EMS Annual Meeting Abstracts
Vol. 12, EMS2015-169, 2015
15th EMS / 12th ECAM

Reconstruction of hydro-climatic changes in the S Balkans from the Medieval Warm Period to the present based on a high-resolution lake level stage record derived from beach ridge sediments of Lake Prespa (Greece, Albania, FYROM)

Tim van der Schriek and Christos Giannakopoulos
National Observatory of Athens, Athens, Greece (timvanderschriek@gmail.com)

Mediterranean climate change over the past millennium shows a distinct E-W pattern, with a boundary approximately W of Greece. Generally, the West experienced drier conditions during the Medieval Warm Period and wetter conditions during the Little Ice Age; the East experienced opposite conditions. This pattern is linked to the multi-decadal North Atlantic Oscillation (NAO) Winter Index: positive phases are associated with drier (wetter) and negative phases with wetter (drier) conditions in the W (E) Mediterranean. However, a more complex pattern emerges in the E Mediterranean over the observational (∼100yrs) period when the spatial detail of hydro-climate data is much greater than in the preceding centuries. Specifically, winter precipitation in the S Balkan / SW Turkish mountains is clearly lower (higher) when the winter NOA has a positive (negative) phase. Unfortunately, regional palaeo-climate records lack sufficient spatial/temporal detail to establish whether this relationship was the same or different in the foregoing centuries.

This study presents the first absolute lake level stage reconstruction, covering ∼1000yrs, in the Balkans using the high-resolution beach ridge record of Lake Prespa. Calibration of recent beach-ridges with observational (∼60yr) hydro-climatic data allowed the conversion of exact stage-indicators to quantitative inflow changes related to precipitation/runoff. Lake levels (842-847m) from ∼900-1400AD indicate ∼10%/year less inflow mainly due to drier winter-springs and less runoff. From ∼1450 to 1988AD lake levels fluctuated >847m, except for a fall (∼845m) around 1640AD. High levels (>849m: ∼1450-1600AD, ∼1660-1750AD, ∼1800-1987AD) indicate wetter winter-springs with more runoff. The 1987-2000AD lake level fall to 842-845m is caused by water abstraction, amplified by wet season precipitation decreases and less runoff.

These results show that the observed, decadal, NAO influence on regional winter precipitation is also relevant on centennial timescales and that the S Balkan mountains experienced similar climatic changes as the W Mediterranean over the past millennium.