

Review of the collapse structure of the Onikobe caldera based on borehole geology

Keiichi Sakaguchi[1]

[1] AIST

<http://staff.aist.go.jp/k-sakaguchi/>

The Onikobe caldera in northeast Japan is the source caldera of Ikezuki Tuff (0.25 Ma) and Shimoyamazato Tuff (0.21 Ma) (Yamada, 1972; Tsuchiya, et al, 1997). Previously, Yamada (1988) studied the borehole geology of the Onikobe caldera and presented a Vellies-type-like collapse structure model. But Yamada (1988) didn't recognize intra-caldera ash flow deposit, which is generally reported in other calderas, and argued that the post-caldera formations lie directly over the pre-caldera formations.

Reinvestigation of the collapse structure of the Onikobe caldera based on the borehole borehole geology is in progress, and tentative results are reported. Core samples from six boreholes (KR-1 to KR-6) drilled by NEDO for geothermal resource exploration are used in this study.

At boreholes KR-2 and KR-5, pre-Tertiary basement rocks are captured much shallower depths (-100m and 50m above sea level, respectively) than other wells. Therefore these two boreholes are situated outside or near to the rim of the collapse structure. At KR-1 and KR-6, thick pyroclastic flow deposits (welded tuff, lapilli tuff and tuff breccia) occupy the lower part. Thickness of the pyroclastic flow deposits is 600m at KR-1 and over 500m at KT-6. Yamada (1988) correlated this deposit to pre-caldera Torageyama Formation. But the phenocryst mineral assemblage is different from the pyroclastic flows of the Torageyama Formation and similar to caldera-forming Ikezuki Tuff, and this thick pyroclastic flow deposit is confirmed only in the Onikobe caldera collapse structure. These suggest that this thick tuff is the intra-caldera ash flow deposit. Breccia beds and upward-grading lake deposit lying above the thick pyroclastic flow deposit are possibly the collapse deposits from unstable caldera walls and deposits formed in growing caldera lake. At KR-3 and KR-4 that are located inner part of the collapse structure, (at least thick) intra-caldera ash flow deposits do not exist and older pre-caldera rocks occupy the shallow underground. This may indicate the resurgent activity during the post-caldera stage.

Tsuchiya, N. et al. (1997) Geology of Iwagasaki District (Quadrangle Series, 1:50,000), GSJ.

Yamada, E. (1988) Rept. Geol. Surv. Japan, no.268, 61-190.

Yamada, E. (1972) Geol. Surv. Japan Bull, vol.23, 217-231.