



Long-term summer temperatures variations in the southern French Alps, A.D. 749-2007

C. CORONA (1), J.L. EDOUARD (1), J. GUIOT (2), F. GUIBAL (1), A. THOMAS (1), and M. SAULNIER (1)
(1) IMEP, UMR 6116, Aix en Provence, France, (2) CEREGE, UMR 6635, Aix en Provence, France

With respect to the past millennium and Europe, only a few temperature reconstruction from sensitive composite tree ring width records exist from northern Scandinavia (Briffa et al. 2007; Helama et al. 2005) and the Alps (Büntgen et al. 2005; Nicolussi and Patzelt 2000). Only one, in the Spanish Pyrenees (Büntgen et al. 2008) concerns the Mediterranean region. The purpose of this presentation is a reconstruction of the summer temperatures over the southern French Alps (44-45°N 6°29'-7°40'E) during the last millennium. This reconstruction, the first regional one centered on this part of the Alps extending prior to 1000 A.D. and extends forward into the twenty-first century (749-2007). It is based on a network of seventeen multi-centennial larch and stone pine unpublished chronologies combining three hundred and fifty three tree-ring width series of living and dry-dead timberline wood (above 2000 m a.s.l.). These series are standardized using an Adaptative Regional Growth Curve (Nicault et al. 2008) allowing the preservation of inter-annual to multi-centennial length variability due to climate. Spatially resolved instrumental measurements (1°x1° Latlong) from the HISTALP dataset (Auer et al. 2007) back to 1800 A.D. reveal strongest growth response to current-year June–August mean temperatures. The proxies are calibrated to instrumental target records by combining an analogue technique, which is able to extend the too short tree-ring series, with an artificial neural network technique for an optimal non-linear calibration including a bootstrap technique for calculating error assessment on the reconstruction. This reconstruction allows the putative “Medieval Warm Period” (MWP) to be described for French Alps and to be compared with 20th-century warming in modeling and attribution studies. The new reconstruction is compared with reconstructions based on historical sources (Pfister et al. 1994), grape ripening (Meier, 2007), speleothems (Mangini et al. 2005), chironomid analysis (Larocque et al. 2008) and tree ring width or maximum density (Büntgen et al. 2005, 2006) from the Swiss and Austrian Alps. Longer-term similarities but also disagreement on decadal to annual scales reveals the specificity of southern Alps subjected to Mediterranean influences.