

## Volcanoes of Japan (Third edition) published in 2013

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The Geological Survey of Japan issued the new map in 2013, Volcanoes of Japan (Third Edition), geological compilation covering volcanoes in the Quaternary Period in Japan. The first edition (Isshiki et al., 1968) and the second edition (Ono et al., 1981) were issued in 1968 and 1981. The second edition covered Quaternary volcanoes in land areas and submarine volcanoes only with eruption records. Thereafter, there was dramatic progress with radiometric dating technology and chemical analysis methods, enabling a great volume of dating measurement values and chemical compositions to be collected. The third edition covered Quaternary volcanoes in land areas, in addition to the results of studies on such dating measurement values and chemical compositions since the publication of the second edition. Due to changes to the definition of geologic period definitions (the base of the Quaternary Period was changed from approximately 1.8 Ma to approximately 2.6 Ma) by IUGS in 2009, the third edition has a significantly greater number of volcanoes compared to the second edition.

The distribution map was created based on the Seamless Digital Geological Map of Japan at the scale of 1:200,000, and some of the latest knowledge was added to this edition. In order to basically have a single type of volcano or volcano group for a single classification, geological boundaries on the seamless geological maps were integrated or removed, because the seamless geological maps which had been created until 2012 adopt the later part of the late Miocene and Pliocene (from approximately 7 Ma to 1.7 Ma) as a single period classification, and are not only based on the new geologic age definitions. Extracting individual volcanic rocks of the Gelasian Stage (from approximately 2.6 Ma to 1.8 Ma), which has been newly included in the Quaternary Period, has been manually carried out.

A large number of land volcanoes have been added due to the redefinition of geologic periods. In addition to these, there are some volcanoes which were not in the second edition but have been included in the third edition, because they were found to be in the Quaternary Period, based reasons such as age measurement. Information on such volcanoes is essentially based on the database by Nishiki et al. (2012). Quaternary volcanoes according to the former definition are based on website, Quaternary Volcanoes in Japan, by the Geological Survey of Japan. A large volume of unpublished age measurement data was also referred to in looking into active periods.

The caldera volcanoes, which erupt a large volume of pyroclastic materials, include pre-caldera stage, caldera-forming stage, and multiple post-caldera stages. In this case, each volcano name was given according to the stage. In some cases where it is deemed that there are no chronological gaps between individual active stage or where such gaps are unknown, or if the details of the caldera volcano itself are unknown, such cases are treated as a single volcano.

Neighbouring volcanoes which are deemed to have relatively similar active periods and active ranges are sometimes treated as a single volcano group. The definitions of individual volcanoes and volcano groups include those in the second editions issued in 1981, those based on names and definitions which had been used in previous studies, those newly classified, and those which have been redefined.

In addition to obvious submarine eruption points, sites with which any volcanic phenomena such as discolored water, floating pumice and submarine hydrothermal activity are found, are displayed as submarine volcanoes.

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