



## **Evaluation of the occurrence of agricultural frost in state of Parana, Brazil, generated by a regional forecast model**

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This study evaluated the potential use of a regional atmospheric model to predict the occurrence of agricultural frost three days in advance, as based on the vulnerability to low temperatures of the main crops in eight locations in the state of Parana, Brazil, between 2000 and 2007. Based on the reported occurrence of frosts, the values of the air temperature observed at meteorological stations were compared with the 66 h advance predictions obtained by the model. In general, we observed a slight overestimation of the air temperature values for all of the locations during the frost events. However, regression analyses demonstrated a good quality of the prediction of the model despite the data grid being relatively coarse. The coefficients of determination ( $R^2$ ) were larger than 0.65, whereas the systematic errors varied between 0.26 and 0.69°C, and the magnitude of error does not exceed 1.7°C. The hit rates of the categorical forecasts showed that the temperature 66 hours in advance was adequate to detect the occurrence of frost because the accuracy of forecasting exceeded 0.80, the probability of detection reached 0.70, and the false alarm rate did not exceeded 0.3.