Depositional features and emplacement mechanism of pyroclastic density currents based on 1929 Hokkaido Komagatake deposit.

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Pyroclastic density currents (PDCs) are normally high-temperature and high-speed causing devastations in and around the volcanic area. Understanding of emplacement mechanism of PDCs are needed for volcanic hazards mitigation. This study focuses on the emplacement mechanism of 1929 Hokkaido Komagatake PDCs based on the depositional features. A 10m-thick 1929 Hokkaido Komagatake PDC deposits are in an outcrop 4.8km WNW from the source. At least five, 2.5 to 5m-thick flow units with (25cm to 100cm-thick) pumice-concentration zone at the top are observed. The pumice-concentration zone contains relatively rounded pumices (MP=40cm) and sometimes show clast-supported features. Each flow unit can be subdivide into 0.2 to 1.5m-thick subunits with pumice rich zone at the top. The orientations of elongated pumices are relatively parallel to the flow direction from the bottom to the higher levels of the flow unit. The degree of alignment is higher at the bottom of the flow unit. The pumice-concentration zones at the top of each flow unit are considered to be formed due to grain interactions between pumices and lithics causing large pumices to float upward from the bottom of thick turbulent PDC. The subunits within the flow units suggest that the flow unit were not formed from mass freezing, but formed incrementally at 0.2-1.5m intervals. The elongated pumices parallel to the flow direction in almost all levels of Komagatake PDC also suggest that the pumices were aligned due to shear stress within relatively dense thin underflow formed at the bottom of thick turbulent PDC.

Keywords: Hokkaido Komagatake, Pyroclastic density current, depositional features, emplacement mechanism

