Geophysical Research Abstracts
Vol. 18, EGU2016-6001, 2016
EGU General Assembly 2016

Hailstorm forecast from stability indexes in Southwestern France

Pablo Melcón (1), Andrés Merino (1), José Luis Sánchez (1), Jean Dessens (2), Estíbaliz Gascón (1), Claude Berthet (2), Laura López (1), and Eduardo García-Ortega (1)

(1) University of León, Química y Física aplicadas, León, Spain, (2) Association Nationale d'Etude et de Lutte contre les Fleáux Atmosphériques (ANELFA). Toulouse. France.

Forecasting hailstorms is a difficult task because of their small spatial and temporal scales. Over recent decades, stability indexes have been commonly used in operational forecasting to provide a simplified representation of different thermodynamic characteristics of the atmosphere, regarding the onset of convective events. However, they are estimated from vertical profiles obtained by radiosondes, which are usually available only twice a day and have limited spatial representativeness. Numerical models predictions can be used to overcome these drawbacks, providing vertical profiles with higher spatiotemporal resolution.
The main objective of this study is to create a tool for hail prediction in the southwest of France, one of the European regions where hailstorms have a higher incidence. The Association Nationale d'Etude et de Lutte contre les Fleáux Atmosphériques (ANELFA) maintains there a dense hailpad network in continuous operation, which has created an extensive database of hail events, used in this study as ground truth. The new technique is aimed to classify the spatial distribution of different stability indexes on hail days. These indexes were calculated from vertical profiles at 1200 UTC provided by WRF numerical model, validated with radiosonde data from Bordeaux. Binary logistic regression is used to select those indexes that best represent thermodynamic conditions related to occurrence of hail in the zone. Then, they are combined in a single algorithm that surpassed the predictive power they have when used independently. Regression equation results in hail days are used in cluster analysis to identify different spatial patterns given by the probability algorithm. This new tool can be used in operational forecasting, in combination with synoptic and mesoscale techniques, to properly define hail probability and distribution.
Acknowledgements
The authors would like to thank the CEPA González Díez Foundation and the University of Leon for its financial support.