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The under-ice microbiome, a five-year study at Lake Tovel

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Little is known about changes in microbial abundance and community composition during persistent ice cover of lakes. Here, the under-ice 16S rRNA diversity was assessed for different pelagic layers and compared between years (2015, 2017, 2018, 2019, 2020) at Lake Tovel (1177 m above sea level; Italy). Functional profiling of amplicon sequences variants (ASVs) was also done with Piphillin. Environmental parameters (chemistry, temperature, light climate, oxygen concentration) were linked to the observed diversity patterns. Despite relatively uniform temperature and chemistry profiles, the pelagic and hypolimnetic microbiome of different years were different as assessed by a Principal Coordinates Analysis. The under-ice light climate was a driving factor of the observed differences and related to different precipitations patterns. These results underline how a changing climate also influences life under ice.