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Estimating the economic value of icing forecasts on wind turbines

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The value of a weather forecast is strongly defined by the potential user of this forecast and the respective weather parameters. The user must have alternative courses of action available which are weather dependent. If the user decides on actions based on a forecast which he would not have taken otherwise and benefits from these alternative actions economically, then the forecast has been of value to the user.
Icing of wind turbine blades can lead to unplanned downtime periods and thereby reducing the energy yield. It is the aim of this work to minimize these downtime periods by integrating deterministic and ensemble forecasts of meteorological and connected icing models. In this contribution we present results from a simple Cost-Loss ratio (C/L) decision model using different scenarios of increasing complexity. The work is performed within the project ICE-CONTROL an Austrian research initiative.
The economic value in the C/L model is defined similar to a skill score of a verification measure. It measures the relative reduction of expenses calculated from the actual forecast to the maximal reduction of expenses calculated from a perfect forecast both in relation to a reference forecast. The four key parameters of this model are the hit rate and false alarm rate of the specific event , the mean occurrence of the event (climatological mean) and the user specific C/L ratio.
In our case, C describe the costs for blade heating and L the losses due to unplanned downtime periods of the wind turbine due to icing. We are testing different scenarios for describing an icing event. Further the effect of ensemble forecasts on the value curves is investigated. First results will be presented at the conference.