

Holocene Eruptions and Geochemical Characteristics of Mt. Rittmann, Northern Victoria Land, Antarctica

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Mount Rittmann, an active volcano, is part of the Mt. Overlord Volcanic Field in northern Victoria Land, Antarctica. The volcano is predominantly ice-covered, with limited outcrops exposed along its remnant summit caldera and on the walls of the Aviator Glacier. It has been documented as a primary source of tephra and cryptotephra layers preserved in numerous Antarctic ice cores. Tephra studies (Lee et al., 2019) have identified a major eruption around 1252 CE, further supported by evidence of geothermally heated, steaming ground. A distinguishing feature of Mount Rittmann is its remnant caldera, measuring approximately 8×5 km, indicative of a history of significant explosive volcanic activity.

The exposed volcanic rocks primarily consist of trachytic lava flows and hawaiitic scoria, with less common occurrences of mugearite, benmoreite, and phonolite. This study presents new $^{40}\text{Ar}/^{39}\text{Ar}$ age data for eight trachytic lava samples, three portions of pumice, and three hawaiitic lava samples collected from the summit caldera region. $^{40}\text{Ar}/^{39}\text{Ar}$ dating of sanidine crystals in the trachytic lava samples yielded ages ranging from **2.08 to 56.45 ka**, while the oldest age, **113.57 ± 2.08 ka**, was obtained from sanidine crystals in a pumice sample. Additionally, age determinations from the groundmass of hawaiitic lava samples indicate an age range of **54.29 to 67.38 ka**. By providing the first direct geological age constraints on Holocene volcanic activity at Mount Rittmann, this research, in conjunction with geochemical analyses, aims to advance our understanding of the volcano's temporal and magmatic evolution.

[1] Lee, M.J., Kyle, P.R., Iverson, N.A., Lee, J.I., Han, Y., 2019. Rittmann volcano, Antarctica as the source of a widespread 1252±2 C.E. tephra layer in Antarctica ice. *Earth and Planetary Science Letters* 521, 169-176.