Geophysical Research Abstracts,
Vol. 11, EGU2009-9625, 2009
EGU General Assembly 2009

Reconstruction of temperature variations, during the last 7 centuries using grape harvest dates

I. Garcia de Cortazar-Atauri (1), I. Chuine (1), A. Parker (3), C. Van Leeuwen (3), J. Tardaguila (4), J. M. Boursiquot (5), G. Demarée (6), B. Seguin (7), P. Yiou (2), and the OPHELIE Team

(1) BioFlux Centre d'Ecologie Fonctionnelle et Evolutive-Centre Nationale de la Recherche Scientifique, Montpellier, France, (2) LSCE, LSCE, Gif-sur-Yvette, France (pascal.yiou@lsce.ipsl.fr), (3) Ecole Nationale d'Ingénieurs de Travaux Agricoles, Bordeaux, France, (4) La Rioja University, Logroño, Spain, (5) INRA, Montpellier, France, (6) Institut Royal Météorologique de Belgique, Bruxelles, (7) Institut Nationale de la Recherche Agronomique, Avignon, France

Several studies aimed to reconstruct temperature variations of the last centuries in Europe using grape harvest date as a proxy. Most of these studies were focused only on two very specific areas, Burgundy in France and Switzerland. In this work, we present the results of the research program OPHELIE (Observations PHEnologiques pour reconstruire le cLImat de l'Europe) which aimed to obtain regionalized climate reconstructions in Europe using historical harvest date archives. We recovered more than 338 series of harvest date and quality covering 28 areas of France, Switzerland, Spain and Luxembourg. Most series covered the last 5 centuries, and the oldest one spanned the last millennium. We used these series to reconstruct temperature anomalies using process-based phenological models, which are much more robust than statistical models. We calibrated and cross-validated phenological models of grape maturity for most important grape varieties cultivated in the studied regions using an important dataset of grapevine phenological stages (budburst, flowering, veraison) and maturity of more than 40 varieties. We precisely identified for each region the varieties cultivated during the period investigated. For each region, we reconstructed temperature anomalies of Spring and Summer time by inversing the calibrated phenological models of the identified set of grapevine varieties. We also used harvest quality historical series to strengthen the reconstructed temperature anomalies obtained with harvest date series.