

## Distribution and origin of *Thaumarchaea* in the deep hypolimnion of Lake Maggiore

*Thaumarchaea* represents one of the most abundant groups of Archaea on Earth, being found in a variety of environments including soils, oceans, and freshwaters. Ammonia-oxidizing *Thaumarchaea* (AOA) significantly contribute to the global nitrogen and carbon cycle through chemolithoautotrophic oxidation of reduced nitrogen compounds. Their distribution in freshwaters is still far less known than in marine and terrestrial environments. In this study, we analyzed the diversity and relative abundance of AOA in the deepest layers of the oligotrophic Lake Maggiore, confirming previous published results of AOA presence and showing spatial but no seasonal trends with respect to Bacteria. A high resolution at the *Thaumarchaea* community level was reached with the probe MGI-535 specifically designed in this study and applied for CARD-FISH analysis. Furthermore, phylogenetic analysis of AOA clone libraries from deep lake water and from the lake tributary, River Maggia, suggested the riverine origin of AOA of the deep hypolimnion of the lake.

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