



## **Cluster analysis of back-trajectories arriving in SE Spain. Relation with TOMS AI**

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A cluster analysis of back-trajectories arriving in Elche at 3000 and 1500 m has been performed to identify and describe the origin of the air masses affecting SE Spain. 72 and 96-hour back-trajectories arriving at 12UTC during 2004 were computed using the HYSPLIT model. The k-means clustering method was used with the procedure described by Dorling to reduce the subjectivity in the selection of the appropriate number of clusters. Different methods to initialize the cluster centroids are discussed.

The 3000m back-trajectories are clustered into several Northwesterlies (NW) and Westerlies (W), one Southwesterly (SW) and one for regional Mediterranean recirculations (MedR). For 1500m an European air mass (EU) cluster is also identified. The major cluster for 3000m back-trajectories is SW. W and MedR follow in importance. The major cluster for 1500m is the MedR. African dust intrusions are better classified at 3000m, associated with the SW and MedR clusters.

The cluster analysis is also applied to classify only the days affected by dust-loaded African air masses. Those days are identified by satellite imagery and dust prediction models. The results reflect the different synoptic situations that lead to these episodes.

The variation of the TOMS AI values according to the different clusters is significant. High AI values are associated with SW and MedR air masses in all cases. For 3000m back-trajectories the NW moderate flows are associated with negative AI values, while for 1500m the NW fast flows (North-American continental air masses) correspond to negative AI. EU back-trajectories show negative AI values in winter; from January to March this is due to the advection of air masses loaded with anthropogenic aerosols. We acknowledge support from CICyT, CGL2004-04419/CLI (RESUSPENSE).