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# Climate Change Impacts on Atmospheric Summer Circulation in the Iberian Peninsula

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Recent catastrophes in Europe like the 2003 heat wave and the 2002 major floods have focussed attention on the dramatic impacts of extreme events. Climate models suggest an increase in frequency and magnitude of extreme weather events, due to higher temperatures, increase in rainfall intensities in the northern Hemisphere, an intensified hydrological cycle or more vigorous atmospheric motions.

The topographical features of the Iberian Peninsula and its geographical location on the western Mediterranean border create the ideal conditions for the formation of a thermal low in the centre of the peninsula during the summer months, late spring and early autumn. The synoptic surface features of the days in which a low pressure appears at the centre of the peninsula are similar for all months, i.e., the Azorean Anticyclone extends a ridge towards central Europe and the Mediterranean Sea. Along the western and northern edges of the peninsula strong mean sea level pressure gradients are observed, as well as a strong sea breeze which can transport moist and cooler air for more than 200km inland

In this paper, high-resolution climate model scenarios for 2071-2100 are used to determine possible changes in the regional atmospheric circulation patterns. These scenarios reveal an increase in frequency of the development of the Iberian Summer thermal low. Its extent and an intensity index are determined for future climate scenarios as well as for a control run which represents present day climate from 1961 to 1990. Both values are compared to assess the impact of climate change. The correlation

between these indices and temperature and humidity trends is also evaluated.

Since Portugal's summer climate is controlled by coastal processes, the strength of the pressure gradients in the western edges of the peninsula, the wind speed maxima, humidity and temperature are also used to assess regional circulation changes.