Probabilistic Temperature Forecasting

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Climate change is an important issue in the last decades, where the uncertainty is a constant in these studies. Therefore, climate forecasting has become an essential tool in agriculture to prevent crop damage and in crop insurance politics.

One of the main factors in crop development is temperature, particularly in crop selection and in frost risk analysis. This work presents a forecast of hourly temperatures at different length of forecasting based on hourly data obtained from an automatic meteorological station. The forecast temperatures is estimated on autoregressive integrated moving average models (ARIMA) following the Box-Jenkins methodology. The model obtained in hourly temperatures is (1,1,1)(1,1,1) with a seasonality of 24 hours. Based on several forecast error indexes a decision methodology is proposed to change in 24, 12 and 8 hours the forecast length period and to calculate a probabilistic risk index to have a temperature below a certain value.

Finally, using the same methodology, temperature monthly time series are modeled to be used in crop selection for a given field plot.