Hermoso, A., V. Homar, S. J. Greybush, and D. J. Stensrud, 2020: Tailored ensemble prediction systems: Application of seamless scale bred vectors. *J. Meteor. Soc. Japan*, **98**, 1029-1050. https://doi.org/10.2151/jmsj.2020-053

Plain Language Summary: Uncertainties in numerical weather forecasting derived from an imperfect knowledge of the initial conditions are coped with ensemble forecasting. Breeding technique provides a simple and low computationally expensive ensemble generation strategy. The technique aims at capturing growing errors, obtained from the difference between control and perturbed runs at regular time intervals. Modifications to the traditional arithmetic rescaling are investigated, including logarithmic and orthogonal rescaling. In addition, the Bred Vectors Tailored Ensemble Perturbations method is designed to control the spatial scale of the perturbations. This technique outperforms traditional breeding techniques in terms of diversity (ensemble dimension) and skill.

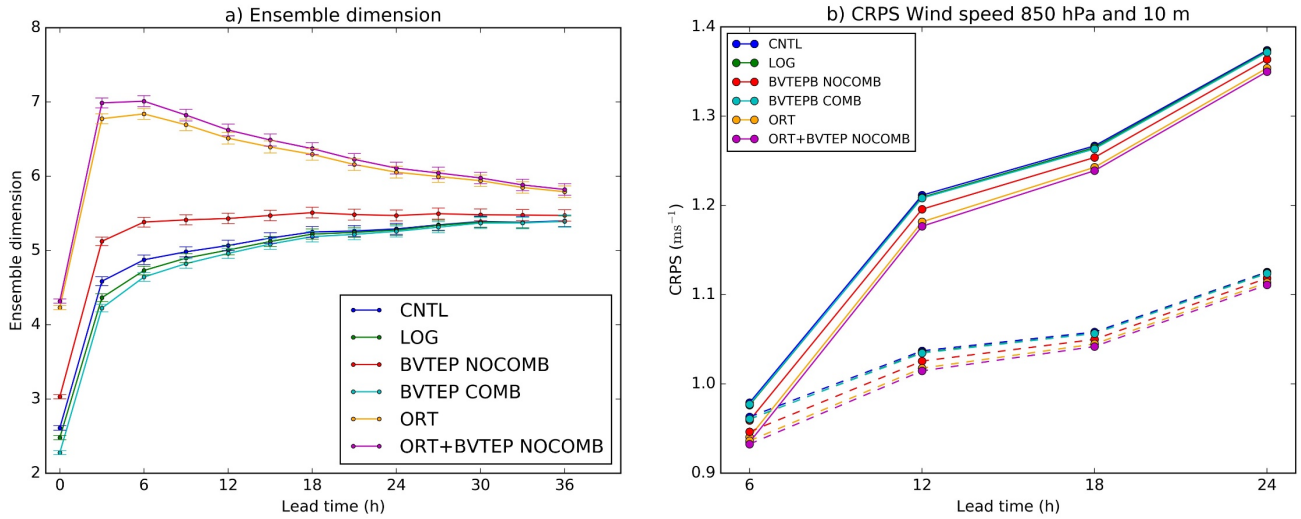

Figure 1. a) Ensemble dimension for temperature at model level 8 as a function of lead time for the different ensemble configurations tested. b) Continuous rank probability score (CRPS) for 850 hPa (solid) and 10 m (dashed) wind speed.

- The use of a different rescaling norm (e.g. logarithmic) in the breeding cycle does not have a significant impact on ensemble performance.
- Ensemble diversity and skill is higher for ensembles with initial perturbations constructed from one bred vector with modified scale.
- The combination of scale modification of perturbations with orthogonalization renders the best diversity and verification results.