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Quantitative reconstruction of the Holocene climate in the Mediterranean basin inferred from marine and continental pollen records: model/data comparison

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The Holocene period is particularly well investigated in the Mediterranean area by a large amount of data (palynologi¬cal, speleothems, or lake-level evidence). All these data show the Holocene to have a complex pat¬tern of climatic change across the Mediterranean region with strong and spatial and temporal variability. Recent studies based on lake-level records from Italy suggest a North–South climatic partition in the central Mediterranean through the Holocene (Magny et al., 2012). If the recent precipitation estimates based on pollen records of these Italian lakes seem support these interpretation (Peyron et al., 2012), given the scarcity of reliable palaeoclimatic records in the north and central-south Mediterranean, new evidence is needed to validate this hypothesis at the scale of the Mediterranean basin, particularly in East and West Mediterranean regions.
This study aims to provide robust and precise quantitative estimates of the Holocene climate in the Mediterranean region based on:
(1) A multi-method approach to better assess the error of reconstruction inherent in pollen-based climate predictions;
(2) Four high-resolution pollen records taken from lakes located along a latitudinal gradient from the northern Italy to the south Italy. Three lakes are from peninsular Italy (Lake Ledro, Lake Accesa, Lake Trifoglietti), and one is from Sicily (Lake Pergusa). In addition, one pollen record is located in Greece (Tenaghi Philippon);
(3) Six high-resolution pollen records taken from marine cores located along a longitudinal gradient from the Alboran Sea to the Aegean Sea (cores ODP 976, MD95-2043, MD90-917, MD04-2797, SL152, and NS14).

These quantitative estimates of the Holocene climate will be compared to the simulations performed with a regional model (Brayshaw et al., 2010).

We investigate climatic trends during the Holocene and test the hypothesis proposed by Magny et al., (2012) of opposite mid-Holocene summer precipitation regimes between the north-central and south Mediterranean, with a minimum in north central Italy and a maximum in Sicily. The use of the marine cores will help to test this hypothesis at the scale of the Mediterranean basin, particularly in East and West Mediterranean region to better understand the climate forcings.

We also aim to test the reconstruction of the precipitation seasonality which can be validated by independent proxies obtained for same records, i.e. lake-levels, charcoal/fires (Magny et al., 2011; Vannière et al., 2011).