

## **Holocene eruption episodes of Mt. Melbourne, Antarctica: constraints from proximal-distal tephra correlations**

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The 2732 m high Mt. Melbourne is an active alkaline stratovolcano along the western coast of the Ross Sea in northern Victoria Land, Antarctica. Reconstructing the recent eruptive history is problematic due to its burial and glacier-clad outcrops. Here, we present geochemical characteristics of juvenile products of several proximal pyroclastic sequences in order to establish stratigraphic correlations. We document major and trace element compositions of glasses from a welded pumice deposit on summit crater, englacial tephra layers from upper and lower flanks, and from an ice cliff surrounding the volcano. Correlations with the Melbourne tephra layers documented from Talos Dome ice core are used to constrain the timing of explosive eruption of the volcano.

Geochemically distinct three trachytes are recognized. The youngest sequence is intermittently found at the top of the summit crater with very small volume and shows very fresh shiny bluish appearances. The dark and brownish welded pumice deposit and big pumice fragments up to 50 cm length finding frequently in summit and flank area are considered to be the same phase and resulted from the second youngest eruption. They show a strong geochemical similarities with the Talos Dome tephra layer TD85, which suggests they are the same and the significant and quite explosive eruption of Mt. Melbourne occurred at 1280 CE. The oldest eruption products are only identified from the englacial tephra layers. The three episodic products show an evolution trend towards systematically decreasing SiO<sub>2</sub> contents (from 66.7 wt.% to 62.5 wt.% SiO<sub>2</sub>). However, the total alkali contents (Na<sub>2</sub>O+K<sub>2</sub>O) show an increasing trend towards the second eruption phase and then decreasing again to the youngest phase.