

Unzen Volcano : the 1900-1992 eruption

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21. A Documentary of People's Life during the 1990-1992

Eruption of Unzen Volcano

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The Fugendake Peak of Unzen Volcano in the Shimabara Peninsula, Nagasaki Prefecture, erupted suddenly on 17 November 1990, after a 198-year-long quiescence. Although the eruption seemed to have subsided soon after, it erupted again on 12 February 1991. In May, ejecta around the crater produced debris flows due to heavy rain. A lava dome appeared on the summit of the volcano and the volcanic activity continued, giving rise to frequent pyroclastic flows.

Finally, on 3 June a never-expected, big pyroclastic flow covered the Kamikoba area at the foot of the volcano and sacrificed as many as 43 lives, either killed or missing. The path over which nuées ardents ran depositing the ejected material, left nothing surviving, just ruin.

Since the event, the volcanic activity has shown no sign of ceasing, but has produced, instead, frequently repeated collapse of the lava dome producing glowing clouds. This is the modern 'Shimabara Catastrophe'. As of 1 May 1992, as many as 7,609 people of 1,946 families have still been forced to evacuate their houses that stood against the power of nature.

Awaked volcano after 198-year-long dormant period

The Fugendake Peak awoke on 17 November 1990 after a 198-year-long dormant period. A first report from village residents was that 'A mountain fire took place!', which was a natural mistake, because nobody had predicted such an eruption.

The smoke was white and violent and erupted as the first firemen appeared on the scene who could only watch. Two days later, the volcanic

activity seemed to have weakened and consequently people in Shimabara City and hot spas in the Unzen area resumed their normal life.

Second eruption on 12 February 1991

On the 87th day after 17 November the Fugendake Peak burst into a violent eruption again. A newly born crater on this occasion smoked violently and ejected huge amounts of ash. This eruption was much higher in energy than the first one and has still maintained constant activity.

Debris flows and beginning of endless evacuation of residents

The first destructive debris flow took place around 1:40 a.m. on 15 May in the upper stream of the Mizunashi River, which issues from Fugendake and drains the southwestern part of Shimabara City. Careful precautions were exercised against emergencies of lava flows and a glowing phenomenon was viewed on the top of the Fugendake, suggesting magma rising to the crater level.

A debris-flow sensor recorded a reaction to the first flow at 1:48 a.m. on 15 May. The Shimabara City authority had set up the headquarters for precaution against eruption disasters by 2:00 a.m. on the same day. The headquarters officially urged 95 families (416 people) in Kamikoba and other four residential areas to seek safe places to move. 45 people of 22 families in the neighboring town of Fukae-machi also evacuated their houses. Shimabara City reorganized the head-

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quarters for countermeasures against disasters (the Shimabara Headquarters) on 18 May and started 24-hour monitoring system of eruptions and debris flows. This was the beginning of endless flow of the residents in those area seeking refuge.

The precipitation on that day measured as much as 78 mm during the time span from 0:40 to 6:10. The Mizunashi River rapidly rose and, as a result, even a very large boulder measuring 3 m across was moved by a flow. Fortunately no damage was recorded to life or dwellings, but some garages and electric poles were damaged. In the upper reaches, however, the river banks were broken at many places and large amounts of volcanic matter filled up the river.

On 19 May fissures were witnessed at the top of Fugendake, which made people anxious about out-flowing lavas. At 1:40 on the same day, a second big debris flow rushed down along the Mizunashi River. It was much larger in scale than the previous one on 15 May. Two bridges were washed away. Because the river was threatening to overflow, the Shimabara Headquarters advised 3,043 people (780 families) in Kamikoba and 9 other areas to evacuate. The town authority of Fukae-machi also advised the same to 478 people (128 families) in four areas. Thus, all together 1,326 people took refuge at local primary schools. On the next day (20 May), another debris flow took place at 7:20 a.m. The continuous life of refuge made people exhausted and restless more seriously than before.

A great surprise—Birth of lava dome

A sudden appearance of a lava dome on 20 May was a surprise. As people watched the riverhead of the Mizunashi River worrying about the progression of debris flows, it suddenly appeared in their view.

On the following day, the lava dome was split into four blocks owing to the pushing up action of the magma and heavy burden of the dome itself. Debris flows began to recur frequently. Consequently, people became more and more nervous about the dangerous situation due to eruptions and rainfall. As the lava dome continued in growth, it began to break down into pieces on 22

May. And at last on 24 May, a big collapse of the dome took place.

Pyroclastic flow—Indescribable danger

An unfamiliar term “pyroclastic flow” appeared in the newspaper for the first time on 25 May. On the same morning ‘the Nishinippon Newspaper’ opened with a headline “What happens due to pyroclastic flows, dome collapse, and volcanic mud flow (lahars)?”, and predicted a future pattern of volcanic activity. No articles in the newspaper, however, touched on the dangers of pyroclastic flows. Therefore, at that moment few people had recognized the hidden danger in the pyroclastic flow. On the contrary, most people paid attention only to highly possible attacks of big debris flows.

On the night of 24 May, the Shimabara Headquarters issued an official warning to all the residents in the areas along the Mizunashi River to take refuge to safe places, judging from predicted heavy rain and debris flows, but not from pyroclastic flows.

On the first page of a morning newspaper on 26 May a main headline said “Lava collapse of Unzen causes pyroclastic flow.” Lava collapse on 24 May gave rise to a pyroclastic flow, but no press people had enough knowledge about the true danger of pyroclastic flows.

On 26 May there were frequent pyroclastic flows. One of workers who was removing debris-flow deposits, got seriously burnt in a hot cloud. This was the first case of accidental injury in the Unzen eruption. In this event, the flow approached only 200 m from a dwelling house 3 km away from the crater. The National Committee of Prediction of Volcanic Eruption raised a warning against pyroclastic flows as dangerous to life.

Past seven o'clock in the evening of 29 May, a pyroclastic flow, the largest ever before, caused a fire in a forest at only 300 m from a house. Recurred pyroclastic flows kept the evacuees from returning to their homes, and thus, 1,094 people of 252 families near the middle and upper reaches of the Mizunashi River had to stay longer than expected out of their houses. Pyroclastic flows reached as close as 400 to 500 m to

dewelling houses. Even at this time, however, many news reporters still stayed in the Kamikoba area for their reporting activity. In addition, there were some evacuees who came back to their houses in order to take with them items necessary for their daily life in the refuge camp. More attention was paid to volcanic mud flows or debris flows rather than pyroclastic flows. Now we can realise that the bright red-colored lava strew on the mountain side was a sign of warning from Fugendake Volcano.

On 30 May a pyroclastic flow reached as close as 200 m to a house. On 1 June, one week passed since the Shimabara City first advised the residents to evacuate their houses. The city permitted people from three quarters of the lower reaches of the Mizunashi River to return to their houses, but 404 people of 96 families of the south and north Kamikoba areas continued their life in refuge, suffering from many difficulties.

43 victims—The fated pyroclastic flow on 3 June

Alas! The fated day came on 3 June. With a terrific detonation at the top of Fugendake at 6 minutes past four o'clock in the afternoon, the largest pyroclastic flow rushed down the slope on the east side of the Jigokuato Crater with a frightful speed and hit the Kamikoba area of Shimabara City. Then, the flow passed along the Mizunashi River, spreading fanwise, and arrived at Shiratani-machi about 4 to 5 km away from the crater. Firemen, police men, residents, and news reporters were involved in this event, and finally 43 people were killed and 11 were injured.

The hot blast with temperature of about 900°C near the crater surged down to the foot of the mountain maintaining a high temperature of 450°C, and burnt 179 houses. Forest trees were burnt and vegetables on farmland were buried beneath ash and debris, presenting a lifeless and hell-like scene.

The Unzen Meteorological Observatory issued the 4th announcement about volcanic activity at ten minutes past five o'clock in the afternoon of 3 June that "Volcanic activity of Fugendake is still very active, and a strict watch is necessary against pyroclastic flows and debris flows." The Shima-

bara Headquarters assigned more areas as the off-limit quarter, as a total 13 quarters. Thus, about 4,200 people of 1,090 families were advised to escape.

A severe question arised "Why were there so many news reporters and residents within the off-limit quarters?". It was because nobody imagined that pyroclastic flows might reach there. Was it beyond our common sense?

Difficult decision—Setting up of the off-limit area

The Shimabara City invoked the Act for Countermeasures against Disaster and set up the off-limit quarters coming into effect at noon on 7 June. The north Kamikoba area by the Mizunashi River, where 1,074 people of 247 families lived, was assigned as one of the off-limit quarters for 20 days. This legal action was the second application of the Act subsequent to the Tokachi-dake eruption in Hokkaido in December 1988. The assignment of residential areas with more than 100 families to the off-limit quarters occurred in the first case.

This decision makes sure of the safety of people, but it deprives them of their jobs and forces them to endure lots of restrictions in their daily lives. With regard to this decision there were many questions even inside the city authority as to whether such a small town with a population of only about 40,000, will be able to solve such problems as non-duty compensation and living expense compensation. In the situation of prolonged growth of the lava dome and fears against another big pyroclastic flow, the Japanese Government and Nagasaki Prefecture strongly suggested Mr. Kan'ichi Kanegae, the Mayor of Shimabara City, to set up the off-limit quarters in order to protect the life of all the people in the areas, even though severe limitations would be caused in citizens' daily life. The neighbouring town of Fukae-machi also invoked the off-limit quarters at 6:00 p.m. on 8 June.

Consequently, 8,600 people of 647 families had to move out of their houses to safe places. People took out not only household goods but pet animals by using trucks just like 'Noah's Ark'.

Second big pyroclastic flow on June 8 approached the sea

The rapidly emerging lava dome, which had collapsed five days ago, produced a pyroclastic flow at 7:51 p.m. on 8 June, much bigger than the previous one. It flowed rapidly along the Mizunashi River to Highway No. 57 which is about 5.9 km away from the Jigokuato Crater. Heated blast materials reached a point only 2.1 km from the seacoast. It burnt and destroyed 207 houses including 72 dwelling houses along the Mizunashi River, which was filled with ashes and pyroclastic flow deposits.

It was very fortunate that no injury was reported in the damaged area. The invocation decision, made only one day before, led to the result that it saved so many lives. The evil blast attacked the Fukae-machi area only two hours after the off-limit quarters were established.

A heavy fall of ashes and lapillis in the downtown area of Shimabara City and volcanic thunders created a panic among the citizens and many of them tried to escape out of the city in long lines of cars.

On 9 May, the off-limit quarters were expanded. Thus, 9,277 people of 2,389 families had to evacuate their houses.

Big debris flow on 30 June destroyed 151 houses

A large debris flow took place in the Mizunashi River on 30 June, which was triggered by concentrated heavy rains in the rainy season. It overflowed the middle reach of the Mizunashi River which was already filled with pyroclastic flow deposits, and spread over to the north. This overflow washed away an area 150 m wide and 151 houses including 64 dwelling ones were carried away. People were, thus, highly irritated by the torment of water after fire.

Third pyroclastic flow on 15 September spread 15km

The time lapse of three months after the last

big pyroclastic flows in June helped people relax, leading them to resume a normal life. Since 15 September, however, big pyroclastic flows began to occur frequently in the Kamikoba area and the Ohnokoba area of Fukae-machi. The maximum distance of flow movements was about 6 km and the amount of collapsed lava measured about 3,000,000 m³, which was three times as large as the 3 June collapse. Damages by the pyroclastic flows were serious in the Ohnokoba area. 218 houses were destroyed by the flows. In particular, children were greatly shocked by destruction of their school buildings by fire. The heated blast at that time reached a point only about 1.5 km from an evacuees' camp site.

Greeting the New Year at the camp site

People had to greet the New Year at their camp site, as Fugendake Volcano gave no sign of ceasing activity. 8,100 people of about 2,100 families from the off-limit quarters were forced to stay at those 41 camp sites during the New Year season.

Debris flows again after eight months

Debris flows suddenly attacked the Mizunashi River area around 1:30 a.m. on 1 March. Fortunately no damage to life and houses occurred, but Highway No. 251 was covered with sediments of muds and gravels 300 m wide and 60 cm thick. The Shimabara Railway lines were disrupted again, although the railway service had become completely normal at the end of the last year.

There was about 70 mm of rain until 8:00 a.m. on 1 March, and 32 mm rainfall during one hour when the debris flow took place. On 15 March another debris flow occurred around 10:00 a.m. On that day 100 mm rainfall was recorded from 0:00 to 13:00, and at the time of the flow the precipitation measured 29 mm.

Restless volcano

According to air-photo surveying by the National

Geographic Institute, the growth rate of the lava dome is estimated as about 280,000 m³/day. As compared with the figures of about 300,000 m³ from September to October and about 350,000 m³ from October to November, there is no indication of a decline in volcanic activity. The lava dome has grown up to the seventh dome, giving rise to frequent pyroclastic flows on small to medium scales.

7,600 people still under refuge, for more than one year

As of 1 May, 1992, 7,609 people of 1,946 families were experiencing difficult life in refuge. Since the first debris flow on 15 May, 1991, they have been left to lead the same lifestyle. It is very unusual in Japan that so many people are forced to spend life in refuge for so long.

Sad cases were reported that an 82-year-old woman killed herself on 2 January 1992 at her refuge camp and on 25 March 1992, a farmer of 43 years old also committed suicide at his home place within an off-limit area. Such a long time in refuge has given increasing stress to residents in the refuge quarters.

Here is described how to decide the off-limit quarter. Mr. Kan'ichi Kanegae, the Mayor of Shimabara City, and Mr. Yukinobu Yokota, the town-head of Fukae-machi, are responsible for the final decision of the quarter on the basis of advice by Mr. Isamu Takada, the Governor of Nagasaki Prefecture, Prof. Kazuya Ohta, the Director of the Shimabara Earthquake and Volcano Observatory, Kyushu University, and other scientists and administrators.

As of June 1991, 10,688 people of 2,802 families at most had evacuated their houses, but, considering their family life, the administrative authorities have allowed as many people as possible to go back to their houses. Highway No. 57 between Shimabara City and Unzen and No. 251 along the sea coast had been closed for a long time, but the latter road was opened on 20 December, 1991 and the Shimabara Railway service was also resumed on 27 December 1991.

Admission by the local government authorities of evacuees' return to their houses has been criticized by scientists, who have insisted that the

volcanic activity is still in a very dangerous condition. Legal restrictions to evacuees' life are to be checked every one month, and the decision makers have experienced a very difficult and hard time.

Warm support to evacuees - Compensation for damages and reconstruction

The long-term volcanic activity not only has rendered severe bad effects on the local economy in agriculture, commerce and industry, and sight-seeing business, but also has been about to break down the community life of the evacuees. It is urgently needed to extend warm administrative supports to the evacuees, considering the prolonged volcanic activity.

However, the response from the Japanese Government for supporting those people has been always so slow that people concerned are disappointed very much. For example, a very strong demand from local peoples to make a special law for the rescue, has not been seriously considered by the Japanese Government.

As an alternative, the Government has provided foods, a low interest loan, and 91 other kinds in 21 fields and has established a fund of the sum of 33,000,000,000 yen for the Countermeasures against the Shimabara Disasters (the Shimabara Fund).

The Prime Minister, Mr. Kiichi Miyazawa visited Shimabara City in March, 1992 and promised to raise the Shimabara Fund to the amount of 60,000,000,000 yen and to extend the support for food expenses for another 6 months.

On the other hand, residents have strongly demanded compensation for damages to individuals caused by the designation of the off-limit quarters, and the purchase of lands in pre-disaster prices in order to construct sand-control dams and other facilities for prevention of disasters. The Government, however, has disapproved these demands and, it is natural therefore that the residents in Shimabara have shown lack of confidence in the Government.

Long-term plan for prevention of disasters—Construction of super-dams

The Government has been inclined to judge that the Kamikoba area of Shimabara City and a part of the Ohnokoba area of Fukae-machi are no longer suitable places for residence, even if the volcanic activity may cease in the near future. Following this judgment, the Ministry of Construction and Nagasaki Prefecture revealed a new project in February, 1992, to construct a super-dam for erosion control at the junction of the Mizunashi and Akamatsu-dani Rivers.

According to their plan for prevention of pyroclastic flows and debris flows, the dam will be 1 or 2 km wide and 14 m high, accompanied by more than 80 erosion-control dams in the upper reaches. At the same time, in the lower reach, a conduit with 100-250 m wide and 2 km long leading to the sea will be constructed for debris flows.

This is a very important fundamental project, but it bears the problem that residents in the area of about 340 ha with more than 300 houses will have to be removed. Consequently, purchasing these residential places in prices settled before the disaster and arrangement for substituting their living places will have to be considered by the Government for the residents. The Government, however, has not yet shown any plans for compensation to the people.

Dreaming of the day of a happy life

Scientists from Kyushu University and other Institutes say that “Unzen Volcano was born about 500,000 years ago. As compared with this span of time, the duration of the recent volcanic activity is only a second. We will have to monitor the volcano in a long-term schedule. Only this will increase the accuracy of prediction of volcanic activity.” These words are impressive, but our naive question is that “Is nature still far beyond ourselves?”.

The observations and monitoring of the volcano by the joint teams of university researchers have been intensively carried out without break, with the effective support by the army.

These observations predict that Fugendake will continue its activity for another two or three years. Therefore, we would like to appeal to the Government to support more effectively the residents in the areas damaged by the eruption in order to help them rouse themselves.

Before the eruption, Unzen-Fugendake had shown to the residents and visitors her beautiful face with seasonal changes. Now, everybody wishes sincerely that her beautiful face will be seen again as soon as possible.