

A hypothesis regarding their generation and storage process about tsunami traces due to 7.3 ka Kikai caldera eruption

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Many researchers have noted that Yakushima may have been struck by a huge tsunami before the Koya pyroclastic flow at the time of the Kikai Caldera eruption about 7.3 ka, but there is currently no clear evidence of this. We studied traces of the tsunami in the northeastern part of Yakushima, in southwestern Japan. Holocene marine terraces were observed after the Jomon transgression near the Miyanoura lowland. From local observations, we assumed that the highest sea level phase (9.7 m) occurred between 7.3 and 5 ka. We re-examined a previously studied outcrop near the Onagawa river mouth at the Koseda coast, and interpreted it as follows. A wave cut bench (WB-4) emerged before 7.3 ka. There is a 30-cm thick pyroclastic flow deposit that was unaffected by wave action; the lowest elevation of the bottom of the pyroclastic flow deposit is 8.4 m. We therefore inferred that the sea level height 7.3 ka was 8.4 m or less, and that a transgression of 1~2-m continued after 7.3 ka. In addition, a poorly sorted, 30-cm thick gravel bed was observed between the surface of WB-4 and the pyroclastic flow deposit. This gravel bed has a very similar composition to modern gravels distributed around the Onagawa river mouth. The pyroclastic flow deposit is covered by a fluvial reworked deposit and a 2-m thick gravel bed. The maximum annual tidal range is about 1.5 m in this region; the elevation of the upper surface of the gravel bed is 11.0 m. From this, we infer that the gravel bed was deposited during the highest sea level phase. Therefore, we conclude that the 7.3 ka tsunami moved gravel from the Onagawa river mouth to the surface of WB-4 in a stony debris flow before the pyroclastic flow reached the Koseda coast.

Keywords: Tsunami traces, 7.3 ka Kikai Caldera eruption, Koya pyroclastic flow, Koseda coast, Yakushima Island, storage process