Medieval climate in the East Mediterranean: instability and evidence of solar forcing

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This paper examines the climate of the East Mediterranean during the Medieval Climate Anomaly (MCA, 10-14 centuries AD), a time interval of significant cultural changes in the Near East and eastern North Africa. We review several regional hydroclimate archives, such as the reconstructed, late Holocene, Dead Sea level, the Cairo Nilometer and the Soreq Speleothem. We also include information from two historical surveys of period chronical published recently that have emphasized linking climate with human events in the region. Collectively, the data show that the climate in the region was punctuated by several episodes of region-wide extreme aridities, reflected in abrupt Dead Sea drops and deposition of salts in its bottom and in large, extended declines in Nile flood levels. The lake and river flood levels dropped between the late 10th and the middle 11th centuries AD and during much of the 14th century AD. During these times, historical documents describe unprecedented severe and persistent cold and dry winters in the northern regions of the Middle East, between Mesopotamia to historical Iran. The simultaneous cold and dry winters in the northern Near East and the droughts in the Levant and Egypt are consistent with timing of the two, medieval grand solar event: the Oort and Wolf minima. We argue and provide evidence that these solar events influence the state of the North Atlantic Oscillation and the intensity of the Siberian High, on the one hand and the frequency and intensity of El Niño, on the other hand, thus simultaneously afflicting the East Mediterranean with a severe hydroclimatic state that affected the history of the region.