has been preserved by local residents, are one of Shimabara's attractions as a community whose history and culture are intimately connected to water.

MC 173 749 279

④ Shimabara Castle

Shimabara Castle is one of the city's most famous destinations. The moat surrounding the castle's keep is adorned with blossoming cherry trees and rhododendron in the spring, and with lotus flowers in the summer. There are exhibits of historic materials and other artifacts related to Christianity in the tower, and the castle's grounds include the Folk Museum, Seibo Memorial Museum, and Tourism Reconstruction Memorial.

MC 173 719 527

City of Shimabara

⑨ Mizugashira no Ido

Legend holds that you can enjoy a long life if you pour water over the stone statue of a turtle next to this well, which is located on a quiet residential street. The well, which was dug by local residents in 1941, yielded ample volumes of spring water, and it continues to play a part in residents' lives today.

MC 415 390 037

⑥ Ginsui and Hamanokawa Spring

Located next to Hamanokawa Spring, a typical Shimabara spring that continues to be maintained by the local community, this restaurant, which invented a local dish known as kanzarashi dumplings, reopened in August 2016. Local residents have long loved the spot, which has also been visited by many prominent figures.

MC 173 719 713

⑦ Seiryutei

Seiryutei promotes tourism in the surrounding area by displaying local Shimabara products and providing sightseeing information. Don't miss the colorful carp swimming slowly in the facility's spring-fed pond.

MC 173 719 682

⑧ Shimabara Yusui-kan (Koi Cafe Yusui-kan)

This cafe in the style of an old townhouse is located in a residence that was originally built at the beginning of the Showa period in the center of a town known for its swimming carp (Koi-no-Oyogumachi). On Saturdays and Sundays, you can experience how kanzarashi dumplings, a traditional dessert prepared with Shimabara spring water, are made (fee applies; reservation required three days in advance).

⑫ Kaminokawa Spring and nearby carbonated spring

Kaminokawa Spring continues to produce large volumes of water today. The site is said to have been the last spot where people climbing up to Unzen Jigoku could take a break during the suppression of Christianity, and it centers in various secret episodes about Christianity. Nearby you can also view a carbonated (cold) spring that produces large volumes of burbling water.

City of Minamishimabara

MC 173 292 782

⑩ Arie Storehouse Tour

The Arie district of Minamishimabara, which prospered as a center of local government in ancient times, is home to industrial heritage sites related to sake, miso, and soy sauce brewing as well as somen noodle production and several brick walls, along with historic heritage sites like shrines, temples, and the remains of Christian sites. The area hosts the Arie Storehouse Tour, an event that invites participants to visit a townscape centering on five traditional storehouses.

City of Unzen

MC 173 749 280

⑪ Kojirokuji and the Nabeshima residence

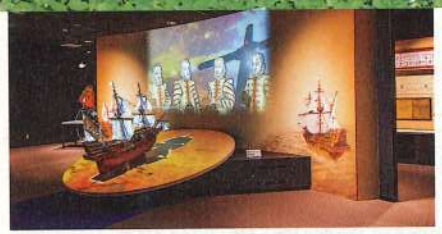
This town was built by the Nabeshima clan, which ruled the Kojiro district of the Saga Nabeshima domain. The Kojirokuji area around the Nabeshima stronghold and residence has been designated an Important Traditional Building Preservation District by the Japanese government. The site evokes the atmosphere of the Edo period.

Exploring the Museums of the Shimabara Peninsula

Collegio altar cross
(from a collection of Christian artifacts
in the Shimabara Castle tower)

① Shimabara Castle

Shimabara Castle's tower houses exhibits on topics including Christian history, local history, and folk history, and the castle's northeastern turret functions as a folk museum by offering displays of numerous nostalgic folk implements dating from the Meiji period to the Showa period, offering a glimpse of how the people of Shimabara used to live. The castle's grounds are also home to the Seibo Memorial Museum, which features exhibits of works by sculpture giant Seibo Kitamura, and the Tourism Reconstruction Memorial, which introduces topics including the nature of the area's volcanic processes and Shimabara's culture.



② Kuchinotsu Museum of History and Folklore

Located on the second floor of the newly completed New Kuchinotsu Port Terminal Building, this museum explores the history of Kuchinotsu, a port town at the southern end of the Shimabara Peninsula, with a focus on how it attracted foreign ships during the 16th century and later prospered as a trading port in modern times. A separate branch of the museum, which incorporates the remains of the former Nagasaki Customs Kuchinotsu Branch Office, originally built in 1899, serves as a museum of Meiji-period Western architecture.

③ Honda Yudayu residence (Obama Town Museum of Historical Materials)

This museum is located at the site of the residence of the Honda Yudayu, who for generations laid the foundation for the growth and development of Obama Onsen starting in 1614. "Yudayu" is the name of the official who was entrusted by the Shimabara domain with the management of the hot spring. The museum features numerous exhibits exploring topics including the accomplishments of officeholders and materials related to Obama Onsen.

④ Unzen Visitor Center

This facility provides a wealth of information about the Shimabara Peninsula, with a focus on the natural surroundings of Unzen Onsen. It also introduces the area's history as well as the mechanisms by which volcanoes and hot springs function.

⑤ Unzen Vidro Museum

This facility is considered Kyushu's premier antique glass museum. Exhibits showcase antique glass from around the world, including Edo-period Nagasaki, Bohemia, and Venice; 19th-century oil lamps; works by Czech master Stanislav Libenský; and Old Imari ware ceramics.

⑥ Arima Christian Heritage Museum

This museum introduces topics including the Hara Castle Ruins, which comprise the peninsula's only World Heritage site; the Hinoe Castle Ruins, which is a related historical site; and the Arima Seminary, an educational institution that bolstered Christian believers' faith. Visitors can learn about the entire sweep of Christian history in the area, including the introduction of Christianity, its flourishing, its brutal suppression, and its eventual revival after years underground.

⑦ Seibo Memorial Museum

The house in the Minamiarimacho district of Minamishimabara where sculptor Seibo Kitamura, who created the Nagasaki Peace Statue, was born displays of about 60 of the artist's sculptures, papers, and other materials. Located in Seibo Park, the museum also includes 13 outdoor sculptures, along with a quarter-size reproduction of the Peace Statue.

Kids Geopark

The Great Heisei Eruption Cinema

The Path of Pyroclastic Flow

Kids Geopark

⑧ Gamadas Dome (Mt. Unzen Volcano Museum)

This museum, which features hands-on exhibits about geology and volcanoes, recently reopened after a renovation. New attractions include new content being shown at the facility's The Great Heisei Eruption Cinema; Kids' Geopark, where young visitors can enjoy hands-on attractions modeled on Mt. Fugen-dake; and Wonder Lab, where visitors can have fun learning about volcanoes and disaster preparedness.

MC 173 164 824

① Arima Christian Heritage Museum

This museum introduces topics including the Hara Castle Ruins, which is part of the "Hidden Christian Sites in the Nagasaki Region" World Heritage site; the Hinoe Castle Ruins, which is a related historical site; and the Arima Seminary, an educational institution that bolstered believers' faith. Visitors can learn about the entire sweep of Christian history in the area, including the introduction of Christianity, its flourishing, its brutal suppression, and its eventual revival after years underground.

MC 173 255 678

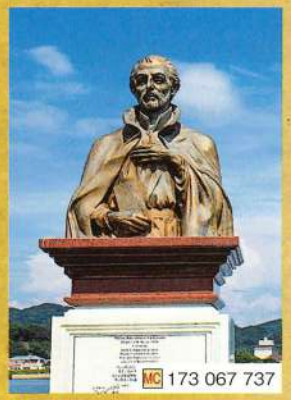
② Hinoe Castle Ruins

The Arima clan of powerful Christian daimyo from Hizen resided at this castle during the Sengoku period. Among other artifacts, excavations have unearthed gold-leaf roof tiles.

MC 173 230 836

③ Christian tombstone

This beautiful semi-cylindrical tombstone with a stone cover, the oldest Christian tomb in Japan, bears a carved romanized epitaph. (The site has been designated a historic landmark by the Japanese government.)



MC 173 067 737

④ Alessandro Valignano

Italian-born Alessandro Valignano, who founded a seminary in Arima, was a Jesuit missionary. He's known for sending four youths who had studied at the seminary to Europe on a trip known as the Tensho embassy in 1582. After a long ocean voyage, the young delegates had audiences with the Pope and other leaders during the trip, enjoying a warm welcome everywhere and informing the world of Japan and the Japanese. Valignano was an important missionary of the Christian faith in Japan.

MC 173 097 065

⑤ Landings of foreign ships

Three foreign ships entered the port of Kuchinotsu in 1567. Seven more arrived over the course of the next 15 years. At the time, Kuchinotsu became the center of efforts to spread the Christian faith throughout Japan and a hub of the so-called Nanban trade.

Tracing the History of Christianity

⑥ Museum in the Shimabara Castle tower (with exhibits tracing Christian history)

Shimabara Castle was built by Matsukura Shigemasa over the course of seven years starting in 1618. Today, a reconstruction of the tower houses exhibits on topics including Christian history, local history, and folk history. Nearby are Christian tombstones and a statue of Amakusa Shiro by Seibo Kitamura.

MC 173 749 280

⑦ Monument to Christian Martyrs in Unzen Jigoku

Unzen Jigoku is a major sightseeing destination in Unzen Onsen. Characterized by sulfurous fumes and covered by blasts of steam and hot air emanating from the ground, the landscape truly resembles hell itself. The area is known as a site of Christian martyrdom, and a monument has been erected.

⑧ Hara Castle Ruins World Heritage site

It is here that the Shimabara-Amakusa Rebellion, which broke out in 1637, came to an end. The Edo shogunate adopted a policy of completely closing off the country from outside contacts in response to the uprising, leaving underground Christians no choice but to continue in their faith on their own. Archaeological excavations have unearthed numerous human bones along with implements of faith such as medals and crosses from inside the castle, where the rebels barricaded themselves.

MC 173 165 083

Amakusa Shiro Tokisada

Amakusa Shiro is considered to have been the leader of the Shimabara-Amakusa Rebellion. Only about 16 years old when the rebellion broke out, he is said to have directed the fighting while carrying a cross. However, he was killed by retainers of the Hosokawa domain during an assault on the castle by the shogunate.

City of Minamishimabara

Tour of the Hara Castle Ruins, where the Shimabara-Amakusa Rebellion ended

Minamishimabara is home to Minamishimabara Guide Arima-no-Sato, an association of tour guides. Members explain the history of Minamishimabara and its townscape to tourists in an easy-to-understand manner.

③⑤ ···City of Minamishimabara

Hospitality in the form of sweets from the Shimabara Peninsula

Local cuisine experiences

① Shimatetsu Cafe Train

This sightseeing train lets you enjoy the serene landscapes of the Shimabara Peninsula from its windows as you eat local gourmet cuisine and sweets.

Dates Year-round

Local cuisine experiences

② Baking your own Yusenpei rice crackers

Enjoy traditional flavor as you bake your own Yusenpei rice crackers by adding chilled hot spring water to wheat flour, eggs, and sugar; kneading the mixture together; and baking thin sheets of dough.

Dates March through May, September through November

Overnight experiences

③ Overnight agriculture, forestry, and fishery experiences

Why not make some memories by participating in an overnight agriculture, forestry, or fishery experience in Minamishimabara, where you can see what it's like to live in the country. You can participate in a variety of seasonal activities, for example harvesting vegetables or preparing local cuisine, at a household involved in agriculture, forestry, or fisheries work.

Dates Year-round

Local cuisine experiences

④ Making your own kanzarashi dumplings

Located in the spring water destination Koi-no-Oyogumachi, Shimabara Yusui-kan offers visitors a chance to make their own kanzarashi dumplings, a local Shimabara delicacy, on weekends.

Dates Saturdays and Sundays (Reservation required three days in advance.)

Try it! Discover new things!

Experiencing Everything the Shimabara Peninsula Has to Offer

By experiencing the culture and lifestyles of the people who live on the Shimabara Peninsula, you can learn about the area. Why not take advantage of hands-on programs to make your trip a special one?

So many exciting things to try!

Local cuisine experiences

⑤ Making your own somen noodles

Try your hand at rolling hand-drawn somen noodles, a famous local product, by participating in the last step of the production process.
When you're finished, you can sample the noodles you've made.

Dates Year-round (1:00 pm to 2:00 pm)

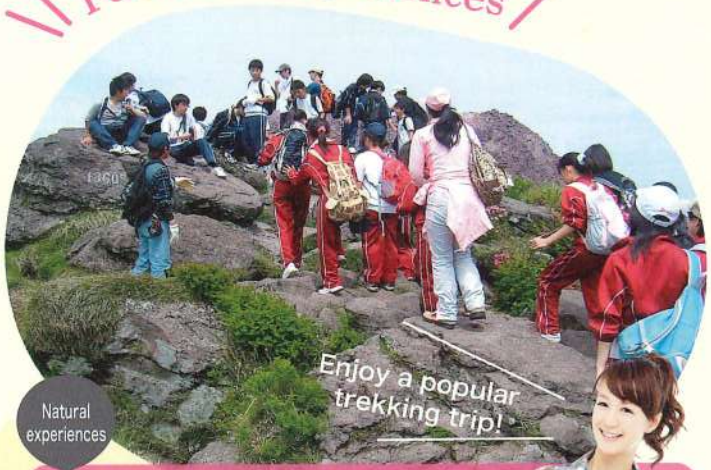
Creative culture experiences

⑥ Making Japanese candles, a tradition that dates back to the Shimabara domain

Tour one of the few Japan wax factories that remains nationwide. Try your hand making Japan wax candles, a tradition that was passed down from the time of the Shimabara domain. The soft, harmonious light that comes from natural materials is otherworldly.

Dates Saturdays and Sundays (Reservation required three days in advance.)

Enjoy Shimabara Peninsula Experiences



Natural experiences

⑦ Hiking Mt. Unzen Fugen-dake

Trekking brings you face to face with the beautiful natural scenery of Mt. Unzen Fugen-dake. Listen to explanations from your guide as you hike Mt. Unzen, whose appearance shifts throughout the seasons.

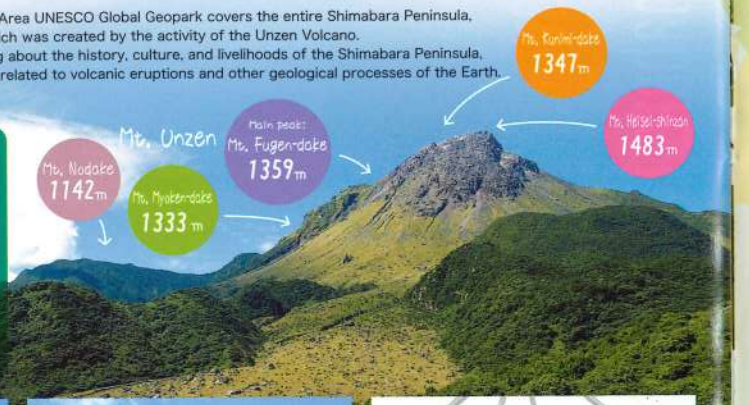
Dates Year-round

Scan this QR code to learn more about hands-on programs on the Shimabara Peninsula.

A park of the Earth, centered on the Unzen Volcano, with the theme of the coexistence of an active volcano and people.

Unzen Volcanic Area UNESCO Global Geopark

The Unzen Volcanic Area UNESCO Global Geopark covers the entire Shimabara Peninsula, which was created by the activity of the Unzen Volcano.
You can enjoy learning about the history, culture, and livelihoods of the Shimabara Peninsula, as well as how they are related to volcanic eruptions and other geological processes of the Earth.



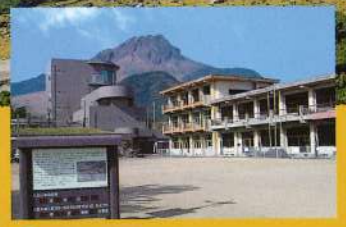
1 Mt. Heisei-shinzan

Consisting of a magma dome that was formed when highly viscous dacite magma accumulated atop a crater, Mt. Heisei-shinzan was designated a natural monument by the Japanese government in April 2004. The area around the peak, which currently reaches an elevation of 1,483 meters, has been designated a warning area, meaning that it's off-limits to the public.

2 Gamadas Dome

(Mt. Unzen Volcano Museum)

This volcano-themed facility offers visitors opportunities to view, experience, play, learn, and recreate. It offers an expansive space that's packed with intellectual entertainment related to volcanoes. What happened from the start of volcanic activity at Mt. Unzen Fugen-dake in November 1990 to the declaration of the end of that activity in May 1996? What remains? You'll find exhibits that provide exhaustive coverage of the threats posed by nature and the wisdom and intelligence of those who have faced them.



3 Former Onokoba Elementary School and Onokoba Sabo Mirai Museum

This site preserves an elementary school that burned to the ground due to exposure to the blasts of hot air accompanying the eruption's pyroclastic flow. It's also home to the Sabo Museum, where you can view conditions following the disaster and subsequent recovery efforts through materials including photographs and graphic panels. The facility is dedicated to communicating the lessons of this volcanic disaster to future generations and to promoting learning about disaster preparedness.

4 Memorial Park of the Houses Destroyed by Debris Flows

This memorial park serves as an important place of remembrance for the people of Shimabara. Mt. Unzen-Fugendake erupted in 1990, and some of the farthest-reaching damage to the town occurred in August 1992. This park was later built on about 3 meters of debris, and the houses damaged by debris flows are preserved and exhibited here.

UNESCO Global Geopark

This program aims to preserve valuable heritages of the Earth and to inherit them for the future generation through sustainable development of local communities.
The Shimabara Peninsula has been designated as one of the first Global Geoparks in Japan.

Scan this QR code or access to the URL below to learn more from the official website of our Geopark.

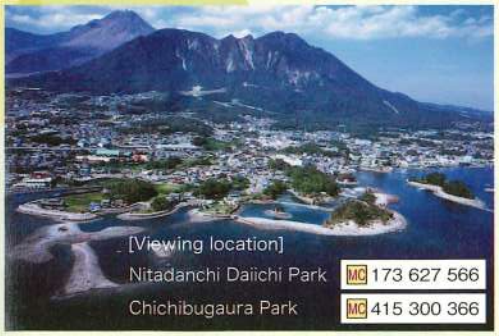
https://www.unzen-geopark.jp/en/

Official Mascots of Unzen Volcanic Area Geopark
Geo-kun & Jina-chan

Unzen Volcanic Area
UNESCO Global Geopark

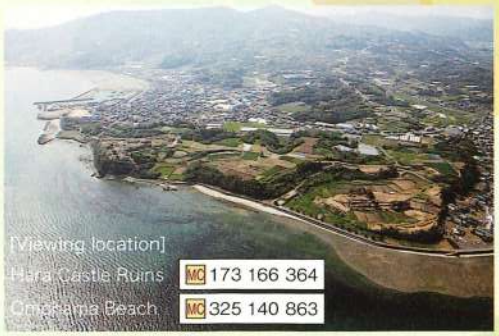
Recommended Sightseeing Spots

The more you know, the more interesting it gets.
These are some of the must-see spots of our Geopark.



5 Amphitheater Wall of Mt. Mayuyama Caused by the 1792 Sector Collapse

Mt. Mayuyama, which is located to the west of the castle town Shimabara, collapsed during a powerful earthquake accompanying the volcanic eruption of 1792. Debris from the mountain fell into the ocean and created a tsunami. In some locations, saltwater reached heights of greater than 20 meters. The disaster created a scenic landscape known as the Tsukumojima Islands ("ninety-nine islands").



6 Pyroclastic Flow Deposits from the Aso Volcano

The Hara Castle, known as the final battlefield of the Shimabara-Amakusa Rebellion (1637-1638), was built on a plateau created by the massive eruption of Aso Volcano, which occurred about 90,000 years ago. If that eruption had not occurred, would the Hara Castle have been built on the same location? And, would the history of Japan have been different?

7 Tatsuishi Seashore

Here you can see a geologic stratum created by an early volcanic eruption of Mt. Unzen. The presence of pumice stone indicates that Mt. Unzen began to grow with an explosive eruption. Subsequently, the mountain's eruptions changed to the type that produce a magma dome. This stratum, which contains numerous round rocks, comprises part of the base of the mountain where it finally grew enough to reach the coastline.

8 Hayasaki Seashore

Hayasaki Seashore, at the southernmost tip of the Shimabara Peninsula, is the birthplace of the peninsula. Jet-black, cobblestone-like rocks and rugged, reddish-brown geologic strata tell us that volcanic eruptions of the type seen in Hawaii right now occurred here around 4.3 million years ago.

9 Terraced Field Observation Platform

This platform offers panoramic views of terraced fields built on steep slopes with Tachibana Bay as a backdrop. Farmers have cleared and excavated the mountainous terrain of the Shimabara Peninsula, which is home to extensive agriculture, to grow potatoes, lettuce, squash, and other crops.

★Shimabara Local Gourmet★

Gourmet Dining on the Peninsula

The Shimabara Peninsula is full of natural blessings and delicious foods!
Come see and taste traditional delicacies made with fresh ingredients!

Kanzarashi dumplings

This dish is made by cooling small dumplings made with rice flour with Shimabara spring water and toping them with a special syrup made of honey, sugar, and other ingredients. This simple, local treat is popular for an elegant sweetness that seems to melt in your mouth as well as for the pleasant sensation it gives when swallowed.

Enjoy crisp texture and outstanding springiness!

Puffer fish (ganba)

Puffer fish, whose consumption was prohibited by the rulers of the Shimabara domain during the Edo period because it is highly poisonous, is known locally as ganba, a word formed from the word for coffin to suggest people's eagerness to enjoy the food, even if doing so meant keeping a coffin close to hand.

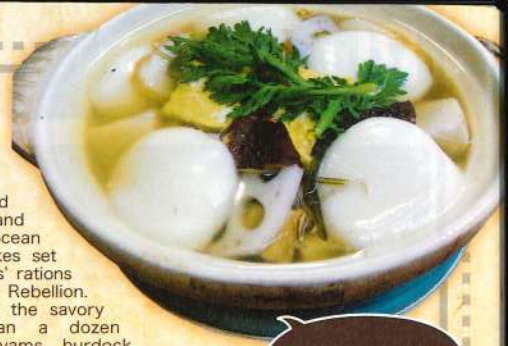
Taste the flavor of the ingredients.

Rokubee

Legend holds that this simple local dish, which is based on soup stock and flavorful condiments, was prepared using powdered sweet potatoes by a farmer named Rokubee in the village of Fukae during a famine.

Guzoni stew

One theory holds that this dish was created when ingredients gathered in the mountains and harvested from the ocean were added to rice cakes set aside for use as soldiers' rations during the Shimabara Rebellion. Today, the dish blends the savory flavors of more than a dozen ingredients, including yams, burdock, lotus root, Chinese cabbage, shiitake mushrooms, chicken meat, boiled fish paste, grilled eel, omelets, garland chrysanthemums, and rice cakes.



Served with plenty of savory soup stock!

Tairagane/Ariakegane

These Japanese blue crabs, which are known as gazami, are called Tairagane or Ariakegane to indicate where they were harvested. They taste best from summer to fall, but they're a famous product of the Ariake Sea that can be enjoyed all year long.

Miso soup with scorpion fish

Scorpion fish caught (known locally as arakabu) in the Hayasakiseto Strait, which has one of the three strongest tidal currents in Japan, have been certified as Hayasakiseto Arakabu, a Nagasaki Prefecture fish brand. Miso soup prepared with stock made from the fish's dense white, red-tinged meat is supremely delicious.

Obama champon noodles

More than 100 years have passed since people visiting hot springs to cure disease introduced champon noodles, a dish that was created in Nagasaki, to Obama Onsen. The dish, which consists of numerous ingredients added to mild soup along with small shrimp still in their shells, became a veritable soul food in Obama Onsen.

Somen noodles

One theory holds that somen noodles were brought to the area by immigrants from Shodo Island following the Shimabara-Amakusa Rebellion, while another posits that the dish was brought by Chinese sailors arriving in Nagasaki. Made with wheat flour produced in the area's temperate climate along with salt and subsoil water from Mt. Unzen, these noodles are known nationwide for their unique firmness, stickiness, and pleasant feeling when swallowed, all of which are made possible by traditional skills that have been passed down unbroken over the generations.

Minamishimabara unrefined sake (Yonoyoshite)

This unrefined sake was the first to be licensed in Nagasaki Prefecture.
The name means "all night long" in Minamishimabara's local dialect. The maker's wish for customers to drink it all night long is evident in its sweet, fruity flavor.

Unzen Smoothie

Enjoy an Unzen Smoothie prepared with a creative touch by one of the shops in Unzen Onsen Town using select seasonal vegetables grown in a rich natural setting on the Shimabara Peninsula.

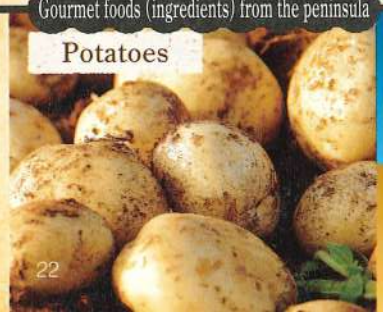
Nanban croquettes

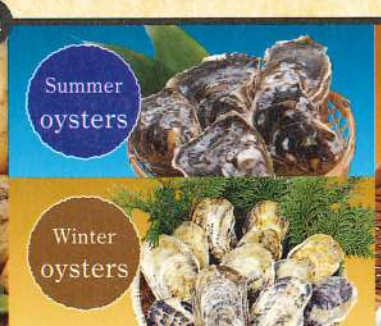
These croquettes are said to have been brought to the port of Kuchinotsu in 1580 by ships arriving from Portugal and Spain. They became popular in Minamishimabara because the area was one of the leading producers of potatoes in the country. You can enjoy a variety of creative croquettes in the area's shops and restaurants.

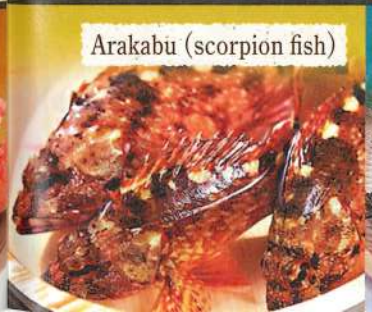
Unzen hayashi rice

Conventional wisdom holds that long ago many foreign tourists came to Unzen Onsen to escape the summer heat, and that they enjoyed a Western-style version of hayashi rice topped with demiglace sauce. This new gourmet dish from Unzen Onsen is a creative take on that history.

Gourmet foods (ingredients) from the peninsula







List of gourmet restaurants on the Shimabara Peninsula

Kanzarashi dumplings · Rokube · Guzoni stew · Tairagane crab
Obama champon noodles · Somen noodle dishes · Nanban croquettes · Unzen hayashi rice

Shimabara City area

1 Aoi Rihatsukan
10:30 am to 6:00 pm (Mondays: open until 5:00 pm)
0957-64-6057 Closed Irregularly closed Parking Yes

2 Nakaya
10:00 am to 5:00 pm
0957-62-3675 Closed Irregularly closed Parking Yes

3 Shimabara Castle Shiro no Chaya
9:00 am to 5:00 pm
0957-63-4874 Closed None Parking Yes (fee applies)

4 Tea room & Gallery Hayamegawa
11:00 am to 6:00 pm
0957-62-3117 Closed Wednesdays, third Thursday of every month Parking Yes

5 Cafe Shimabara Mizuyashiki
11:00 am to 4:30 pm
0957-62-8555 Closed Irregularly closed Parking No

6 Toichi
11:00 am to 2:00 pm / 5:30 pm to 8:30 pm
0957-62-3323 Closed Thursdays Parking Yes

7 Coffee Shop Cairn
10:00 am to 10:30 pm (Sundays and public holidays: opens at 11:00 am)
0957-63-5711 Closed Irregularly closed Parking Yes

8 Hoju
11:00 am to 11:00 pm
0957-64-2795 Closed None Parking Yes

9 Kazamidori
10:00 am to 10:00 pm
0957-62-6313 Closed Irregularly closed Parking Yes

10 Poem Takemoto Jelly (carry-out)
10:00 am to 7:00 pm
0957-62-3388 Closed Wednesdays Parking Yes

11 Rokube
10:30 am to 11:00 pm
0957-62-2421 Closed Thursdays Parking Yes

12 Koraku
11:00 am to 2:00 pm / 4:30 pm to 9:00 pm
0957-63-2200 Closed Wednesdays (open when Wednesday is a public holiday) Parking Yes

13 Chikara-zushi
10:00 am to 9:00 pm
0957-64-1116 Closed Every other Monday Parking Yes

14 Himematsuya Honten
11:00 am to 7:00 pm
0957-63-7272 Closed Second Tuesday of every month (subject to change) Parking Yes

15 Himematsuya Shinmachiten
10:00 am to 7:00 pm
0957-62-3775 Closed Thursdays (open when Thursday is a public holiday) Parking Yes

16 Funato Ichiba Tottotto (winter only)
11:00 am to 3:00 pm (L.O. 2:30 pm)
0957-63-9911 Closed Thursdays Parking Yes

17 Edoshin
11:00 am to 9:00 pm
0957-62-2044 Closed Irregularly closed Parking Yes

18 Shokusai Shiki Oriori
11:00 am to 2:00 pm / 5:00 pm to 11:00 pm
0957-63-7070 Closed Irregularly closed Parking Yes

19 Nakano
11:00 am to 2:00 pm / 5:00 pm to 11:00 pm
0957-62-0071 Closed Thursdays Parking Yes

20 Baioutei Steakhouse
11:30 am to 2:00 pm / 5:00 pm to 10:00 pm
0957-64-2222 Closed Thursdays Parking Yes

Unzen City area

21 Tairagane Crabs Promotion Association (representative: Kangetsuso)
Please inquire.
0957-78-2027 Closed Please inquire. Parking Please inquire.

22 Yama Cafe Ricky (Modern Folkart Inn Unzen Fukudaya)
11:00 am to 2:30 pm
0957-73-2151 Closed Tuesdays Parking Yes

23 Unzen Kanko Hotel
12:00 pm to 1:30 pm (reservations required)
0957-73-3263 Closed None Parking Yes

24 Unzen Sky Hotel
11:30 am to 2:00 pm
0957-73-3345 Closed Tuesdays Parking Yes

25 Restaurant Komatsu
10:00 am to 9:00 pm
0957-73-3515 Closed Irregularly closed

26 Sabo Imamura Teahouse
9:00 am to 7:00 pm
0957-73-2444 Closed Irregularly closed Parking Yes

27 Yoshihisa Restaurant
9:00 am to 11:00 pm
0957-73-3555 Closed Irregularly closed Parking Yes

28 Tarafukutei Restaurant
10:00 am to 11:00 pm
0957-73-3566 Closed Irregularly closed Parking Yes

29 Kinugasa Shokudo
11:00 am to 11:00 pm
0957-73-3491 Closed Irregularly closed Parking Yes

30 Green Terrace Unzen
11:00 am to 4:00 pm
0957-73-3277 Closed None Parking Yes

31 Yakiniku no Araki
8:30 pm to 12:00 am
0957-73-3432 Closed Irregularly closed

32 Kokoro
11:00 am to 8:00 pm
0957-74-2305 Closed Wednesdays Parking Yes

33 Manpuku Shokudo
12:00 pm to 10:00 pm
0957-74-3631 Closed Irregularly closed

34 Kaikatei
10:30 am to 9:00 pm
0957-74-2776 Closed Wednesdays (irregularly) Parking Yes

35 New Obama
9:30 am to 8:00 pm
0957-74-2804 Closed Irregularly closed Parking Yes

36 Benten
4:00 pm to 2:00 am
0957-74-5016 Closed Irregularly closed Parking Yes

37 Izakaya Yoshicho
5:00 pm to 12:00 am
0957-75-0125 Closed None Parking Yes

38 Izakaya Jin
6:00 pm to 12:00 am
0957-74-4129 Closed Tuesdays Parking Yes

39 Ajidokoro Yudokoro Yoshicho
11:00 am to 10:00 pm (L.O. 9:30 pm)
0957-75-0107 Closed Second and fourth Wednesday of every month Parking Yes

40 Shokuraku Omori
11:30 am to 2:30 pm / 6:00 pm to 9:00 pm
0957-74-2470 Closed Irregularly closed Parking Yes

41 Irishio
11:00 am to 2:00 pm / 4:30 pm to 8:30 pm
0957-74-3610 Closed Thursdays Parking Yes

42 Ryu
11:00 am to 2:30 pm (L.O.) / 4:00 pm (reservations required)
0957-74-4861 Closed Irregularly closed on Monday Parking Yes

43 Unzenso
11:30 am to 2:00 pm
0957-76-0550 Closed Irregularly closed Parking Yes

Minamishimabara City area

44 Kokorozashi
11:00 am to 2:30 pm / 5:00 pm to 9:30 pm (L.O. 9:30 pm)
0957-72-5360 Closed Tuesdays

45 Senrishokudo (reservations required)
11:30 am to 2:00 pm / 6:00 pm to 10:00 pm (L.O. 9:30 pm)
0957-72-5596 Closed Thursdays

46 Yamanotera Yuukyo
Summer: 11:00 am to 6:00 pm (last entry) / Winter: 11:00 am to 2:50 pm (last entry)
0957-65-1550 Closed Wednesdays

47 Tori No Shiraishi
11:00 am to 8:00 pm
0957-72-3369 Closed Fourth Tuesday of every month

48 Shokuji dokoro Yakko
11:00 am to 1:30 pm / 5:00 pm to 10:00 pm
0957-72-6077 Closed Tuesdays

49 Ryoriya Wasaki
6:00 pm to 12:00 am
0957-72-7366 Closed Mondays

50 Mikizushi
11:30 am to 2:00 pm / 5:30 pm to 10:00 pm
0957-82-2528 Closed Mondays

51 Kaachanzushi
11:30 am to 2:00 pm / 5:00 pm to 10:00 pm
0957-82-2287 Closed Mondays

52 Yakiniku Takagi Arieten
5:00 pm to 12:00 am
0957-82-3787 Closed Second and fourth Wednesday of every month

53 Kuchabedokoro Wagaya
6:00 pm to 12:00 am (L.O. 11:30 pm)
0957-82-6050 Closed Mondays

54 Galletto-KAMEYA
10:00 am to 9:00 pm
0957-82-4480 Closed Irregularly closed

55 Taki no Chaya
11:00 am to 8:00 pm
0957-82-8284 Closed Irregularly closed

56 Mensho Sukawa Menkui
10:00 am to 4:00 pm
0957-82-0848 Closed Thursdays

57 Suwatei
11:00 am to 10:00 pm
0957-84-2215 Closed Irregularly closed

58 Karaagedokoro Yamasho (in Eco Park Ronshobaru)
9:00 am to 5:00 pm
0957-65-7056 Closed Dec. 29 to Jan. 3

59 Harajou Onsen Masago (Seasonal items).
12:00 pm to 2:00 pm
0957-85-3155 Closed None

60 Kappou Shiro
11:00 am to 8:00 pm (L.O. 7:30 pm)
0957-85-2101 Closed Irregularly closed

61 Kuchinotsu Onsen Shirahama Beach Hotel
11:00 am to 2:00 pm L.O. / 5:00 pm to 8:00 pm L.O.
0957-86-3030 Closed None

62 Shokuji dokoro Hamine
11:00 am to 2:00 pm / 5:00 pm to 11:00 pm
0957-86-4030 Closed Mondays

63 Tonari no Takochan
6:00 pm to 10:00 pm (Phone reservations accepted)
0957-86-3883 Closed Tuesdays

64 Shikisaisai Hiiro
6:00 pm to 12:00 am
0957-87-3342 Closed Irregularly closed

65 Oshokuji dokoro Hyotan
11:30 am to 2:30 pm / 4:30 pm to 10:00 pm
0957-87-3509 Closed Mondays

66 Japanese Restaurant Uokatsu
11:00 am to 2:00 pm L.O. / 5:00 pm to 8:00 pm
0957-87-4703 Closed Tuesdays

67 Okonomiyaki Waiwai Club
11:00 am to 2:00 pm / 5:00 pm to 9:00 pm
0957-87-2041 Closed Irregularly closed

68 Uchidakamabokoten
8:00 am to 7:00 pm
0957-82-2114 Closed Irregularly closed

69 MAR, SALA
11:00 am to 3:00 pm / 5:00 pm to 10:00 pm
0957-86-5408 Closed Mondays and Tuesdays

Guide to Shimabara Peninsula Hotels and Inns

■All phone numbers are preceded by the Shimabara Peninsula area code (0957).
♨…Hot springs ♨…Open-air Bath 🚶…Day-use bath (●Reservations required) 📶…Wi-Fi

Shimabara City (Shimabara Onsen)

(Hotels and inns)

1	Hotel Nampuro	☎62-5111
2	Toyo Tsukumo Bay Hotel	☎62-3111
3	Hotel Seaside Shimabara	☎64-2000
4	Ryokan Kaiboso	☎62-2225
5	Fujinoi Ryokan	☎62-4406
6	Shinyama Onsen Ue no Yu	☎63-2290

(Business hotels)

7	Shimabara Station Hotel Hanamizuki	☎62-1000
8	Business Hotel Toraya	☎63-3332
9	Shimabara Toyo City Hotel	☎62-3120
10	Shimabara Hakusan Hotel	☎63-5400
11	Business Hotel Chidori	☎62-4845
12	Shimabara Toyo Parkside Hotel	☎63-0011
13	Shimabara Station Hotel	☎65-0666

(Guest houses)

14	Minshuku Shimabara	☎62-2681
15	Minshuku Kazuki	☎62-3031
16	Minshuku Naniwa	☎63-2168

(Other)

17	Guest House Shimabara	☎62-4451
18	RV Camping at Shimabara Castle	☎62-4766
19	Shimabara Onsen Yutorogi no Yu	☎63-1126

Unzen City (Unzen Onsen)

(Hotels and inns)

20	Unzen Iwaki Ryokan	☎73-3338
21	Unzen Kyushu Hotel	☎73-3234
22	Yuyado Unzen Shin'yu Hotel	☎73-3301
23	Azumaen Ryokan	☎73-2588
24	Modern Folkart Inn Unzen Fukudaya	☎73-2151
25	Unzen Kanko Hotel ●	☎73-3263
26	Unzen Miyazaki Ryokan	☎73-3331
27	Unzen Sky Hotel	☎73-3345
28	Yumei Hotel	☎73-3206
29	Yumoto Hotel	☎73-3255
30	Ryotei Hanzuiryo Inn	☎73-2111
31	Yukai Resort Unzen Toyokan	☎0570-550-078
32	Unzen Kojigoku Seiunso Onsen	☎73-3273

(Guest houses)

33	Marutoya Ryokan	☎73-3457
34	Minshuku Sekiso	☎73-3477
35	Minshuku Unzen	☎73-3525
36	Minshuku Shindo	☎73-2323

(Other)

37	Mori no Ie Guesthouse	☎73-3541
38	TSUDOI Guest House	☎60-4225
39	Kojigoku Onsenkan	☎73-3273
40	Yunosato Onsen Kyodo Yokujo	☎080-5266-2576
41	Unzen Shin'yu Onsenkan	☎73-3233
42	Unzen Yokayu	☎73-3482

Unzen City (Obama Onsen)

(Hotels and inns)

43	Iseya Ryokan	☎74-2121
44	Uguisuya Ryokan	☎74-2281
45	Orange Bay	☎76-0881
46	Ryokan Kunisaki	☎74-3500
47	Syun-you-kan	☎74-2261
48	Yuyado Jyo-kiya	☎74-2101
49	Tsutaya Ryokan	☎74-2134
50	Fukutokuya Ryokan	☎74-2181
51	Ryokan Fujiya	☎74-2155
52	Ryokan Yamadaya	☎75-0505
53	Ryokan Yunoka	☎75-0100
54	Mutsumi No Yado Ryokan Wataya	☎74-2234

(Business hotels)

55	Obama Business Hotel	☎75-0331
56	Obama Town Hotel	☎74-3590
57	Hamakan Hotel	☎74-2222

(Other)

58	Unzenso	☎76-0550
59	Wakihama Onsen	☎74-3402
60	Hamanoyu Public Bath	☎38-3111
61	Yudokoro Yoshicho	☎75-0107
62	Naminoyu Akane Seaside Open-air Bath	☎76-0881

Unzen City (Chijiwa-cho)

(Inns)

63	Amakawaya Bekkan	☎37-3196
64	Rest House Mori no shirabe	☎37-6556

Unzen City (Aino-machi)

(Inns)

65	Kasugaya Ryokan	☎36-0118

Unzen City (Mizuho-cho)

(Public inns)

66	Mizuho Sukoyaka Land Fureai Kaikan	☎77-4111

(Business hotels)

67	HOTEL AZ Nagasaki Unzen	☎77-4401

Unzen City (Kunimi-cho)

(Inns)

68	Kangetsuso	☎78-2027
69	Ryokan Suehiro	☎78-2716
70	Ryokan Syouei	☎78-2719

(Public inns)

71	Yugakunoyakata	☎78-3331

Minamishimabara City (Fukae-cho)

(Inns)

72	The Marqui's	☎72-2031
73	Unzen Mikado Hotel Honkan	☎72-5420
74	Futsu Fukushi Center Yurari	☎72-7212

Minamishimabara City (Nishiarie-cho)

(Inns)

75	Shioyu Ryokan	☎82-3121

(Business hotels)

76	Sukawa Kanko Hotel	☎82-3967

Minamishimabara City (Kitaarima-cho)

(Other)

77	Eco Park Ronshobaru Cabin	☎65-7056

Minamishimabara City (Minamiarima-cho)

(Inns)

78	Hotel Shiro	☎85-2148

(Public inns)

79	Harajou Onsen Masago	☎85-3155

Minamishimabara City (Kuchinotsu-cho)

(Inns)

80	Kuchinotsu Onsen Shirahama Beach Hotel	☎86-3030

(Guest houses)

81	Minshuku Matsuo	☎86-3944
82	Tonari no Takochan	☎86-3883

Minamishimabara City (Kazusa-cho)

(Inns)

83	Tokiwaya Ryokan	☎87-2013

(Guest houses)

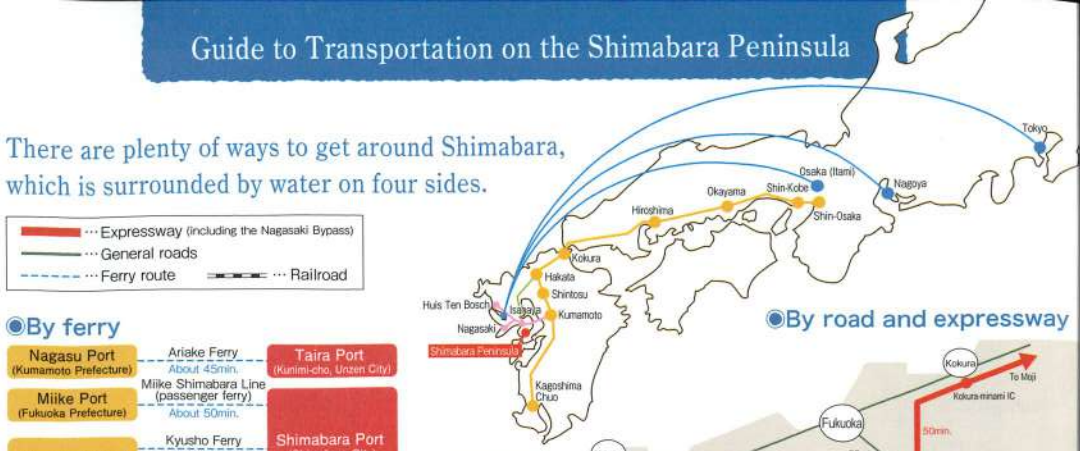
84	Minshuku Taiyo	☎87-4964

(Other)

85	Minshuku Kazusa Bungalow Village	☎87-2964

Guide to Transportation on the Shimabara Peninsula

There are plenty of ways to get around Shimabara, which is surrounded by water on four sides.

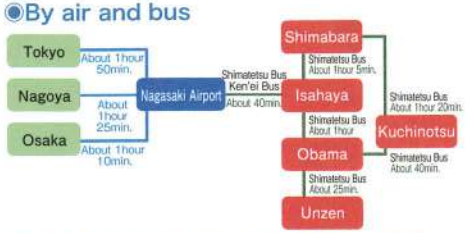


◉By ferry

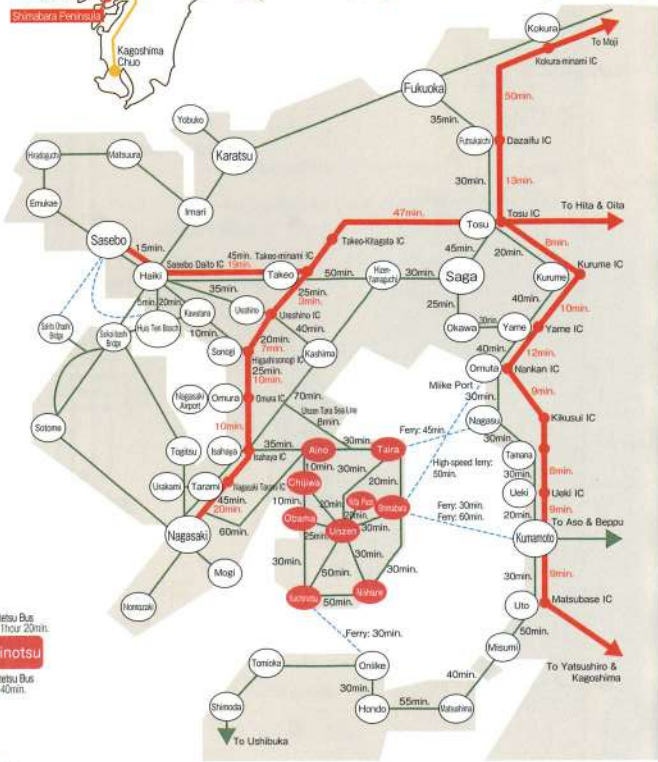
Nagasu Port (Kumamoto Prefecture)	Ariake Ferry	About 45min.	Taira Port (Kunimi-cho, Unzen City)
Miike Port (Fukuoka Prefecture)	Miike Shimabara Line (passenger ferry)	About 50min.	Shimabara Port (Shimabara City)
Kumamoto Port (Kumamoto Prefecture)	Kyusho Ferry	About 60min.	
	Kumamoto Ferry	About 30min.	
Oniike Port (Kumamoto Prefecture)	Shimatetsu Ferry	About 30min.	Kuchinotsu Port (Kuchinotsu-cho, Minamishimabara City)

◉By car

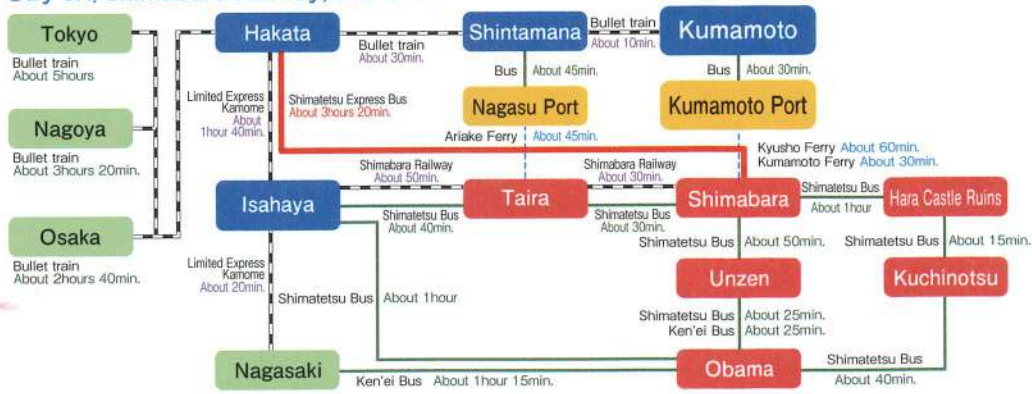
◉By air and bus



◉By road and expressway



◉By JR, Shimabara Railway, and bus

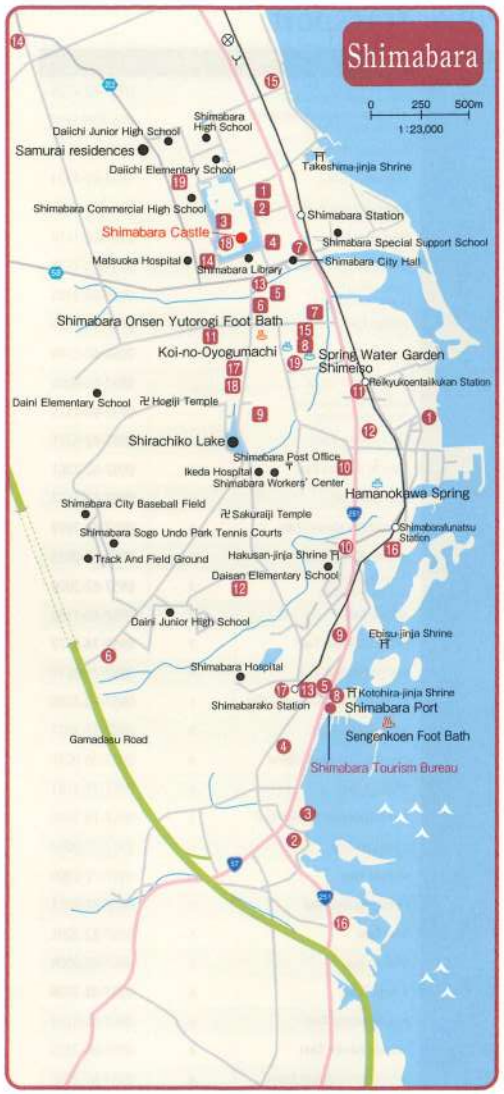


"Shimabara Peninsula: A Perfect Place to Visit" Map

Obama

Unzen

Shimabara



Minamishimabara

♨…Day-use bath ♨…Spring

Public transport

	Service or facility	Area	TEL
Railroad	Shimabara Railway (Information Center)		0957-62-4705
	JR Kyushu/Nagasaki Station Information Center		095-826-4336
Airport	Nagasaki Airport		0957-52-5555
Bus	Shimatetsu Bus		0957-62-4703
	Nagasaki Ken'ei Bus		095-823-6155
	Nagasaki Bus		095-826-1114
	Kyushu Kyuko Bus		095-861-7224
Ferry/ high-speed ferry	Shimatetsu Ferry (Kuchinotsu Port)		0957-86-2165
	Ariake Ferry		0957-78-2105
	Kyusho Ferry		0957-62-3246
	Kumamoto Ferry		0957-63-8008
	Miike Shimabara Line (high-speed ferry)		0957-64-1515
Taxi	Shimatetsu Taxi	3	0957-62-6271
	Daiichi Koutsu Taxi	3	0957-62-2261
	Koarashi Taxi	3	0957-62-3177
	Hayashida Kanko Taxi	3	0957-63-1919
	Honda Kanko Taxi	3	0957-63-0073
	Heiseikanko Taxi Shimabara Office	3	0957-62-2000
	Ariake Taxi	2	0957-68-1166
	Obama Onsen Taxi	7	0957-74-3177
	Obama Kanko Taxi	7	0957-74-2619
	Heisei Kanko Taxi Unzen Office	1	0957-73-2010
	Imasaka Taxi	8	0957-37-2021
	Ekimae Taxi Aino Office	8	0957-36-0039
	Mizuho Taxi	9	0957-77-3161
	Kunimi Kowan Kanko Taxi	2	0957-78-3246
	Miyazaki Taxi	3	0957-72-2057
	Mishio Taxi	4	0957-72-2209
	Heisei Kanko Taxi	5	0957-82-1011
	Arie Taxi	5	0957-82-2001
	Mishio Taxi	5	0957-82-2009
	Arima Taxi	6	0957-84-2029
	Harajo Kotsu Taxi	6	0957-85-2103
	Honda Kanko Taxi	6	0957-86-2100
	Minamishimabara Kotsu	6	0957-87-3930
Car rentals	TOYOTA Rent a Car Nagasaki Shimabara	3	0957-62-0100
Other	Unzen Ropeway	1	0957-73-3572

···Tourist information

···Kumamoto Port Tourist Information (open Saturdays, Sundays, and public holidays only)

Numbers: Taxi service areas

Tourist associations in the Unzen Onsen Town

A

Unzen Destination Service
320 Unzen, Obama-cho, Unzen-shi, Nagasaki Prefecture 854-0621
☎0957-73-3434 (Open 9:00 am to 5:00 pm year-round)

B

Shimabara Tourism Bureau (Shimabara Port Tourist Information)
7-5 Shimokawashiri-machi, Shimabara-shi, Nagasaki Prefecture 855-0861
☎0957-62-3986 (Open 9:00 am to 5:30 pm year-round)

C

Minamishimabara City Tourist Association
1395 Minamiarima-cho Otsu, Minamishimabara-shi, Nagasaki Prefecture 859-2412
☎0957-65-6333
(Open 8:30 am to 5:30 pm except over the New Year's holiday)

Unzen Volcanic Area UNESCO Global Geopark

Council of Unzen Volcanic Area Geopark Secretariat
1-1 Heisei-machi, Shimabara-shi, Nagasaki Prefecture 855-0879 (in Gamadas Dome)
☎0957-65-5540 (Weekdays, 8:30 am to 5:15 pm)

Shimabara Tourism Section, City of Shimabara
537 Uenomachi, Shimabara-shi, Nagasaki Prefecture 855-8555
☎ 0957-63-1111 ／ FAX 0957-62-8006

Tourism and Local Products Section, City of Unzen
714 Ushiguchimyo, Azuma-cho, Unzen-shi, Nagasaki Prefecture 859-1107
☎ 0957-38-3111 ／ FAX 0957-38-3205

Tourism Promotion Section, City of Minamishimabara
96-2 Satobo, Nishiarie-cho, Minamishimabara-shi, Nagasaki Prefecture 859-2211
☎ 0957-73-6632 ／ FAX 0957-82-3086

Shimabara Tourism Board
1-1 Heisei-machi, Shimabara-shi, Nagasaki Prefecture 855-0879 (in Gamadas Dome)
TEL：**0957-62-0655** (Weekdays, 8:30 am to 5:15 pm) Unzen Onsen Town
Website

Published: March 2022

雲仙温泉郷

海に浮かぶ火の山の大地

火山が作った海に浮かぶ火の山。
その大地には自然と人がながい年月をかけて作り出した
独特の風景がありました。

そう感じる心は もう動いている。

島原半島
雲仙温泉郷