

## Frequency and types of volcanic eruptions of Chokai volcano during the last 2,500 years

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Volcanic ash layers preserved in peat soil at the Oda peatland on the northern flank of Chokai volcano have recorded the sequence of volcanic eruptions during last 2,500 years, after the sector collapse to the north. There are 14 ash layers between To-a and OD12 that was dated as c. 2,290 ± 50 years (385 BC) by Hayashi et al. (2000). One of the layers is composed of fine-grained glass shards suggesting a distal plinian fallout deposit that may be Hr-FP. Other than the plinian tephra and To-a, the ash layers are considered to be derived from Chokai volcano. Ash layers above the To-a ash (915AD) imply that at least 6 eruptions in 4 ages occurred during the period between late Heian and Muromachi eras. Some of them are scoriaceous ash layers, therefore, magmatic eruptions occurred during these eras. No documented record during this period is known probably because of lack of historic documents. According to Ueki and Hori (2001), old documents recorded two magmatic eruptions, but some other magmatic eruptions are recorded in the outcrop. The ash layer right beneath To-a is considered to be the ash of 871 AD eruption that accompanied lava effusion (Hayashi et al., 2000). Numbers of eruptions are both recorded in documents and the peat soil during the Asuka, Nara, and early Heian ages, but each eruption cannot be correlated. Many eruptions are recorded in documents during Edo era, but the ash layers during the age are not distributed in the outcrop. The peatland is 2.4 km far from the summit of the volcano, and ash of the last eruption in 1974 is not distributed there. As ash from small eruptions may have not been reached the peatland, frequency of eruption is higher than that estimated with the number of ash layers between To-a and OD12 (once a century).

The ash layers contain scoria, blocky ash, altered lithic, igneous minerals and clay. Composition of the ash layers varies widely from entirely juvenile to non-juvenile, accordingly, eruption style show a wide spectrum from strombolian, vulcanian, via phreatomagmatic to phreatic. The eruption type randomly changed during the last 2,500 years. Phreatic eruption deposits are thinner than magmatic eruption deposits. The ash deposits younger than To-a comprise phreatomagmatic and strombolian products, indicating magmatic event during historical age. The 871AD ash is composed of fine hydrothermal clay and juvenile fragments, indicating that a phreatomagmatic eruption occurred along with the lava effusion. Non-juvenile materials discharged by phreatic and phreatomagmatic eruptions are basically hydrothermally altered lithic and hydrothermal minerals, such as smectite, kaolinite, pyrophyllite, gypsum, and chlorite, implying that the ash were derived from hydrothermal alteration zone, and that the source of steam discharged by the eruption is the subvolcanic hydrothermal system.

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