



Improved marine reservoir age estimation and palaeoclimate synchronisation of the early Holocene Levantine/NW-Arabian region based on identification of the S1 tephra in Dead Sea and Tayma palaeolake sediments

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Due to a lack of tephra identified in marine and terrestrial palaeoclimate records from the Levantine-Arabian area, this region is still not sufficiently connected to the eastern Mediterranean tephrostratigraphical lattice. Here we report on the first finding of cryptotephra in the Holocene lacustrine sediment records of the Dead Sea and the Tayma palaeolake (NW Arabian Peninsula). The major elemental chemistry of the rhyolitic glass shards proves this tephra identical to the distal 'S1 tephra' identified in the Yammoûneh palaeolake, Lebanon (Develle et al., 2009), in a marine sediment record from the SE Levantine basin (Hamann et al., 2010) and in the Sodmein Cave archaeological site in Egypt (Barton et al., 2015). The 'S1 tephra', most likely corresponding to the early Holocene 'Dikkartın' dome eruption of the Erciyes Dağ volcano in central Anatolia, Turkey, has been dated in the marine record at 8830 ± 140 cal yr BP. We present new age estimates of the 'S1 tephra' based on radiocarbon dating of terrestrial plant remains (Migowski et al., 2004) and pollen concentrates (Dinies et al., 2015), which reveal modelled ages of 8939 ± 83 cal yr BP in the Dead Sea sediments and 9041 ± 254 cal yr BP in Tayma. This allows the estimation of an early Holocene marine reservoir age of ca. 320 years in the SE Levantine Sea. The timing of the volcanic eruption during the early Holocene humid period, which led to the formation of sapropel S1 in the Mediterranean Sea, and the identification of the 'S1 tephra' more than 1200 km to the south are crucial for the synchronisation of marine and terrestrial palaeoclimate records in the eastern Mediterranean region.

References:

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