Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.28991

Assessment of trace elements distribution and sources from snowpits in the Lambert Glacier region, coastal East Antarctica

YALALT NYAMGEREL[1], SOON DO HUR[2], TSEREN-OCHIR SOYOL-ERDENE[3], CUNDE XIAO[4], **SEIN MOON**[1], HYEJUNG JUNG[1] AND JEONGHOON LEE[1]

[1]Ewha Womans University
[2]Korea Polar Research Institute
[3]National University of Mongolia
[4]Beijing Normal University

The measurement of trace elements in Antarctic snow is crucial for understanding historical atmospheric geochemical changes and circulation patterns. However, studies on their spatial distributions remain limited, particularly those evaluating multiple metals across several snowpits, making interpretation challenging. This study investigates the distributions and sources of trace elements—including Cd, Ba, Pb, U, Bi, V, Mn, Fe, Cu, Zn, and As—across four snowpits in the Lambert Glacier Basin, East Antarctica. The trace elements exhibit site-, element-, and season-dependent variations, with higher concentrations observed at inland sites. In contrast, $\delta^{18}O$ and ion concentrations decrease with increasing distance from the coast and elevation, underscoring the influence of marine emissions. Crustal sources primarily contributed to Ba, U, V, Mn, and Fe, while non-crustal sources predominantly contributed to Cd, Bi, Zn, Pb, Cu, and As. Positive matrix factorization (PMF) analysis indicates that trace element concentrations in Pits 2 and 3 are influenced by both crustal and non-crustal sources, while Pit 4 reflects a mixed-source influence. Pit 1 (coastal site) also indicates the mixed sources with influence of a highly dynamic marine climate and environment. The PMF results reveal similarities in emission sources and atmospheric transport patterns across the snowpits, facilitating a more comprehensive interpretation of longer ice core records. Overall, this study provides valuable insights into trace element distributions and enhances our understanding of past environmental and climatic conditions.