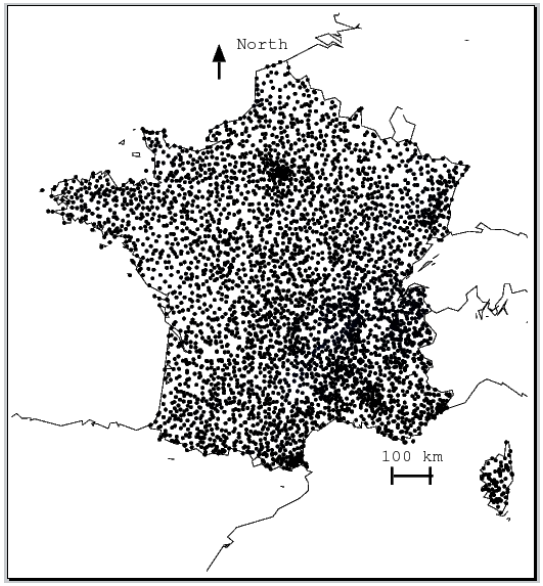
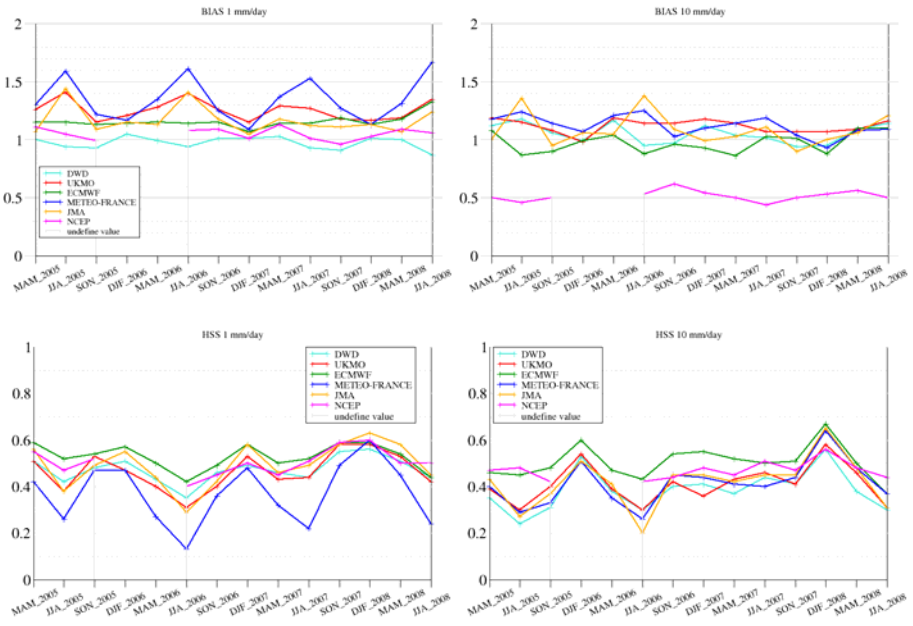
Climatological state network

4000 raingauges giving 24 hours accumulated rain every day

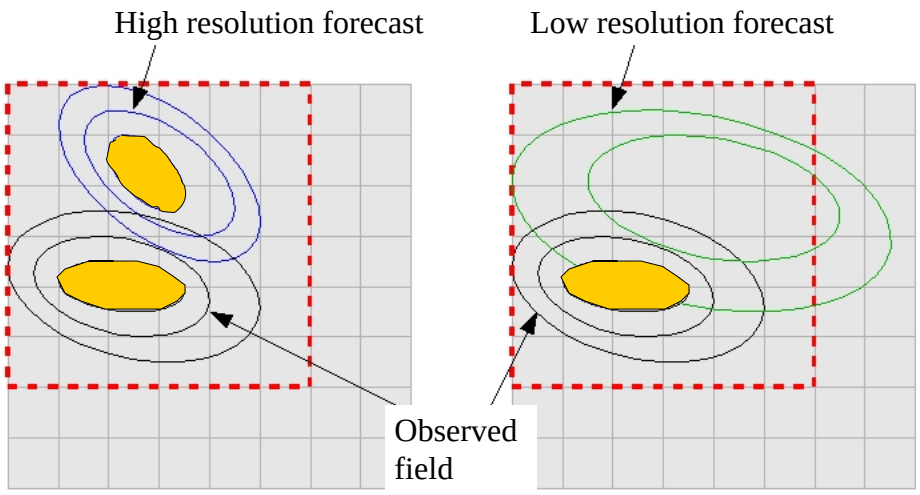


## QPF verification for meso-scale models

- Average the data at 0.2°x0.2°
- Average the models QPF at the same grid: ALADIN 0.1→ 0.2 or AROME 0.025→0.2
- Compute the classical and probabilistic scores:BIAS, HSS, BSS… and if their difference is significant

## double-penalty and neighbourhood



# Fuzzy approach

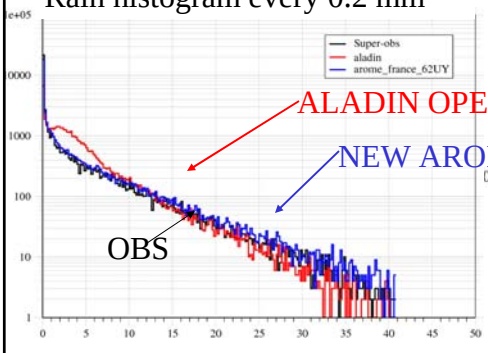
- Brier Score (BS): $BS = \frac{1}{n}\sum_{k=1}^{n}(pk - ok)^2$ with $BSperf = 0$
- Brier Skill Score(BSS): $BSS = 1 - \frac{BS}{BSref}$
- 2 interesting limits :

  1- Neighbourhood size = 0 : $BSS \xrightarrow[v \to 0]{} HSS$

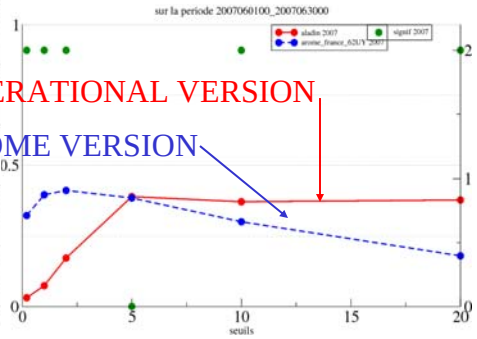
  2- Neighbourhood = simulation domain $BS \xrightarrow[v \to L]{} \frac{1}{n}\sum_{j=1}^{n}\alpha(j) \times (1 - BIAS(j))^2$

# QPF verification during June 2007

Rain histogram every 0.2 mm




Heidke skill score against persistence

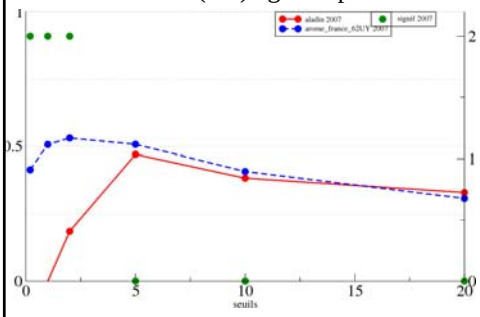


# QPF verification during June 2007

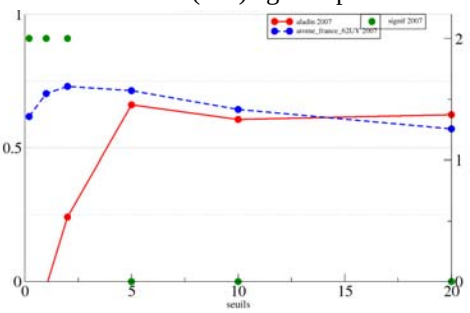
ALADIN OPERATIONAL VERSION

NEW AROME VERSION

Brier skill score (SO) against persistence




Brier skill score (NO) against persistence




The size of the neighbourhood is 130 km

So= Single Observation, NO= Neighbourhood observations