



Variability of atmospheric greenhouse gases as a biogeochemical processing signal at regional scale in a karstic ecosystem

Sílvia Borràs (1,2), Eusebi Vazquez (1,3), Josep-Anton Morguí (1,3), Alba Àgueda (1), Oscar Batet (1), Lúdia Cañas (1), Roger Curcoll (1), Claudia Grossi (1), Manel Nofuentes (1), Paola Occhipinti (1), Xavier Rodó (1,4)

(1) Institut Català de Ciències del Clima (IC3), Barcelona, Spain, (2) Departament de Química Analítica, Universitat de Barcelona (UB), Barcelona, Spain, (3) Departament d'Ecologia, Universitat de Barcelona (UB), Barcelona, Spain, (4) Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain

The South-eastern area of the Iberian Peninsula is an area where climatic conditions reach extreme climatic conditions during the year, and is also heavily affected by the ENSO and NAO. The Natural Park of Cazorla, Segura de la Sierra and Las Villas is located in this region, and it is the largest protected natural area in Spain (209920 Ha). This area is characterized by important climatic and hydrologic contrasts: although the mean annual precipitation is 770 mm, the karstic soils are the main cause for water scarcity during the summer months, while on the other hand it is in this area where the two main rivers of Southern Spain, the Segura and the Guadalquivir, are born. The protected area comprises many forested landscapes, karstic areas and reservoirs like Tranco de Beas.

The temperatures during summer are high, with over 40°C heatwaves occurring each year. But during the winter months, the land surface can be covered by snow for periods of time up until 30 days. The ENSO and NAO influences cause also an important inter annual climatic variability in this area. Under the ENSO, autumnal periods are more humid while the following spring is drier. In this area vegetal Mediterranean communities are dominant. But there are also a high number of endemic species and derelict species typical of temperate climate. Therefore it is a protected area with high specific diversity. Additionally, there is an important agricultural activity in the fringe areas of the Natural Park, mainly for olive production, while inside the Park this activity is focused on mountain wheat production. Therefore the diverse vegetal communities and landscapes can easily be under extreme climatic pressures, affecting in turn the biogeochemical processes at the regional scale.

The constant, high-frequency monitoring of greenhouse gases (GHG) (CO₂ and CH₄) integrates the biogeochemical signal of changes in this area related to the carbon cycle at the regional scale, capturing the high diversity of landscapes and climatic variability. The monitoring is carried out in one of the stations of the ClimaDat network, which consists of eight GHG monitoring stations in highly preserved ecosystems which are very sensitive to climate change in Spain. This constant monitoring will allow relating changes in terrestrial ecosystems, hydrological processes and atmospheric transport of GHG. The goal of the presentation is to show the results obtained since September 2013 through continuous monitoring, focusing on the seasonal changes in precipitation, temperature, and CO₂ and CH₄ changes in atmospheric concentrations.