CHARACTERIZING PRECONVECTIVE CONDITIONS IN SOUTHERN FRANCE TO IMPROVE ANELFA FORECASTS

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1. ABSTRACT

Predicting the occurrence of hailstorms is one of the most complicated tasks in weather forecasting because of the small area of land that is usually affected and because of the short time hail events last. Today there are a number of parameters available that may be used to characterize preconvective conditions and predict the beginning of convection. However, forecast models based on stability indices should be developed separately for each geographic area (Angus et al., 1988; Galway, 1956; Showalter, 1953; Johns and Doswell, 1992; Weisman and Klemp, 1982)

Southern France is affected by a high number of hailstorms. The setting up of short-term forecast models to predict the occurrence of hailstorms requires an analysis of the preconvective conditions. For this study we selected 300 hail events detected by the hailpad network managed by ANELFA in southern France, and another 300 events with no hail precipitation. All the events were registered between 1987 and 2005.

The data provided by radio soundings carried out at 12 UTC at Bordeaux and Nimes were used to obtain 36 meteorological variables for each one of the 600 days analyzed.

The databases available were used in this study with two aims in mind: determining which meteorological variables or indices obtained from the radio soundings are more relevant in characterizing preconvective conditions; and, secondly, setting up an objective short-term forecast model for storms on the basis of one or more meteorological parameters.

Logistic regression was used to establish the dichotomy risk/no risk of storms. A function was developed combining seven meteorological variables.

Finally, an ACP was carried out between some of the meteorological variables and a parameter which is typical of hail precipitation: the maximum diameter of the hailstones in each day. The results show a good correlation between the altitude of the isotherm of 0°C and the maximum hailstone diameter.

2. REFERENCES

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