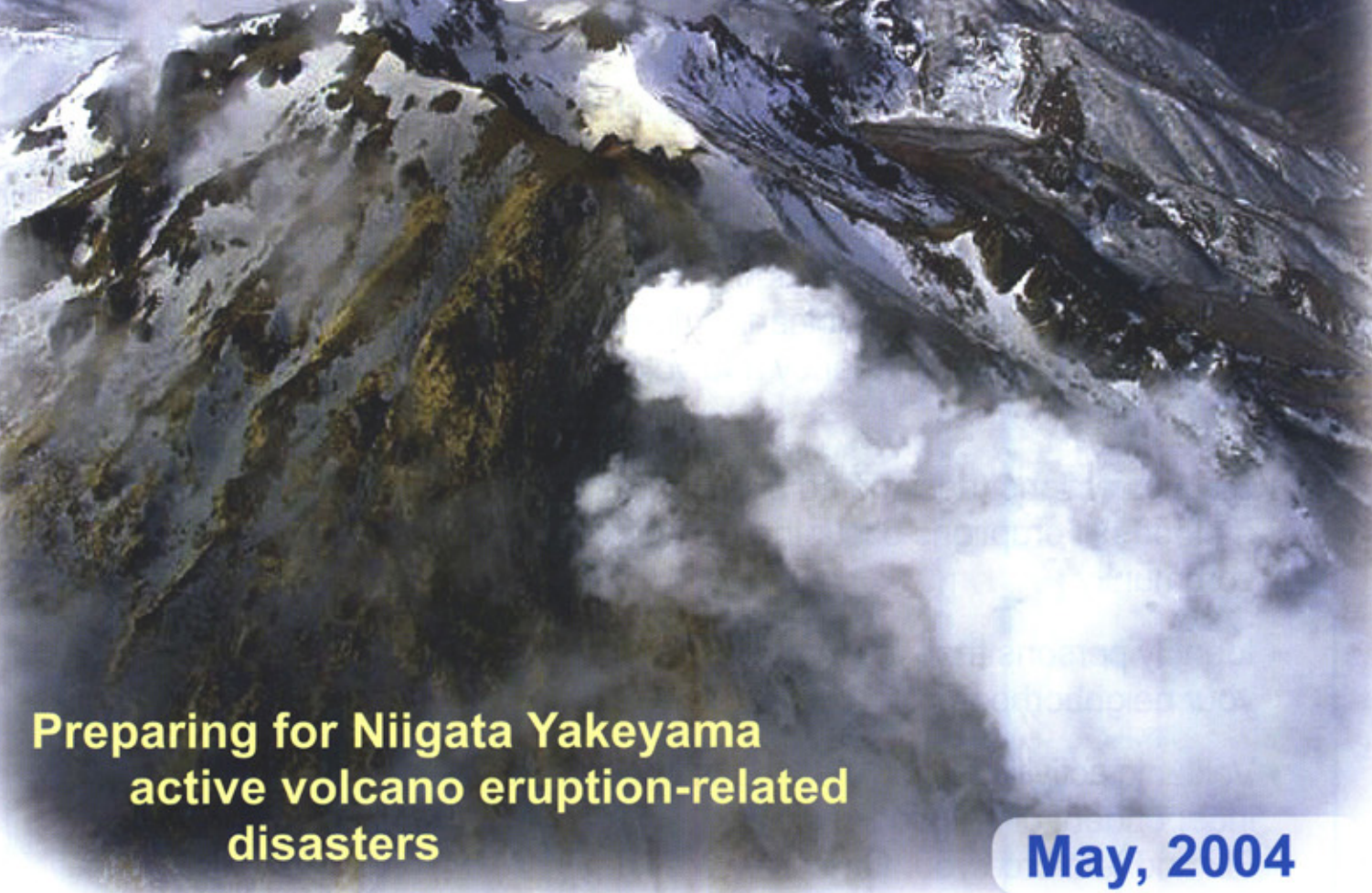


Hazard Map for Volcanic Disaster Prevention in Niigata Yakeyama



Preparing for Niigata Yakeyama active volcano eruption-related disasters

May, 2004

Contact: Reporting on volcanic abnormal information and information-based evacuation activities and relief measures

Police : Tel-110 or Itoigawa Police Station : 0255-52-0110
 Fire station : Tel-119 or Itoigawa Regional Fire Station : 0255-52-0119
 Municipal Office : 0255-52-1511

Contact for "Hazard Map for Volcanic Disaster Prevention in Niigata Yakeyama"

General Affairs Section, Itoigawa Municipal Office : 0255-52-1511
 Planning and Coordination Division, Regional Management Department, Itoigawa Regional Development Bureau (Itoigawa Civil Works Office) : 0255-53-1969

Purpose of Volcano-related Disaster Prevention Map

Niigata Yakeyama is an active volcano, which was formed during the Jomon Era, about 3,000 years ago, and has a history of explosive activities. Since the eruption of the mountain in 1773, large eruptions involving volcanic mudflows and pyroclastic flows have not been observed. Recently, in 1983 and 1997-1998, small-scale steam-explosions occurred, and even now the volcano sometimes blows out gas to a height of more than 200m.

This hazard map collectively describes the characteristics and the scales of presumed eruptions, potential disaster areas, actions during eruptions and preparations on a routine basis, on the assumption of a future eruption of Niigata Yakeyama.

Please discuss with your family and community members the following points after studying this map, so that you can behave in an orderly way if the volcano erupts.

- Characteristics of Niigata Yakeyama
- Preparedness for volcanic disasters
- Evacuation methods and places
- Preparation for emergency kit

Planning : Itoigawa City, Niigata Prefecture
 Survey and Production : SABO Technical Center
 Supervision : Review Committee on Development of Hazard Map for Volcanic Disaster Prevention in Niigata Yakeyama

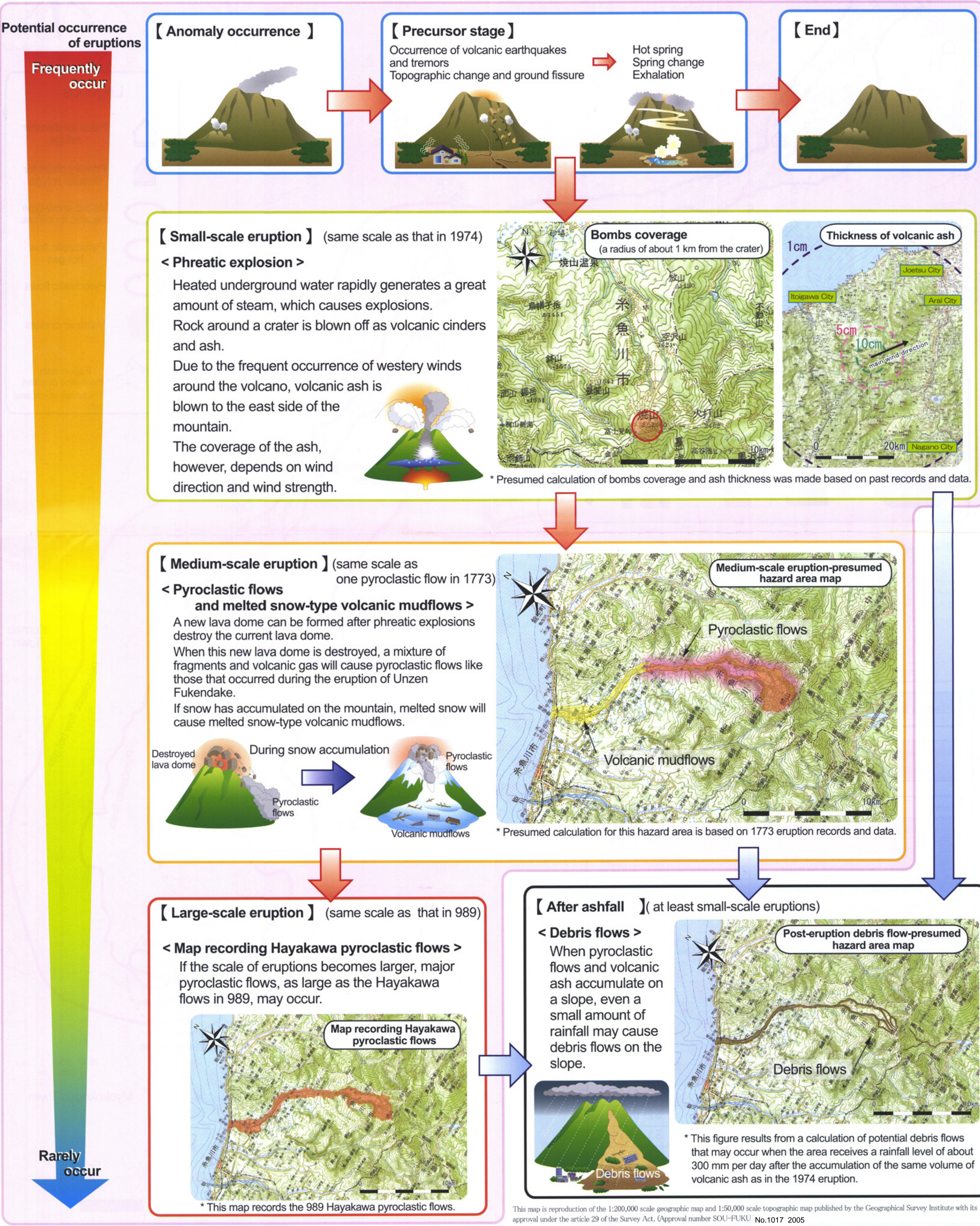
Survey and cooperation : Niigata University, Regional Management Department, Itoigawa Regional Development Bureau, Niigata Prefecture

Information : Kenji Hayatsu, Tadahide Ui, Nobuyuki Ozeki, Hideyuki Ito, Headquarters of The Niigata Prefectural Police, Sabo Section of Public Works Division, Niigata Prefecture, Regional Management Department, Itoigawa Regional Development Bureau, Niigata Prefecture, SABO Technical Center

Prepared as of May, 2004

Sequence of Eruptions

An eruption of Niigata Yakeyama follows various stages. In general, the probability of a large-scale eruption occurring is extremely low. In most cases, eruptions will end with precursor phenomena.



Illustrated eruption phenomenon

Melted snow-type volcanic mudflows



Chokai Mountain: Photo by Tadahide Ui, March 1974

Flows from snow that has melted rapidly due to eruptions travels down at high velocity, cutting a slope surface and involving a large volume of soil and rock.

Pyroclastic flows



Unzen Fukendake: Photo by Nobuyuki Ozeki, June 3, 1991

When a newly formed lava dome is destroyed, a mixture of its fragments and volcanic ash/gas travels down a slope at high velocity. Light hot gas formed on the top of the flows may overpass a gentle ridge.

Lava flows



Miyake Island: Photo by Hideyuki Ito, 1983

Lava flows are composed of magma flowing from a crater. People can escape the flows on foot due to their low velocity, but these high-temperature flows burn everything in their path.

Debris flows



Yakeyama: Photo by Niigata Prefecture, July 1974

Even a little rain may cause debris flows after volcanic ash has accumulated upstream from a mountain slope and a valley. The velocity of the flows reaches tens of kilometers per hour.

Volcanic bombs and ash fall



Mount Usu: Photo by Hideyuki Ito, 2000

Volcanic bombs and ash are released from a crater after an eruption. The bombs fall within a few kilometers from the crater. Volcanic ash is blown by upper air and accumulates on the leeward side.

Volcanic gas

Active exhalation may release gas containing sulfur dioxide and carbon dioxide. It is very dangerous to access a depression around a fumarole when there is little wind.

This map is reproduction of the 1:200,000 scale geographic map and 1:50,000 scale topographic map published by the Geographical Survey Institute with its approval under the article 29 of the Survey Act. (Approval number SOU-FUKU No.1017 2005)

Important:

- * This map was prepared for a reach of Hayakawa (river) (Itoigawa City), but does not indicate all the potential damaged areas due to pyroclastic flows that occurred at the south side in the past.
- * Pyroclastic flows, melted snow-type volcanic mudflows, and debris flows may travel down in a zone other than in the range of the map, depending on eruptions. If eruptions start, you are required to get the latest information and follow the directions of disaster prevention authorities and organizations.
- * Poisonous gas may occur near the peak. In the case of potential active eruptions, it is not recommended that you access the vicinity of the peak.

Characteristics of Niigata Yakeyama

- The volcanic activities of Niigata Yakeyama are characterized as follows:
- An eruption crater has been located near the peak for 3000 years since the mountain was formed.
 - Past eruptions caused lava and pyroclastic flows, volcanic ash, and cinders.
 - Lava flows easily have solidify and do not travel down smoothly.
 - Pyroclastic flows occurred four times in the past and all flowed down along Hayakawa River.
 - Pyroclastic flows are considered to occur after a lava dome at the peak is destroyed by magma rising underground.
 - There is a high possibility that melted snow will cause volcanic mudflows when pyroclastic flows occur during a period of snow accumulation, although there are no records on this phenomenon for this mountain.

Precursor of volcanic eruption

Inform the municipal office or the fire station of this precursor if you observe it.

However, this precursor cannot always be observed. You are required to pay regular attention to TV and radio news and public information from public offices.

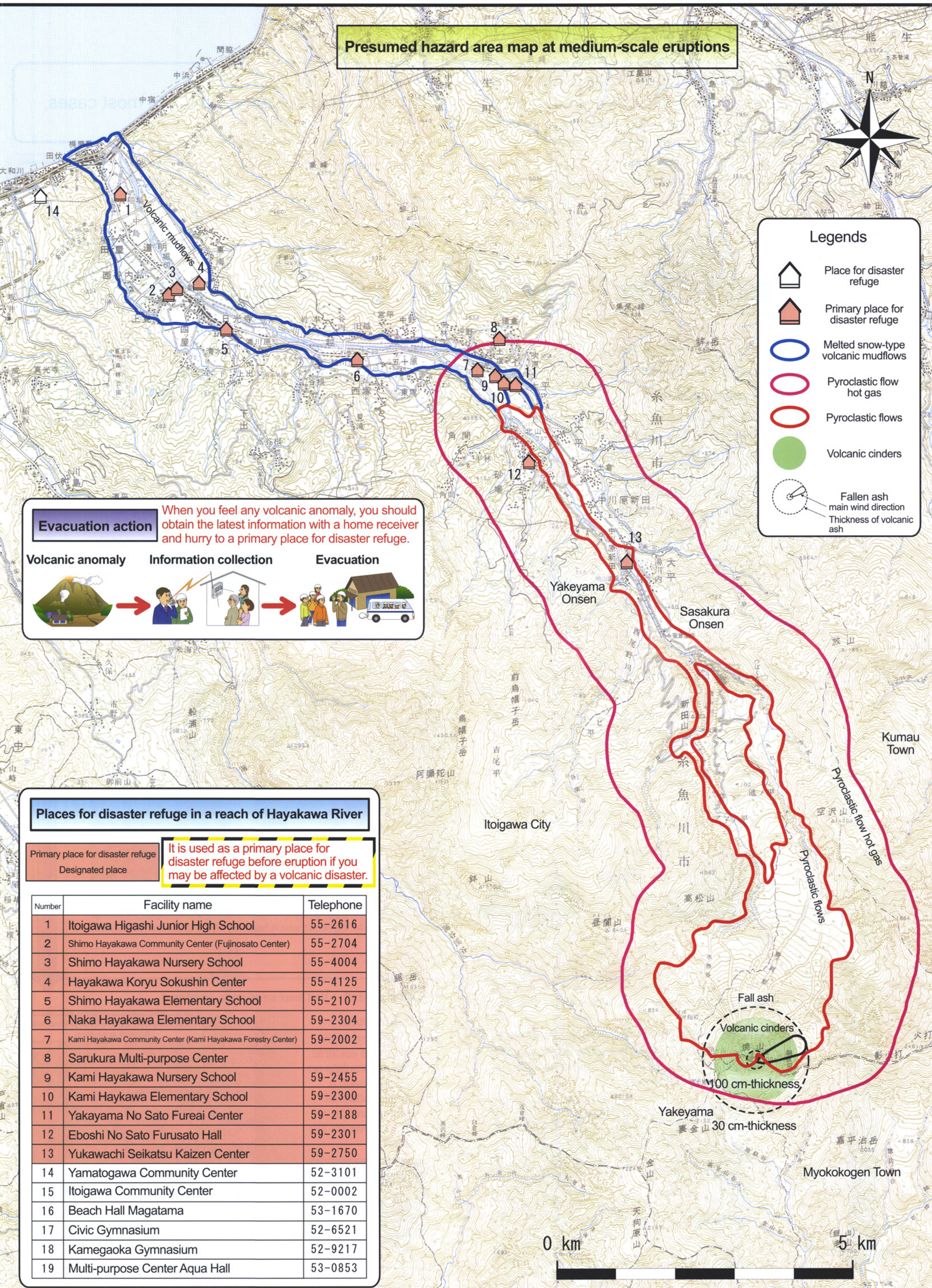
- There may be cracks on ground.
- Earthquake may occur only in a region near the volcano.
- Unstable rock may fall.
- Volcanic gas is released from magma. Gas spouts from an unusual place while gas volume, color, and smell vary at an unusual place.
- There are variations in discharge capacity and temperature of a hot spring or a new hot spring occurs.
- Plants sometimes die. In addition, there are variations in the water level of a river or a lake, and their water is discolored, which may kill fish.
- Explosions from a volcano can be heard and glass windows vibrate (shock wave).
- Animals may behave in an abnormal manner.



Volcanic information types

- Volcanic Observation Report:** Volcanic observation report is issued as supplemental information to Volcanic Alert and/or Volcanic Advisory.
- Volcanic Advisory:** Volcanic Advisory is issued when unusual volcanic phenomena are observed and preparation for disaster prevention/mitigation is required.
- Volcanic Alert:** Volcanic Alert is issued when volcanic activities become extremely high and urgent countermeasures to prevent/mitigate damage to human lives are required.

Presumed hazard area map at medium-scale eruptions



Legends

- Place for disaster refuge
- Primary place for disaster refuge
- Melted snow-type volcanic mudflows
- Pyroclastic flow hot gas
- Pyroclastic flows
- Volcanic cinders
- Fallen ash main wind direction
- Thickness of volcanic ash



Places for disaster refuge in a reach of Hayakawa River

Primary place for disaster refuge Designated place

It is used as a primary place for disaster refuge before eruption if you may be affected by a volcanic disaster.

Number	Facility name	Telephone
1	Itoigawa Higashi Junior High School	55-2616
2	Shimo Hayakawa Community Center (Fujinosato Center)	55-2704
3	Shimo Hayakawa Nursery School	55-4004
4	Hayakawa Koryu Sokushin Center	55-4125
5	Shimo Hayakawa Elementary School	55-2107
6	Naka Hayakawa Elementary School	59-2304
7	Kami Hayakawa Community Center (Kami Hayakawa Forestry Center)	59-2002
8	Sarukura Multi-purpose Center	
9	Kami Hayakawa Nursery School	59-2455
10	Kami Hayakawa Elementary School	59-2300
11	Yakayama No Sato Fureai Center	59-2188
12	Eboshi No Sato Furusato Hall	59-2301
13	Yukawachi Seikatsu Kaizen Center	59-2750
14	Yamatogawa Community Center	52-3101
15	Itoigawa Community Center	52-0002
16	Beach Hall Magatama	53-1670
17	Civic Gymnasium	52-6521
18	Kamegaoaka Gymnasium	52-9217
19	Multi-purpose Center Aqua Hall	53-0853

Regular preparations

- Understand what disaster can be caused in Yakeyama.
- Always obtain volcanic information such as on Yakeyama's features of volcanic activities and volcanic terms through books and booklets.
- This information and knowledge will contribute to a proper understanding of volcanic information released by the Meteorological Agency and volcanic disaster prevention.
- Discuss actions (designated place and evacuation methods) if eruptions occur throughout the whole community.
- Identify persons that need care and evacuation aids in your neighborhood.
- Volcanic activities involve earthquakes that are independent of eruption scale. Fix and reinforce your furniture.
- Always prepare an emergency kit, and check your preparations.



Evacuation guidance

- Start to take actions in a calm manner.
- Remember to take your valuables.
- Make sure that doors and windows are locked, and that there are no potential fire sources by turning off gas and electricity.
- Limit your emergency kit to the following items so that they do not hinder safe evacuations.
- Help evacuations of elderly people, babies, handicapped persons, tourists, and other strangers, and cooperate so that everybody can evacuate immediately.

Emergency kit

Always prepare emergency kit and check on your preparations in case of future volcanic eruptions.

Emergency kit items:

- Clothes:** Underclothes and outerwear, Towel
- Food and water:** Canned food, Pouch-packed food, Snacks, Mineral water, Dog biscuits
- First-aid drugs and official drugs:** Medicine cabinet, Bandage, Antiseptic solution, Official drugs
- Valuables:** Money, Insurance policies, Savings passbooks, Seals
- Other:** Cellular phones, Batteries, Flashlights, Rain apparels, Candles, Cigar lighters, Portable radios
- If there are babies in your family:** Powder milk, Baby bottles, Paper diapers, Baby food
- In case that there are elderly persons in your family:** Dry shampoos, Official drugs

Contact:

- Reporting on volcanic abnormal information and the information-based evacuation activities and relief measures**
- Police : Tel-110 or Itoigawa Police Station : 0255-52-0110
 - Fire station : Tel-119 or Itoigawa Regional Fire Station : 0255-52-0119
 - Municipal Office : 0255-52-1511
 - Niigata Local Meteorological Observatory : 025-244-1705
- NTT Disaster Emergency Message Dial**
171 (No code) * Follow voice guidance, dial "1" for recording and "2" for replay.