

5. Tokyo Volcanic Ash Advisory Center

Most of the volcanoes around the world are known to be potential threats to local inhabitants due to lava flows, volcanic bombs, pyroclastic flows, and ash falls during an eruption that may cause the loss of life and property. However, a lesser-known fact is that volcanic ash thrown high into the atmosphere by an eruption may threaten flights with floating ash clouds of tiny particles. Volcanic ash damages engines and bodies of aircraft and is not only a threat to flight safety but also cause of severe economical damages for airlines and aviation organization. Therefore, timely provision of information of drifting volcanic ash is very important for the aviation safety.

The International Civil Aviation Organization (ICAO), a special organization of the United Nations launched the International Airways Volcano Watch (IAVW) with the assistance of international organizations such as the World Meteorological Organization (WMO, a special organization of the United Nations). Thereafter, ICAO and WMO stipulated that Meteorological Watch Offices (MWO) in individual countries should issue information about volcanic ash cloud as Significant Meteorological Information (SIGMET): information about meteorological weather conditions that may be significant or threatening to flights. ICAO also recommended the establishment of volcanic ash advisory centres that provides Volcanic Ash Advisories (VAA) to help MWO to issue SIGMETs about volcanic ash cloud.

The Japan Meteorological Agency (JMA) established the Volcanic Ash Advisory Center in the Tokyo Aviation Weather Service Center in April 1997 as one of nine VAAC in the world, and started services for the issuance of VAAs in the area of responsibility (see Fig. 1).

Monitoring of Volcanic Ash Cloud

(1) Collection of information about eruptions, volcanic activities and witnessed volcanic ash cloud

- a) In the event of the eruption of a volcano in Japan, the observation data is reported from Volcanic Observations and Information Centers of JMA, and additional information is reported from pilots about eruptions and volcanic ash cloud.
- b) In the event of the eruption of a volcano outside Japan, the volcanic activity reports from both volcano observatories overseas and pilots are important information sources. In addition to this information, Tokyo VAAC also exchanges information about eruptions of volcanoes and divergence of volcanic ash cloud with the adjacent VAACs in Anchorage, Washington, and Darwin. Information from the Web sites is also used as a reference.

(2) Monitoring of volcanic ash cloud using satellite image analysis system

Tokyo VAAC monitors volcanic ash cloud using the satellite image analysis system of visible images and infrared images of the Meteorological Satellite GMS-5 and infrared images of the Earth Observation Satellite of the National Oceanic and Atmospheric Administration.

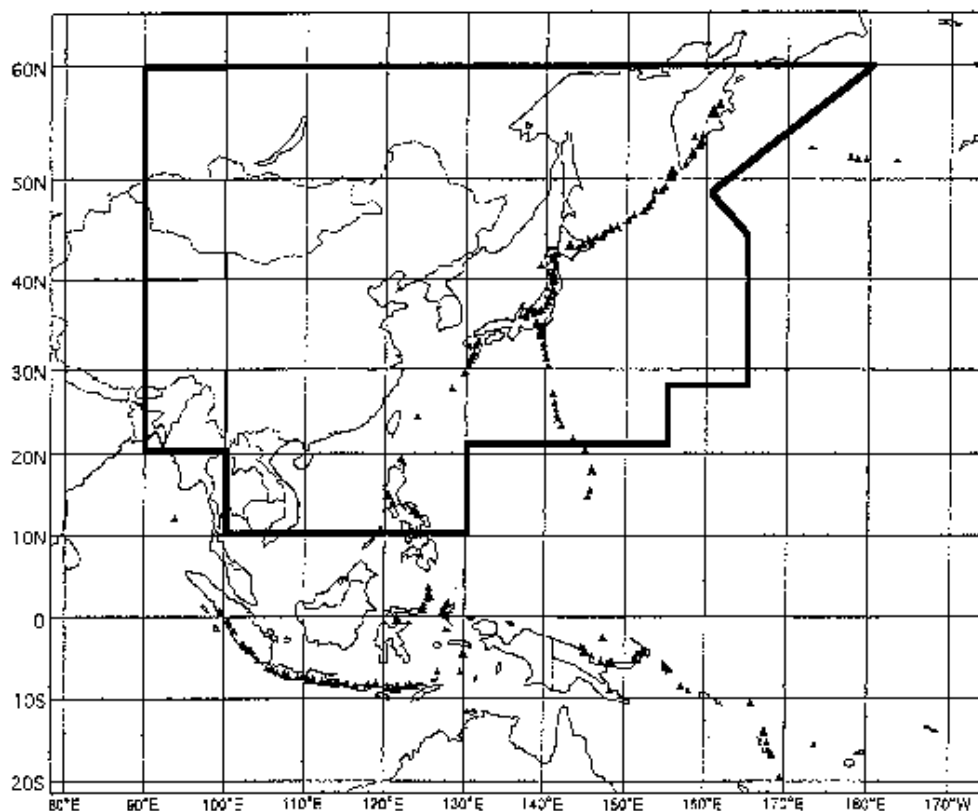


Fig. 1. The area of responsibility of the Tokyo VAAC.

(▲: volcanoes in and around the responsibility area)

Forecasting volcanic ash cloud dispersion

The Tokyo VAAC forecasts volcanic ash cloud dispersion based on the calculation taking the monitored results into account for volcanic ash cloud. The forecasts are issued in the VAA with the monitored results and are also available in a volcanic ash cloud forecast chart.

Issuance of Volcanic Ash Advisories

The issuance criteria for VAA from the Tokyo VAAC are as follows:

- a) When the height of volcanic ash cloud reaches 5,000 meters above sea level as estimated from the relevant information about volcanic ash cloud,
- b) When volcanic ash cloud is detected on satellite imagery and the height of the eruption plume or volcanic ash cloud reaches 5,000 meters above sea level, and
- c) Any time when aircraft in flight may be affected by volcanic ash.

Unless remarkable changes in the situation do occur, VAA update will be issued at 00, 06, 12, and 18 UTC.

If Tokyo VAAC detects or is notified of a volcanic eruption from a volcano in Japan, VAA will be issued in spite of a plume height for the domestic aviation authorities and airlines. JMA will eliminate the criteria mentioned above and to provide low level VAAs for the other volcanoes in the area of responsibility than ones in Japan.

VAAs for volcanic ash clouds over 5,000 m above sea level provided by Tokyo VAAC in these six years are as follows;

Years	number of issuance of VAAs
1997	28
1998	30
1999	22
2000	104
2001	87
2002	39 (for over 5,000 m plume) 290 (for below 5,000 m plume)

(Keiji Doi)