

## **The Nested Collapse Structure Found in the Oligocene Sakurae Cauldron in Southwest Japan**

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The Oligocene Sakurae cauldron (ca.30 - 35Ma) in Southwest Japan is composed of the outer polygonal and inner circular collapses. The cauldron fills consist of acidic to intermediate volcanics intercalating some basic to acidic lavas. The outer collapse (ca. 15 km) (B20kms and occurred primarily, whereas the inner one is secondary collapse with a diameter of 4-5km. The northern rim of this circular collapse is cut by an arcuate fault, but the southern rim is limited by an asymmetric arcuate anticline. The secondary collapse encloses a large rhyolite lava dome which extruded at the final eruption.

Schematic cauldron-forming processes are as follows:

A pre-existed large silicic magma chamber was layered, heated and expanded by the pouring of the basic magma. This overheated expansion of the chamber caused caldera collapse. Volcanic eruption began when the collapse fractures reached this magma chamber from the earth's surface.

The early stage of the eruption is characterized by voluminous acidic pyroclastics associated with some basic to intermediate lava flows. The rapid emission of upper silicic magma should have sucked up the heavy basic substratum in the layered magma chamber. Magma mixing may have occurred in some degree. Volatile concentration in the residual liquid of magma led to the catastrophic pumice eruption in the later stage. The central part of the caldera floor was secondarily collapsed along ring fractures during this eruption. The rapid evacuation of volatile magma increased the viscosity of residual magma. The bottom of the piston-like subsiding block squeezed out of the substratum andesitic magma into the ring vent of this secondary collapse. This andesitic magma was scattered in the silicic pyroclastics as semi-consolidated fragments along the ring vent, and the upper viscous silicic magma flowed out to form a large lava dome in the final

volcanic stage.

Some granite intrusions after the final eruption and porphyritic dikes along the secondary collapse could represent the upper silicic and lower andesitic layers of the magma chamber, respectively.