



## Hydrological and temperature variations in the Black Sea region during the last 650'000 years recorded by speleothem fluid inclusions

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The Eastern Mediterranean including the Black Sea region is influenced by subtropical Mediterranean, temperate European, and continental Asian air masses which make paleoclimate archives from the Black Sea region a valuable source of information about past climatic changes in temperature and rainfall. On glacial interglacial time scales, most information on climate variability in the Black Sea region comes almost entirely from marine/lake sediment cores (e.g. Wegwerth et al., 2015, 2020; Shumilovskikh et al., 2012). In contrast to these paleoclimate archives, oxygen isotope ratios of speleothem calcite ( $\delta^{18}\text{O}$ ) and water isotope ratios ( $\delta\text{D}_{\text{FI}}$  and  $\delta^{18}\text{O}_{\text{FI}}$ ) of speleothem fluid inclusions from Sofular Cave in northern Turkey can provide direct information on the isotopic composition of rainfall and, therefore, potentially identify the sources of moisture at the Black Sea coast. During the last 650'000 years most of the  $\delta\text{D}_{\text{FI}}$  and  $\delta^{18}\text{O}_{\text{FI}}$  values plot closer to the Local Meteoric Water Line (LMWL) than to the Eastern Mediterranean Water Line (EMWL). This indicates that the Black Sea was the dominant moisture source for Sofular Cave during glacial and interglacial periods (Fleitmann et al., 2009; Badertscher et al., 2011). In addition, isotope measurements on speleothem fluid inclusions enables us to reconstruct temperature changes. Holocene temperatures of  $\sim 15^\circ\text{C}$  to  $\sim 20^\circ\text{C}$  are within the range of modern cave air temperatures and proxy records from the Black Sea (Sanchi et al., 2014; Ménot and Bard, 2012). During the last glacial period fluid inclusions indicate a temperature increase associated with Dansgaard-Oeschger warming events.

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