Pyroclastic flow deposit of the 2015 Kuchinoerabujima Volcano

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Explosive phreatomagmatic eruption on May 29, 2015 of Kuchinoerabujima Volcano produced pyroclastic density currents (PDC) in all directions from the summit crater of Shindake. The PDC reached to the coastal line ~2 km from the summit crater. The PDC is characterized with the distribution of thin deposit. The thick block and ash flow deposit distributed in a limited area within the vicinity of the crater. Nevertheless the thin deposit, most of the trees in the area of the PDC were broken and overturned, suggesting a strong flow with high velocity. No remarkable wildfire in the PDC area suggested that the temperature of the deposit was not reached the ignition temperature of the wood. However, the facts that all leafs on the trees within the peripheral PDC area were killed by the thermal damage and one person involved in the PDC got burn injury suggest that the temperature within the PDC was fatal.
We surveyed the distribution and sequence of the PDC deposit and thermal and mechanical damages by the PDC within the area of PDC. The thermal damage was remarkable in the upper part of the trees which were directly exposed to the PDC. The thermal damage on the trees were limited within the area of PDC. No thermal damage was recognized in the area where was covered by the ash fall from the PDC. The nylon items in the PDC deposit were partially melted. The thickness of the deposit at the end of the PDC area in Mukaehama was less than 5 cm. The deposit shows remarkable normal-grading from lapilli and very-coarse sand at the base to very-fine sand at the top. At the base of the deposit, lapilli ~1.5 cm in diameter were found. Many plant fragments in the deposit tell the strong flow which destroyed the forest along its pass. These observations indicate that the deposit was formed by a short and single-pulse PDC with high velocity. This is consistent with the visual observations by some monitoring cameras.

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