

Mid- and Late Holocene hydrological and geochemical changes in Lake Chokrak (NE Crimea)

Yevhenii Rohozin

Taras Shevchenko National University of Kyiv (yevhenii.rohozin@knu.ua)

Karl Ljung

Lund University (karl.ljung@geol.lu.se)

Introduction

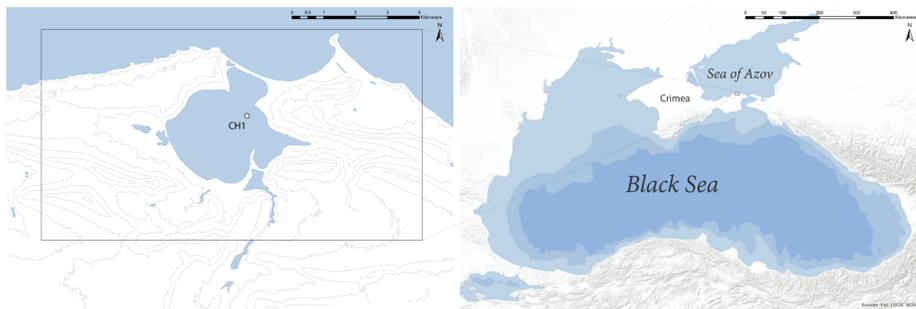
The Crimean Peninsula has around 50 saline lakes, which formed during the Holocene marine transgression. These lakes are valuable archives of the Holocene sea-level changes in the Black Sea, but their chronologies and evolution remain largely unknown. This study presents reconstructions of evolution of the Lake Chokrak basin and its depositional environment during the last 8000 years.

Study questions:

- What was the history of the lake basin through the Mid- and Late Holocene?
- What were the changes in depositional environment and lake geochemistry?
- Were there any aridity and/or erosion events?

Study site

- Lake Chokrak is a hypersaline coastal lake, which is located in the north-eastern part of the Crimean peninsula.
- Former embayment of the Sea of Azov.
- Continuous sedimentation with intervals of annual lamination.

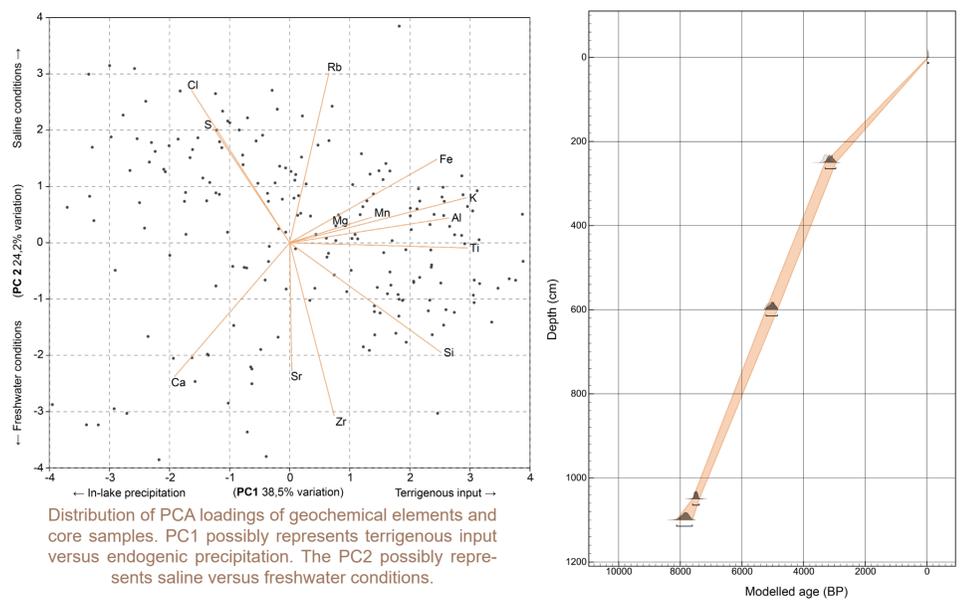


Left: Lake Chokrak basin with coring location. Right: the position of the study site in the Black Sea region.

Materials and methods

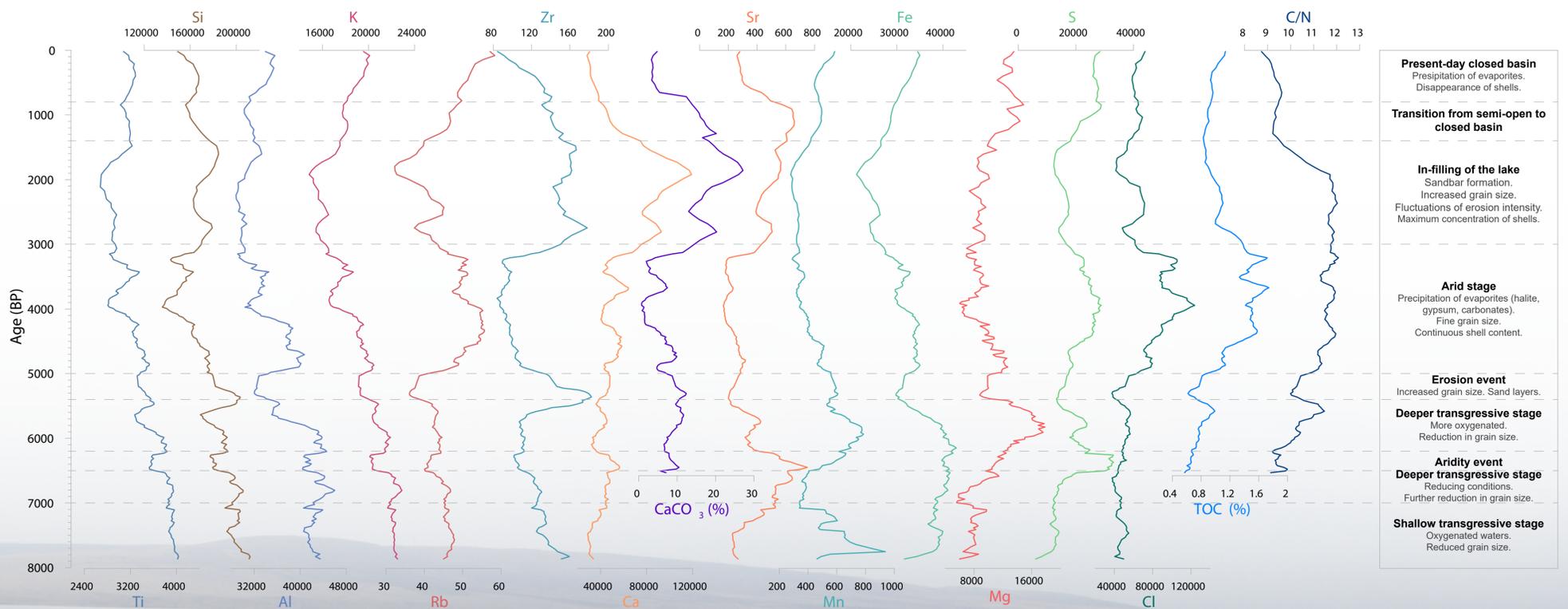
- an 11-m core was retrieved from the north-eastern part of the lake in 1995
- ¹⁴C dating
- Geochemical analyses (XRF scanning, TOC and N measurements)
- Shell content

Results



Distribution of PCA loadings of geochemical elements and core samples. PC1 possibly represents terrigenous input versus endogenic precipitation. The PC2 possibly represents saline versus freshwater conditions.

Age-depth model based on ¹⁴C dating of *Cerastoderma glaucum* shells and the reservoir effect of 408 yr



Conclusions

- The obtained results show that formation of the lake basin was largely influenced by the early-Holocene Black Sea transgression, which led to the inundation of the former river valley.
- The transition from marine to lacustrine conditions occurred around 3000 BP with the formation of the sandbar between the lake and the Sea of Azov.
- Precipitation of evaporites depended on the water content in the basin and its salinity. We assume that carbonates precipitated in lower salinities whereas sulphates and chlorides accumulated in higher salinities.
- The multi-proxy approach highlights that the lake's evolution was affected by a complex interaction of the climate, sea-level changes and local tectonics



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