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The Late Holocene Climate Changes from Lake Gölcük (SW Anatolia): Evidence from Multi-proxy Results

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With global warming looming (causing low agricultural yield, natural disasters e.t.c), current studies have enlisted the Mediterranean region as one of the hotspots for climate change. One of the time-frame to help in understanding the current global warming is the Late Holocene. Therefore, studies of the Late Holocene climate changes are of huge implications.

Located in SW Anatolia, Lake Gölcük is a crater lake with no surface inlets and thus, possesses huge potentials to record past natural climate change as a result of precipitation/evaporation changes. As a result, in order to unravel the past climate change during the Late Holocene in this underreported region, a single long undisturbed 2 m long sediment core was recovered from the Lake. The sediment core was lithologically described and analysed using micro-XRF (for element concentrations) and Multi-Sensor Core Logger (MSCL, for magnetic susceptibility). Then, Ostracod shells were recovered from the bottommost part of the sediment core for C-14 dating.

A radiocarbon date from the bottommost part of the core revealed that the core covers the period from AD 500 to the present. The micro-XRF results revealed various elemental fluctuations from which; dark radiography, higher magnetic susceptibility, density, Sr (cps), Sr/Ca, Sr/Fe, and dark grey coloured fine sand and silty muds point to higher terrigenous input depicting wet periods, whereas, higher Fe (cps), Ca (cps), Ca/Sr, lower density, and light grey coloured silty muds point to authigenic inputs showing dry periods.

Upon correlating the Lake Gölcük results with regional and global paleoclimate data, the results clearly depict a wet Medieval Climate Anomaly characterize by higher terrigenous influx and a dry Little Ice Age notable by authigenic influx. This followed by a relatively dry period with lower terrigenous period. It is highly likely that the North Atlantic Oscillations, North Sea-Caspian Pattern and the Indian summer monsoon were accountable candidate to the observed climate changes during the studied time.

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