Ages of Onomatsuzawa Formation, Miyagi Prefecture - Quaternary intracaldera deposits

Tsukasa Ohba[1]; Shintaro Hayashi[2]

[1] Earth. Sci. Fac. Eng. Res. AKITA UNIV; [2] Dep. of Earth Sci., Akita Univ.

Deposition ages were determined for Onomatsuzawa Formation, Miyagi Prefecture. The formation exposed at the scarp of the huge landslide near the Aratozawa dam on 14th June 2008, triggered by the Iwate-Miyagi Inland Earthquake. The landslide scarp consists of upper conglomerate, middle welded tuff, and lower pumice tuff (pumiceous diamictite). At the foot of the landslide depression, a plant-fossil-bearing laminated siltstone layer underlies the pumice tuff. The pumice tuff (pumiceous diamictite) consists of grouped pumice blocks with matrix of laminated and cross-laminated tuffaceaous sand. The lithology is considered to have been formed by resedimentation of pumice flow deposit in a lacustrine setting. Top of the pumice tuff is hydrothermally altered, implying that the pore water in the wet pumice deposit was heated by the overlying pyroclastic flow deposits. Flame structure at the bottom of the welded tuff also indicates settling of the pyroclastic flow on the wet sediments. Consequently, the siltstone, the pumice tuff, and the welded tuff are considered consecutive deposits in a caldera lacustrine setting; no time gap is needed.

Fission track ages determined are 0.69+-0.13 Ma for the welded tuff and 0.60+-0.14 Ma for tuffaceous sand intercalating in the lower siltstone, respectively. Therefore, all the layers distributed near the Aratozawa dam are Quaternary deposits and the lower three layers deposited c. 0.6 Ma ago. These ages are much younger than those in previous studies. Kitamura (1986) interpreted the formation as Pliocene intracaldera deposits. The assumed Pliocene caldera was later called Kurikomayama Nanroku Caldera (Mt. Kurikoma Southern Base caldera), regarded as a member of the caldera cluster of Onikobe area. Our result revealed that the intracaldera lake sediments and ignimbrites deposited during Quaternary age. Therefore, the Kurikomayama Nanroku caldera is possibly a Quaternary volcano.

Ikezuki tuff, lithologically similar welded tuff with that in Aratozawa, had been dated by many authors and the ages converge at 0.2-0.3 Ma. No welded tuff of 0.6 Ma has been reported from the area, but a number of lower pumice tuff layers are identified in distal area (Osaki Plain). Tsuchiya and Ito (1996) dated the uppermost pumice tuff of Onoda formation (Ot7, Kitamura et al. 1981) at 0.62 Ma. The pumice tuff can probably be correlated with the welded tuff at Aratozawa, but an extensive geological and petrographical study is needed for the correlation.