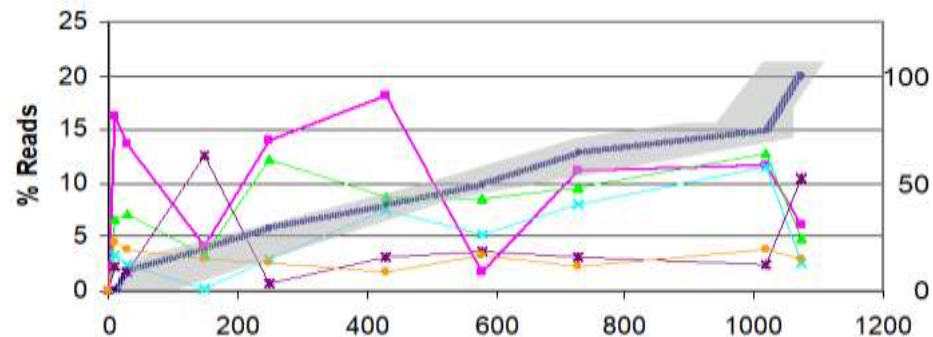


Glacial Ice Age Shapes Microbiome Composition in a Receding Southern European Glacier



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Glaciers and their microbiomes are exceptional witnesses of the environmental conditions from remote times. Climate change is threatening mountain glaciers, and especially those found in southern Europe, such as the Monte Perdido Glacier (northern Spain, Central Pyrenees). This study focuses on the reconstruction of the history of microbial communities over time. The microorganisms that inhabit the Monte Perdido Glacier were identified using high-throughput sequencing, and the microbial communities were compared along an altitudinal transect covering most of the preserved ice sequence in the glacier. The results showed that the glacial ice age gradient did shape the diversity of microbial populations, which presented large differences throughout the last 2000 years. Variations in microbial community diversity were influenced by glacial conditions over time (nutrient concentration, chemical composition, and ice age). A patent impact of human contamination was also observed on the glacier microbiome. The oldest samples, corresponding to the Roman Empire times, were influenced by the beginning of mining exploitation in the Pyrenean area, with the presence of metal-tolerant microorganisms. The most recent samples comprise 600-year-old ancient ice in which current communities are living.