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Last Interglacial (MIS 5) climatic trends recorded by a speleothem from Bucak, Burdur - SW Turkey

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Microscope (microfabrics) and geochemical (stable isotope, trace element, Sr isotope) data derived from the stalagmite BUI collected from Bucak (Burdur Province, SW Turkey) provide detailed insight into paleoclimatic conditions during MIS 5d–b for the first time. MC-ICP-MS U-series dating of the speleothem revealed a two-step growth pattern that spans between ∼118 and ∼89 kyr BP in the late Pleistocene and builds on previously published high-resolution stable isotope time series (10–90 kyr BP) from Dim Cave in S-SW Turkey (Ünal-İmer et al., 2015; 2016). In the microstratigraphic sequence of the BUI stalagmite, carbonate (mostly as calcite and aragonite) fabrics are characterized dominantly by columnar (elongated and microcrystalline) and dendritic forms of calcite, with lesser acicular aragonite and also by diagenetic mosaic calcite and lateral overgrowths. Stalagmite growth rates were determined to be dramatically higher during interstadials, displaying strong links with the summer insolation at 30°N. This possibly reflects the influence of the latitudinal migration of the mean locations of the wet Westerly and dry sub-tropical anti-cyclone systems witnessed along this part of the Eastern Mediterranean. Variations in δ18O - δ13C isotopic records and ICP-MS trace element/Ca (e.g., Mg/Ca, Ba/Ca, U/Ca, and Ho/Ca) profiles exhibit significant temporal covariations and correlations with the growth rate. While δ18O record changes between -8.4 ‰ at 108.2 kyr and -4.4 ‰ at 110.5 kyr BP, δ13C varies from -8.9 ‰ at 117.8 kyr to -1.4 ‰ at 110.4 kyr BP. Chondrite-normalised REY plots of the BUI sub-samples revealed typical seawater origin for the meteoric waters precipitated, which is also supported by elevated Y/Ho ratios averaging at ∼65. TIMS 87Sr/86Sr isotope compositions (0.707304 ± 0.000007–0.706791 ± 0.000010) suggest similar origins with that of the Triassic–Jurassic host limestone (0.70746 ± 0.000006; Uysal et al., 2007), forming a part of the Lycian Nappes. Sr isotope record also revealed a marked decrease from ∼99 kyr to 106 kyr BP; at around the MIS 5b to 5c transition, also coincident with a difference in mineral texture.

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