

ORGANIC GEOCHEMICAL CHARACTERISATION OF LAKE BAFA SEDIMENTS ACCUMULATED DURING THE LAST 4500 YEARS (WESTERN TURKEY)

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This study represents the bulk organic geochemical data for the coastal freshwater ecosystems around the western coast of Great Menderes Delta Plain, but mainly focusing on sedimentary record of Lake Bafa and surrounding swamp area. Great Menderes floodplain is located about 17 km east of the Aegean Sea, in a seismically active N–S extensional depositional basin in Western Anatolia, Turkey. The total catchment area of the corresponding river system covers about 24.300 km², forming the natural lacustrine, lagoon and swamp environments, during the Late Quaternary. Both continental sedimentary processes and also fluctuations on the sea level (post-glacial marine transgression etc.) effect on the paleo-ecological evolution of the area.

Lake Bafa is also known as one of the largest inland lakes around the eastern coast of the Aegean Sea. The lake contains sediments deposited in marine/lagoon/lake environments in such a short time period, starting from Middle Holocene to modern. In this study, a stratigraphical record is dated, along the lake cores and a drilled section taken from the swamp area, located in western boundary of the lake. The lake archive (cores; BAF35-37:4.5m) and the swamp section (drills; BS:14m) contain the geological history of the last 4500 years.

Bulk organic carbon isotopic values are determined in a range of -23 to -28, with an average value of -25 in swamp, lacustrine and lagoon sediments. However, recent soil samples indicate higher positive values, with a range in between -22% to -23%. Similar to the total organic carbon isotopic values C/N ratios indicate similar tendencies for lacustrine sediments (12-19) and swamp sections (13-20). However, moderately higher TOC values are observed for the lacustrine sediments than swamp section, within the TOC range of 3.4% to 0.3%.

Organic carbon isotopic distribution allow us to determinate the arid and humid climate periods based on C3/C4 plant abundances and past changes of precipitation/evaporation ratio. Sedimentary record of the last 800 years (Unit-1) characterized by heavier isotopic composition, (average range of $\delta^{13}\text{C}_{\text{org}}$: ‰-24), indicating relatively dry climate conditions. Unit-2 (0.8-1.75ka yr.BP.) indicates $\delta^{13}\text{C}_{\text{org}}$ isotopic fractionations with the average range of ‰-26. Unit-3 is characterised by the light isotopic values ($\delta^{13}\text{C}_{\text{org}}$: ‰-28). Similar to lake archive, swamp section indicates heavier isotopes for the last 800 years accumulated sedimentary record. Furthermore, lighter $\delta^{13}\text{C}_{\text{org}}$ signals are observed for the stratigraphical interval accumulated in between 800 to 2300 years BP.

Lake sediments (BAF37) indicates HI (hydrogen index) values between 70-316 $\mu\text{g HC/g TOC}$ and swamp section sediments reflects lower values in a range of 16-61 $\mu\text{g HC/g}$. Therefore, lake sediments contain Type-II and type-III kerogens. Especially, 1.46-2.15 and 3.42-371m intervals indicate dominantly type-II organic matter. This could be a signal for increasing alkalinity values within the lake column and fresh water conditions. However swamp section contains only type-III kerogen, indicating the terrestrial organic matter as a dominant source, would probably enriched by flooding events of Great Menderes River. Sedimentary archive of Great Menderes Floodplain indicates progressive environmental change from marine,

lagoon, lake and swamp phases, forcing a transition from saline to brackish and fresh water conditions. The transitional pattern has also been interrupted by individual layers, formed by coastal flooding events and are characterized by organic geochemical signals.

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