

Agreement Scales for Convective-Scale Ensemble Verification

Validation test case

Carlos Peralta

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Validation test case

Section 4 of Dey et al (2016) discusses an idealized experiment to test the agreement scale for ensembles forecast errors: displacement, amplitude, and structure errors, using synthetic fields.

Domain and Setup:

The idealized experiment described in the paper uses a domain of 193×242 grid points, with a 12-member ensemble. Each member contains a circular “rain blob” randomly placed within a specified area, matching the paper’s setup. An idealized observation field was generated with a rain blob of the same size and location as the ensemble’s rain area, representing a “well-spread” case. The ensemble members are shown in the figure below.

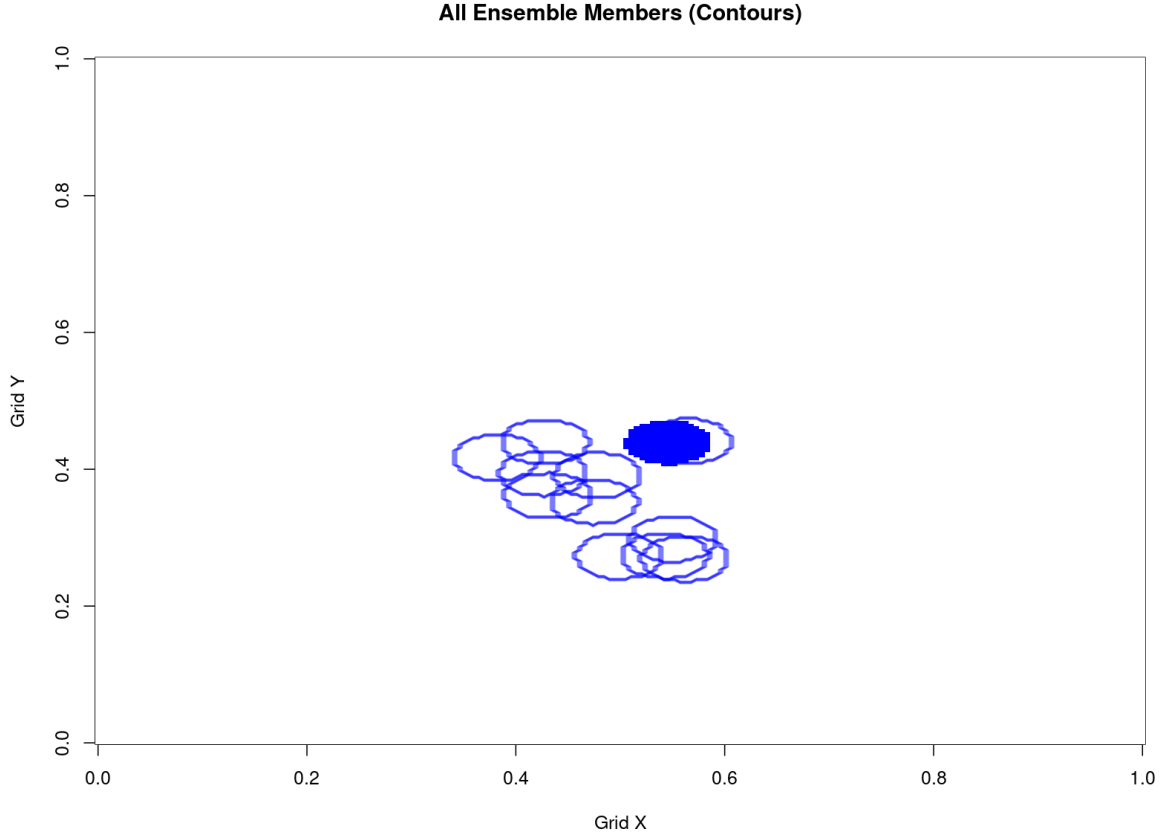


Figure 1: Ensemble fields with 12 members

Agreement Scales Calculation:

The validation case computes:

- SA(mm): Gives the mean agreement scale between all unique pairs of ensemble members, as defined by Equation 6 in the paper.
- SA(mo): Gives the mean agreement scale between each ensemble member and the observation, as defined by Equation 7.

The plot below shows the SA(mm) field using the exact color palette and discrete bins (0–10, 10–20, ..., 70–80), directly reproducing the style and content of Figure 4.

SA(mm) - Agreement Scales (Figure 4 Reproduction)

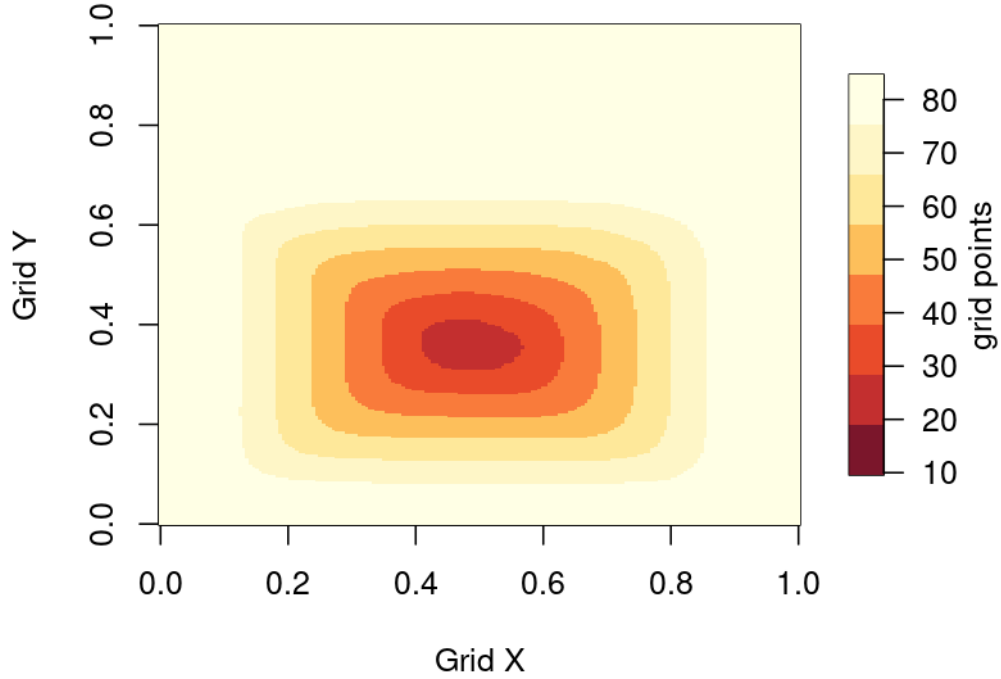


Figure 2: Agreement scales for the idealized experiment, reproducing Fig 4 of the paper

The code is available in this repository under `ACCORD_VS_202507/scripts/dey_validation.R`.

References & Resources

Primary References:

- Dey, S.R.A., et al. (2016). A new method for the characterization and verification of local spatial predictability for convective-scale ensembles. *Q.J.R. Meteorol. Soc.*, 142, 1982-1996.
- Dey, S.R.A., et al. (2016). Assessing spatial precipitation uncertainties in a convective-scale ensemble. *Q.J.R. Meteorol. Soc.*, 142, 2935-2948.