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Paleoclimate reconstruction based on speleothems from the Crimean Peninsula

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The paleoclimate and paleoenvironmental conditions of Crimea are scarcely known due to the lack of high-resolution archives in this area. Crimean speleothems have a high potential of providing valuable information and filling the knowledge gap on the paleoclimate in the northern part of the Black Sea area.

We acquired six well-dated stalagmite records from Crimean caves which grew during different intervals of the Holocene and MIS 3 with a good overlap, spanning from 2.7 (\pm 0.1) to 58.0 (\pm 0.0) ka BP. Records of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ show some resemblance to the Sofular record from the southern Black Sea coast. However, based on our knowledge of the modern pathways of moisture supply to Crimea (with only ca. 14 % of moisture originating from the Black Sea surface^[1]), it can be expected that the controls of stalagmite $\delta^{18}\text{O}$ values may be different in the south and north of the Black Sea. $\delta^{13}\text{C}$ records show larger shifts than the $\delta^{18}\text{O}$ records on the millennial time scale (e.g., Heinrich events) especially during MIS 3. None of the speleothems grew during MIS 2, probably reflecting arid and cold climate conditions.

These records are being analyzed and compared with other paleoclimate records to better understand: (1) the local hydrological dynamics and climate history during the Holocene and MIS 3, (2) the differences in climate conditions between the southern and northern Black Sea regions, and (3) the spatio-temporal teleconnection between the North Atlantic realm and the study area.

^[1] Langhammer et al. (2021) doi: 10.1029/2021EA001727