

## Try to draw the volcanic eruptions and earthquake activity in the same figure around Japan Part 1: in and around Japan

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The relation between the volcanic eruption and the occurrence of large earthquakes were well known. It was the famous eruption of Mt. Fuji in 1707 in Japan. It was followed 49 days after the occurrence of M9 Hiei earthquake. The 2004 Sumatra M9 earthquake followed some eruptions, too. But 2011 off Tohoku, Japan M9 earthquake did not follow eruptions, yet. The seismicity was commonly analyzed in time and space, using several database, for example ISC and PDE catalogs. But the data of volcanic eruptions were not popular and needed to analyze the relation.

The data of eruptions in and around Japan was inputted in order to search the relation between eruptions of volcanoes and occurrence of large earthquakes. The database of the Global Volcanism Program by Smithsonian Institute (<http://volcano.si.edu/>) was adopted. The histories of volcanoes of Onkakesan, Asosan, Kuchinoerabujima, Nishinoshima, Izu-Torishima, Kikai, Ioto, Kirishimayama, Miyakejima, Fukutoku-Oka-no-Ba, Asamayama, Akan, Suwanosejima, Tokachidake, Kita-Ioto, Hokkaido-Komagatake, Toya, Niigata-Yakeyama, Akita-Yakeyama, Adatarayama, Unzendake, Minami-Hiyoshi, Kujusan, Yakedake, Izu-Oshima, Izu-Tobu, Kusatsu-Shiranesan, Myojinsho, Kaitoku Seamount, Fukujin, Shikotsu, Nikko, Azumayama, Kasuga, Izu-Torishima, Sofugan, Chokaisan, Io-Torishima, Nasudake, Kita-Fukutokutai, Aira, Nikko-Shiranesan, Kurikomayama, Nakanoshima, Akagisan(no), Shiretoko-lozan, Iwatesan, Submarine Volcano NNE of Iriomotejima, Akita-Komagatake, Maruyama, Bandaisan, Esan, Midagahara, Fujisan, Yokoate-jima, Kuttara, and (Smisujima) were checked and only 'Confirmed' eruptions were adopted.

The format of eruption data is same as that of hypocenters. The location of the volcano, not craters, is the epicenter. The height of volcano is minus depth in 10m of hypocenter, and the volcanic explosivity index (VEI) is used as the magnitude of the earthquake. The origin time is the date of the eruption and is assumed on 00:00:00 time. The eruption was assumed every day from the start of the eruption to the end. If the start date and the stop date were only known in year, Jan. 1 was assumed for the start day and Dec. 31 for the stop date. If there was no information of the stop date, only the start date was inputted. Totally more than 153,000 eruptions were inputted from AD 20 to 2014.

Mixing this data and earthquake catalog, we can get some relations between eruptions and earthquake occurrences. One is that the 1922 M7.6 earthquake in Okinawa followed VEI 4 eruption near Miyako island in 1924. The other is some large earthquakes occurred before and after the large eruptions in NE Japan in 17 century.

Keywords: volcano, eruption, earthquake, database