

## Preliminary report of marine sediments drilled and cored by D/V Chikyu at Kikai volcano, SW Japan

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Catastrophic caldera-forming eruptions that discharge more than 40 km<sup>3</sup> of Si-rich magma as pyroclastics are rare but extremely hazardous events (eruption magnitude >7). Estimating the eruption volume of pyroclastics and the magma discharge rate in caldera-cycle is essential in evaluating the risk and cause of catastrophic caldera-forming eruptions. For this reason, we took sediment cores with Hydraulic Piston Coring System (HPCS) and Short HPCS (S-HPCS) of D/V Chikyu at Kikai volcano in January 11–14, 2020. Kikai volcano (Kikai caldera) is located about 45 km off southern Kyushu Island, Japan. Except two islands (Satsuma Iwo-Jima Island and Take-Shima Island) on the northern part of the caldera rim, most of the caldera structure is under the sea. At Kikai volcano, three ignimbrites are known; the 140 ka Koabi ignimbrite, the 95 ka Nagase ignimbrite, and the latest 7.3 ka Koya ignimbrite.

Sediments were recovered from 5 sites about 4.3 km off the northeastern side of Take-Shima Island. Each drilling site was separated by 10–20 m from any other site. The sediment was not consolidated. Bioturbation was not observed. The sediment sequence, from the top of the cores, consists of gravel unit, ill-sorted lapilli unit, reddish tephra unit, sandy silt unit, and white tephra unit. The sedimentary facies of these sediments is as follows.

**Gravel unit:** The presence of this unit in the upper part of the sequence is suggested by gravels which fell in the drilling holes and recovered with the sediments of the lower sequence. The gravels consist of white tuffaceous rock, obsidian, gray volcanic rock, reddish altered volcanic rock, gray pumice and altered pumice. They are angular to sub-angular in shape and varying in size up to 5 cm in diameter.

**Ill-sorted lapilli unit:** This deposit consists of ill-sorted lapilli size light yellow colored pumices and lithics of dark volcanic rock, gray volcanic rock, and obsidian. The maximum grain size of the pumice is more than 5 cm, whereas the maximum grain size of the lithic is about 4 cm. The abundance of the pumice component varies with depth. The thickness of the unit is more than 7 m at the drilling sites. The color of the pumice suggests that this unit may be a secondary deposit of underlying Koya ignimbrite deposit.

**Reddish tephra unit:** It consists of layers (maximum thickness at least 40 cm) of slightly reddish to orange ill-sorted pumice lapilli and thin layers (~1 cm thick) of relatively well-sorted ash. The thickness of the deposit is more than 5 m at the drilling sites. The characteristic color of pumice suggests that this unit is the deposit of Koya ignimbrite. Formation of relatively thin layers of lapilli and ash may be due to the deposition under the sea.

**Sandy silt unit:** It consists of very fine fragments of black volcanic rock. The sediment contains small fragments (~5 mm) of sea shells and other organic materials. Foraminifera were also contained in this deposit. The thickness of this unit is at least 20.36 m.

White tephra unit: This deposit mainly consists of ill-sorted white pumice lapilli and relatively well-sorted ash. The maximum pumice size is at least 11 cm. The thickness of the deposit is at least 30 m. The deposit is characterized by the presence of crystals of quartz, which is known as a remarkable feature of the Nagase ignimbrite deposit to distinguish it from the other tephra at Kikai volcano. Especially, the middle part of the recovered Nagase ignimbrite deposit (63–64 m below the seafloor) shows unique sedimentary face: it consists of only crystals of quartz (<2 mm in size), orthopyroxene and clinopyroxene (<1 mm in size), and magnetite (<2 mm in size). Formation of the sedimentary face may be due to the deposition of hot ignimbrite under the sea.

Description of these sedimentary units is essential to distinguish the ignimbrite deposits and understand their flow behavior in the sea. We will show the detail of these sedimentary facies in the presentation.

Keywords: Catastrophic caldera-forming eruption, sedimentary facies, Offshore drilling, Chikyu, SCORE