:::::: **ICP Forests**   LRTAP
                           Long-range Transboundary Air Pollution

PROJECT INFORMATION

Project title:	Interaction between climate and human impacts on vegetation changes in the National Park of Aigüestortes i Estany de Sant Maurice (PNAESM) throughout the last 15,000 years (OCUPA)
Project ID:	19
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PROJECT DESCRIPTION

The project aims to study the effects of climate, human activities and their interaction on vegetation changes in the National Park of *Aigüestortes i Estany de Sant Maurici* (located in the Catalan Pyrenees) throughout the last 15,000 years. Palaeoecological and archaeological techniques are combined to: reconstruct the climate with secular time scales; reconstruct vegetation changes; establish the beginning of human presence and the fluctuations of its impacts on vegetation; analyse the interactions between climate, vegetation and human use of high mountains. For managing purposes, the study is completed by: analysing past history as reference for current changes; valuating the National Park archaeological heritage in the context of the human history in the mountains; and producing outreach materials (iconography and visiting itineraries) for dissemination of the history of nature-human interaction in the mountains.

OCUPA is supported by the following research centers: *Centro de Estudios Avanzados de Blanes* (CEAB) from the *Consejo Superior de Investigaciones Científicas* (CSIC); *Grupo de Geohistoria Ambiental* (GA) from the *Universitat Autònoma de Barcelona* (UAB); and *Grupo de Arqueología de Alta Montaña* (GAAM), a mixed group between the *Departamento de Prehistoria* from the UAB and the *Instituto Milà i Fontanals* from the CSIC. The project is supported by the *Ministerio de Medio Ambiente y Medio Rural Marino* in Spain

Our group at the *Universitat Auntònoma de Barcelona* is involved in developing spatial models of the present and past climate and vegetation of the Pyrenees. We will construct present climate maps throughout spatial interpolation and statistical techniques and past climate maps by using transfer functions obtained from paleobiological data. Once we have drawn the climatic maps we will create probability maps of major tree species of the study area (the Pyrenees) throughout species distribution modeling. In order to carry out the second objective, we will test different techniques: Geographical Information Systems techniques combined with statistical methods for classification (Generalized Linear Models, GLM), maximum entropy or environmental envelopes (such as Domain

or Bioclim). These models will be developed for the present species distribution and, later, will be projected to the past with the past climatic maps.

Obviously, data obtained in the Pyrenees is not sufficient to completely characterize each species niche, so it will be necessary to determine the spatial distribution of the species in Europe or the whole world. Failing to include data from the entire geographic distribution of a species can result in sampling an ill-constrained range of environmental tolerance and underestimate its potential distribution. The species which will be used in the study are: *Abies alba, Acer campestre, Acer monspessulanum, Acer opalus, Betula pendula, Betula pubescens, Corylus avellana, Fagus sylvatica, Juniperus communis, Pinus sylvestris, Pinus uncinata, Quercus humilis, Quercus petraea, Quercus robur, Sorbus aria, Sorbus aucuparia* and *Sorbus torminalis, Taxus Baccata.*