

Microbial Biogeography in Arctic Soils

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With a relatively low number of studies investigating microbial diversity in pristine Arctic soils and different analytical approaches used in each, the identification of microbial biogeographical patterns across the region remains difficult. Currently, differences in microbial communities are generally described on small scales, however, whether these are true ecological difference or merely methodological variations remains to be properly investigated. Furthermore, few studies have shown an absence of large-scale variation while other studies suggest regional differences. Using a small scale, mid-scale and pan-Arctic soil sampling design, we aimed to investigate the level of sampling required to understand terrestrial spatial patterns of microbial diversity across the Arctic. We analysed core physico-chemical properties of sampled soils, used amplicon-sequencing and geostatistics to investigate biodiversity, diversity hotspots and to understand the potential drivers of microbial diversity in Arctic terrestrial ecosystems. We identified microbial biogeographical patterns on different scales, with distinct Arctic regions harbouring different microbial communities. Alaska and Canada appear to support different communities than the European Arctic and Siberia. Identifying biogeographical patterns is a step towards a better understanding of microbial diversity and its drivers in the Arctic region.