

First tephrostratigraphic results of the DEEP site record of Lake Ohrid, Macedonia

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A tephrostratigraphic record covering the Marine Isotope Stages (MIS) 1-15 was established for the DEEP site record of Lake Ohrid (Macedonia/Albania). Major element analyses (SEM-EDS/WDS) were carried out on juvenile fragments extracted from 12 tephra layers and one cryptotephra (OH-DP-0027 to OH-DP-2060). The geochemical analyses of all of these layers suggest an origin from the Italian Volcanic Provinces, including: the Mercato tephra (8.530 ± 0.1 cal a BP) of Somma-Vesuvius, the Y-3 (29.05 ± 0.37 ka cal BP), the Y 5/Campanian Ignimbrite (39.6 ± 0.1 ka), and the X-6 (109 ± 2 ka) of the Campi Flegrei, the P11 of the Pantelleria Island (129 ± 6 ka), the Vico B (162 ± 6 ka) of the Vico volcano, the Pozzolane Rosse (457 ± 2 ka) and the Tufo di Bagni Albule (527 ± 2 ka) of the Colli Albani volcanic district, and the Fall A (496 ± 3 ka, here discussed) of the Sabatini volcanic field. Furthermore, a comparison of the Ohrid record with the tephrostratigraphic records of mid-distal archives allowed the recognition of the equivalents of other less known tephra, such as the TM24-a/POP2 (101.8 ka BP) from Lago Grande di Monticchio and the Sulmona basin, the CF-V5/PRAD3225 (~ 162 ka) from the Campo Felice basin and the Adriatic Sea, the SC5 (494 ± 11 ka) from the Mercure basin, and the A11/12 (511 ± 6 ka) from the Acerno basin, whose specific volcanic origins are still poorly defined. For the first time, the Middle Pleistocene tephrostratigraphic framework of Italian volcanoes could be extended beyond Italy to the Balkan Region. The establishment of the tephrostratigraphic framework for the Lake Ohrid record provides important, independent tie-points for the age-depth model of the DEEP site sequence, which is a prerequisite for paleoclimatic and -environmental reconstructions. Furthermore, this age-depth model helps to improve and re-evaluate the chronology of both unknown and dated tephra layers. Thus, the Lake Ohrid record is candidate to become the template for the central and eastern Mediterranean tephrostratigraphy, especially for the hitherto poorly known and explored Middle Pleistocene period.