

Reconstruction of volcanism in Baitoushan volcano after 10th century huge eruption

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The 10th century eruption of the Baitoushan volcano (Changbaishan in China) is one of the largest volcanism in the past 2000 years. But the other volcanic activities, especially after 10th century, are not known. Based on the research about the documents of surrounding nations, Chinese and North-Korean researches found that there were many historical records implying the volcanisms of Baitoushan volcano since 12th century.

From the volcanological analysis against these records Cui et al.(1995) concluded that three descriptions of AD1668, AD1702 and AD1903 were expressed the eruptions of Baitoushan surely in many records. But previous studies do not refer about the volcanic products corresponding to the three eruptive episodes by the field examinations. In this report we reconstruct the volcanisms of post-10th century huge eruption based on the field survey at the flank of Baitoushan, and especially discuss the validity of interpretation about the description of AD1702 thought the largest eruption after 10th century by previous works.

We investigated the deposits after 10th century in the core samples taken from the Yuanchi Lake at the eastern flank of Baitoushan volcano, about 30km away from the crater. The deposits are 50cm thick from the surface. Upper part is constituted organic sediments without interbedded volcanic ash layer, while lower part is rework deposits derived from 10th century eruption products. As an observation result with laboratory works, any volcanic ash component could not be found in the organic sediments over 10th century eruption deposit.

In the historic records of Li dynasty there is a description that the ash of 4cm thick fell in the town at eastern shore of Korean peninsula on AD 1702. This town is 120 km away from Baitoushan volcano in the east, and the point taking core sample is located among both. If this ash-fall is derived from Baitoushan volcano, the eruption volume are estimated to be over 1km³ under the assumption of tephra dispersion elongated to east direction. In such case we must find a ash layer of at least 20cm thick at the core sampling point. This discrepancy between the field evidence and the result from historical record implies that the interpretation about the description of AD 1702 is not valid. The record of AD 1702 might express not volcanic phenomena by Baitoushan volcano, but the natural disaster such as a forest fire near the east coast. But a few ash layers are intercalated in soil overlying 10th century deposit around the area within 20km from the mountain. These ashes may be corresponding to other historical reports, though the description of AD 1702 is not concerned with volcanism of Baitoushan volcano. The magnitude of eruptions forming these ash layers are inferred to be 10⁶ - 10⁷ m³, and small-scale eruption were repeated for the past 1000 years. Thus we should provide the disaster prevention against an eruption at the same level.