

**Recent advances in the interrelationship of vegetation and climate in Spain**

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The terrestrial biosphere is one of the most critical and complex components of the climate system, regulating fluxes of energy, water and aerosols between the earth surface and atmosphere. The terrestrial biosphere also is central to biogeochemistry of our planet, mostly with regard to the global carbon and nitrogen cycles. Particularly, vegetation plays an important role in the interaction between biosphere and atmosphere. Vegetation regulates energy exchange between the land biosphere and atmosphere, determines the hydrological processes and, through photosynthesis, fixes atmospheric carbon dioxide in the biomass. Thus, a better understanding of vegetation response to climate variability is crucial. The purpose of this work is to synthesize the progress that has recently been made in understanding the atmosphere/vegetation interrelationships using remote sensing. Remote sensing technique plays a major role in the study of the biosphere processes by providing information on the spatial and temporal variations of many Earth processes at regional and global scale. Several studies are presented to quantitatively analyze changes in vegetation related to precipitation at regional scale. The analysis is performed using different data sets (NOAA-AVHRR and MODIS-Terra images) and along two different periods (1989-2002 and 2000-2008). The vulnerability of natural ecosystems against the effects of climate fluctuations like drought is presented. Special attention is given to semiarid areas where vegetation is used as an indicator of landscape degradation. Moreover, forest presently serves as a major net sink of atmospheric carbon being of great relevance to control the interchanges between vegetation and atmosphere. In this sense, an example of the modeling of regional carbon net fluxes of the Spanish forests from remote sensing is shown. Last, different exercises have been carried out at local scale in order to get a deep insight in the relation between vegetation and atmosphere, particularly on land degraded areas. A local study is presented in Valencia region focused on the investigation of how fog water availability contributes to the reforestation of areas where land degradation has occurred after the long-term effects of fire.