



Analysis of surface temperature and precipitation trends and climate indices in Spanish mountain areas

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Several studies and observations suggest that global warming processes are more prevalent in mountain areas, showing higher rates of warming and more pronounced changes in precipitation than in average land data. Snow and ice are highly sensitive to variations in climate. The importance of mountain areas as water reservoirs for the surrounding land and valleys at lower altitudes justifies paying special attention to this type of behaviour and to the changes brought about by global warming. This interest is enhanced by the special environmental sensitivity of mountain ecosystems, and the difficult balance between these fragile ecosystems and their use as tourist resources or winter resorts.

In this paper we analyse climate data collected at mountain weather stations in Spain in time series up to 80 years. Stations in mountain areas are not numerous and are sometimes very scattered; nevertheless, we have selected the available data on temperatures, precipitation and other meteorological variables at stations located in the various mountain ranges throughout the Iberian Peninsula. For the selected stations, trends in temperatures (mean, maximum and minimum) have been studied and a seasonal analysis has been carried out. In addition, the data were processed with RClmDex, statistical and climatic software package, to evaluate Climate Extreme Indices. Cooling and warming patterns have been detected, and changes in precipitation have been analysed, trying to address the distinctive characteristics of mountain areas in the studies conducted. Monthly and seasonal assessments have also been carried out to detect changes in behaviour patterns. In general, good agreement with previously published data has been obtained, although not many studies have been carried out systematically in Spain, except in the Pyrenees area.