

Past and recent biodiversity profiling in ancient Lake Chalco Mexico by a metagenomics analysis

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Map of Mexico

Lake Chalco:

Located at the Center of Mexico

2,240 MASL

Transmexican Volcanic belt



Core sampled

2.5 mts drilling

12,000 years B.P.

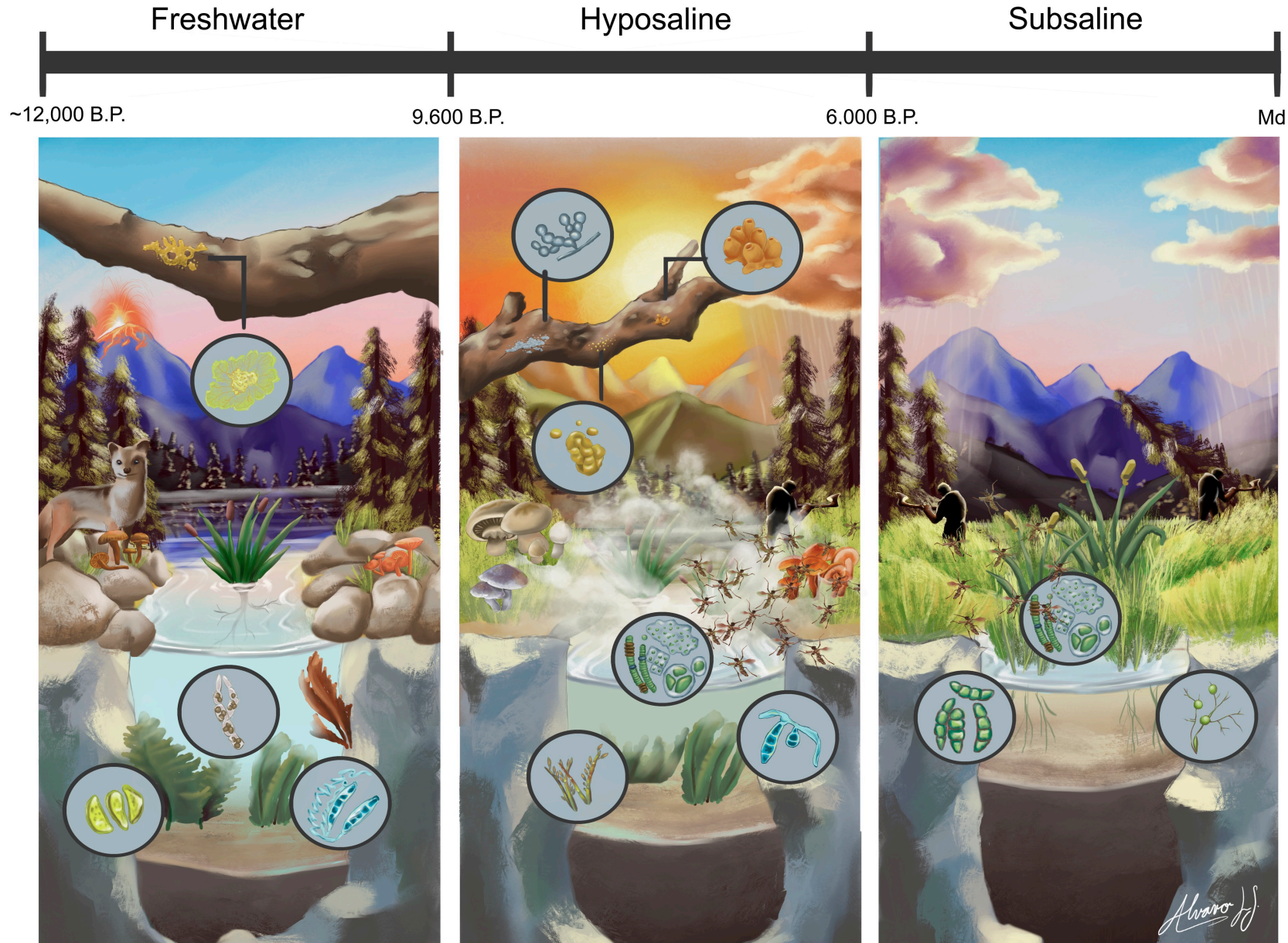
Holocene

We collected 12 samples for:

fossil diatoms
geochemistry
metagenomic analysis.



HOLOCENE

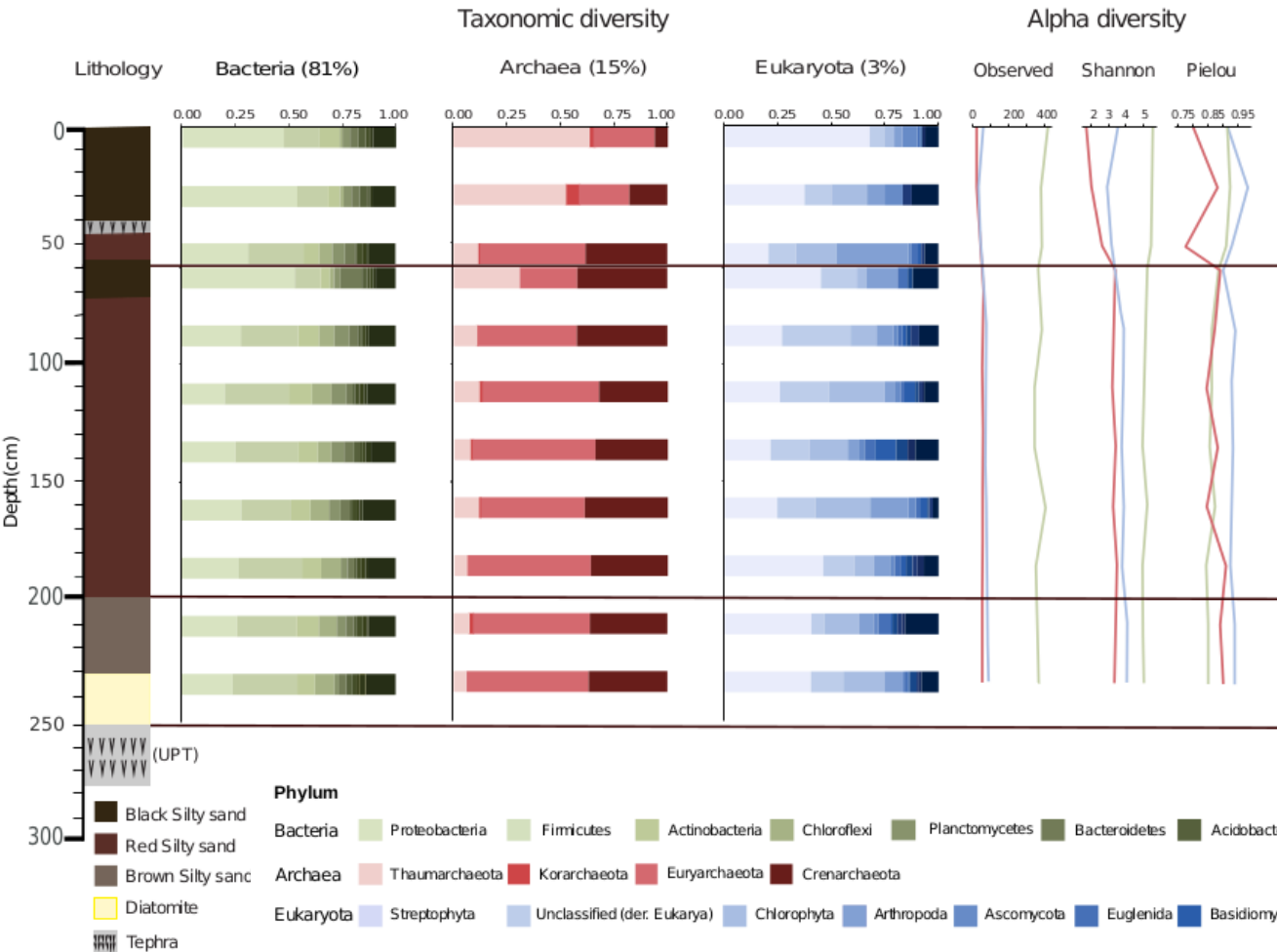


We combined metagenomics result, fossil diatoms and geochemical records:

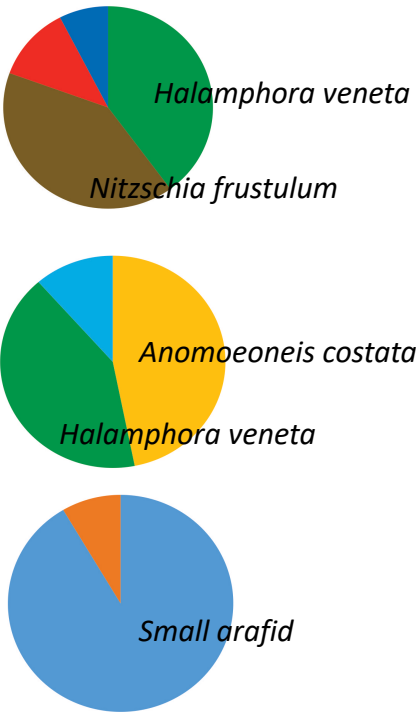
And were be able to reconstructed the past local enviromental condition related to the Holocene period in the lake Chalco, Mexico.

Here we show the biodiversity results base on metagenomics analysis, the fossil diatoms assemblages and geochemistry analysis

Metagenomics



Fossil diatoms



Geochemistry

Ti / Fe (runoff)

Subsaline

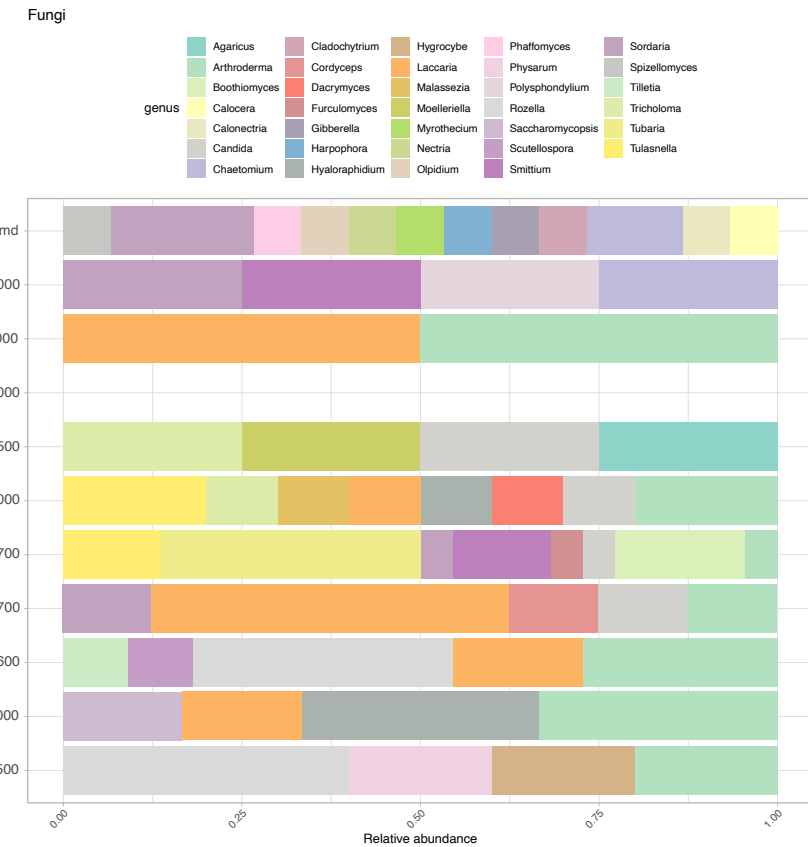
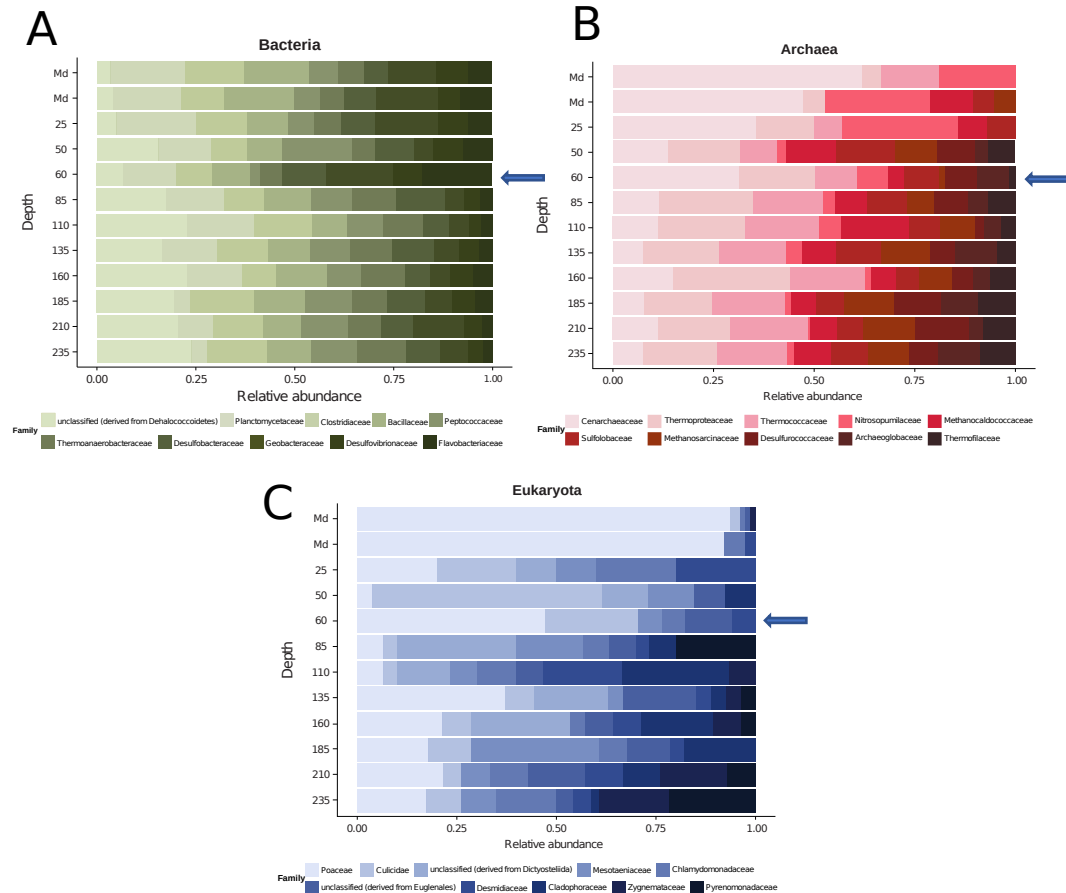
TOC (eutrophication)

Hyposaline

Mn/Fe (transfer of electrons)

Freshwater

Bar plot top10 most abundant families



Advantage of metagenomics to explore sedaDNA studies

Discover new microorganisms difficult or impossible to culture.

Metagenomic are transforming the microbiology and the ecology through new concepts.

sedaDNA is less destructive sampling directly from soil or sediment and is feasible to have a scheme of the environment and its interactions.

Conclusion

- Metagenomics approach correlate with fossil diatom zones proposed and let us infer changes in past environments at lake Chalco.
- During hyposaline zone, the lake Chalco was shallow, warm, hyposaline and eutrophic, with anoxic bottom waters.
- We evidenced a transition stage between the hyposaline and subsaline zones, mainly due to the change in vegetation, the boom of mosquitoes (Culicidae), higher precipitation (Ti), pathogenic fungi, and crops.
- Therefore, we propose that the first human activities had a large and rapid impact on the aquatic and terrestrial ecosystems in this area.



Thank you