Heat-wave events in Spain: air mass analysis and impacts on 7Be concentrations

Abstract:
The present paper describes and characterizes the air mass circulation during the heat-wave events registered during the period 2005-2014 over Spain, paying special attention on the role of the Saharan circulations. With this purpose, backward trajectories at 500, 1500 and 3000 m in Seville (south), Madrid (centre) and Bilbao (north) during the thirteen heat-wave events identified during this period are analysed. Finally, the impact of the heat-wave events and of each advection pattern on 7Be activity concentrations is also analysed. The air mass results indicate that the heat-wave events are characterized roughly by western, southern and nearby advections, with a higher frequency of the first two types. The analysis shows a general and large impact at lower levels of westerly flows and an increase of African air masses with height. The Saharan air masses present a different spatial impact over Spain, with a decreasing occurrence and a decrease in the simultaneous occurrence percentage from south to north. The 7Be activity concentrations during these events show an increase of concentrations in central and southern areas and a small decrease in northern Spain. This increase is not associated with Saharan air masses, but instead to the arrival of distant westerly air masses.

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