

Ignimbrite, tephra-fall, caldera and fatalities of major volcanoes in the East and Southeast Asia

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Large-scale caldera-forming eruption can cause major destruction within 10 to several 100-km radius from the erupting volcano. The information about the area affected by ignimbrite and tephra falls and size of caldera are useful for future volcanic hazard assessment. Hence, the compilation of data about the distribution of ignimbrite and tephra fall, shape and size of caldera and fatalities caused by volcanic eruptions in East and Southeast Asia is very important.

The G-EVER Promotion Team of the Geological Survey of Japan, AIST is implementing the Asia-Pacific region earthquake and volcanic hazards mapping project, which compiles earthquake source regions, active faults, tephra falls, caldera, ignimbrite, and fatalities caused by earthquake and volcanic events, in collaborations with geohazard research institutes in the Asia-Pacific region. The G-EVER Promotion Team published the 1:10M Eastern Asia Earthquake and Volcanic Hazards Information Map in 2016 (Takarada et al., 2016). The contents of the map can also be viewed or downloaded using the Asia-Pacific Region Earthquake and Volcanic Hazard Information System at <http://ccop-geoinfo.org/G-EVER/>. The distribution of ignimbrite and tephra fall, shape of caldera and fatality data are updated and available on the site in 2019.

Ignimbrite: The distribution of large-scale ignimbrites (VEI>6) in East and Southeast Asia are compiled. Ignimbrites data are obtained from 19 volcanic caldera-forming eruptions in the region such as Toba 74 ka, Changbaishan 946AD, Tambora 1815AD, Rinjani-Samalas 1257AD, Aso-4, Aso-3, Aira-Ito, Kikai-Koya, Kikai-Nagase, Ata, Toya, Shikotsu 4.6 ka, Kutcharo I, Kutcharo IV, Krakatau 1883AD, Rabaul 7c, Pinatubo 1991AD, Hakone-Tokyo, and Towada-Hachinohe.

Tephra falls: The distribution of large-scale tephra falls (VEI>6) in East and Southeast Asia are compiled. Tephra falls data are obtained from 24 volcanic caldera-forming eruptions in the region such as Toba 74 ka, B-Tm 946AD, Tambora 1815AD, Rinjani-Samalas, Krakatau 1883AD, Rabaul 7c, Pinatubo 1991AD, Long Island 1660AD, Witori-Kimbe2, Ulleung-Oki and Ulleung-Yamato.

Caldera: The shape of major calderas (VEI>6) in East and Southeast Asia are compiled. There are 23 caldera data obtained from volcanoes such as Toba, Tambora, Aso, Aira, Kikai, Ata, Toya, Shikotsu, Akan, Kutcharo, Taal, Krakatau, Rinjani-Samalas, Pinatubo, Rabaul, Long Island, Dakataua, Wiroti, Billy Michel, Towada, Mashu, and Moekeshi.

Fatalities: The number of volcanic eruption fatalities and their causes (i.e. pyroclastic flow, debris avalanche, tephra fall, lahar, tsunami, volcanic gas and other reasons) since 1400AD in East and Southeast Asia are compiled. The 13 events at 9 volcanoes in Papua New Guinea, 3 events at 2 volcanoes in Solomon Islands, 6 events at 3 volcanoes in Vanuatu, 74 events at 27 volcanoes in Indonesia, 20 events at 6 volcanoes in the Philippines and 36 events at 21 volcanoes in Japan (152 events at 67 volcanoes in total) were compiled.

The data in ESRI shapefile and other formats are available for download at the Asia-Pacific Region

Earthquake and Volcanic Hazard Information System site. The same data with detailed explanation are also available from GSJ open file report. The data are very useful for the various volcanic hazard assessment undertakings.

Figure: Distribution of ignimbrite and shape of Pinatubo caldera after its eruption in 1991AD (Base map provided by the ArcGIS software is used).

Keywords: Ignimbrite, Tephra Fall, Caldera, Fatality, Hazard

