



## **Using KDE to estimate probability of precipitation from EPS simulations, a study case.**

Lisette Guzmán (1) and Vagner Anabor (2)

(1) PPGMET, Universidade Federal de Santa Maria, Santa Maria, Brazil (lisette19901109@gmail.com), (2) Universidade Federal de Santa Maria, Santa Maria, Brazil (vanabor@gmail.com)

The non-parametric technique of Kernel Density Estimation (KDE) was used to obtain probabilistic precipitation forecasts from ensemble simulations, for a heavy precipitation event in southern Brazil. Precipitation amounts from the ensemble predictions system members (EPSm) using the Weather Research and Forecasting (WRF) Model, the ensemble mean precipitation (MPP) and probabilities contours obtained using KDE, were compared against the precipitation product MERGE and conventional surface observations, for two slightly different 24 h periods of the numerical simulations. Probabilistic forecasts using KDE were coherent with precipitation estimates by MERGE, resulting better than the deterministic forecasts from the EPSm. In spite of the miss-location of the precipitation areas by the EPSm, the probabilistic approach using KDE showed improvements over the deterministic forecasts, specially for precipitation above 25 mm and 50 mm in 24 h. Being forecast with more than 50% of probability, those precipitation thresholds presented better values of threat score, false alarm and bias, than the EPSm individual forecasts and the MPP, resulting around a 30% more accurate, according to the Pierce Skill Score.