Geophysical Research Abstracts
Vol. 15, EGU2013-14055, 2013
EGU General Assembly 2013

Assessing SaTScan ability to detect space-time clusters in wildfires

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Besides classical cluster analysis techniques which are able to analyse spatial and temporal data, SaTScan software analyses space-time data using the spatial, temporal or space-time scan statistics. This software requires the spatial coordinates of the fire, but since in the Rural Fire Portuguese Database (PRFD) (Pereira et al, 2011) the location of each fire is the parish where the ignition occurs, the fire spatial coordinates were considered as coordinates of the centroid of the parishes. Moreover, in general, the northern region is characterized by a large number of small parishes while the southern comprises parish much larger. The objectives of this study are: (i) to test the ability of SaTScan to detect the correct space-time clusters, in what respects to spatial and temporal location and size; and, (ii) to evaluate the effect of the dimensions of the parishes and of aggregating all fires occurred in a parish in a single point. Results obtained with a synthetic database where clusters were artificially created with different densities, in different regions of the country and with different sizes and durations, allow to conclude: the ability of SaTScan to correctly identify the clusters (location, shape and spatial and temporal dimension); and objectively assess the influence of the size of the parishes and windows used in space-time detection.

Pereira, M. G., Malamud, B. D., Trigo, R. M., and Alves, P. I.: The history and characteristics of the 1980–2005 Portuguese rural fire database, Nat. Hazards Earth Syst. Sci., 11, 3343-3358, doi:10.5194/nhess-11-3343-2011, 2011

This work is supported by European Union Funds (FEDER/COMPETE - Operational Competitiveness Programme) and by national funds (FCT - Portuguese Foundation for Science and Technology) under the project FCOMP-01-0124-FEDER-022692, the project FLAIR (PTDC/AAC-AMB/104702/2008) and the EU 7th Framework Program through FUME (contract number 243888).