KANN ET AL (2009) → CALIBRATION 2-M TEMP FROM LAM ENSEMBLE USING 1 KM × 1 KM ANALYSIS FIELDS

EVALUATING 2-M TEMP FORECASTS!

ENSEMBLE: ALADIN-LAEF
- 18 KM HORIZONTAL, 37 VERT LEVELS.
- 18 MEMBERS

ANALYSIS DATA: INCA NOWCASTING
- 1 KM × 1 KM, LOWEST 4 KM OF ATM FOR MANY VARIABLES OVER AUSTRIA.

TECHNIQUE → NONHOMOGENEOUS GAUSSIAN REGRESSION (GNEITING ET AL. 2005)
- BOTH MEAN & VARIANCE ARE MODELED BY LINEAR REGRESSION

$$PDF = N(\underbrace{a+b\mu}_{\text{behavior of bias}}, \underbrace{c+d\sigma^2}_{\text{SPREAD-SKILL RELATIONSHIP.}})$$

- MINIMIZE CRPS TO DETERMINE COEFFICIENTS.
- REALLY GOOD SUMMARY OF NGR.

RESULTS: VERIFIED @ 170 AUSTRIAN STATIONS
- ONLY VALIDATE FOR 1 MONTH! (DECEMBER 2007)
- BIAS WAS REMOVED [FROM −1.2C TO ~0C]
- RMSE DECREASED FROM 2.9°C TO 2.4°C.
- ENSEMBLE SPREAD INCREASED FROM ~0.3°C TO 1.6°C !!!
  - → STDEV, OR σ
- PERCENTAGE OF OUTLIERS (WHAT'S THIS) DECREASED FROM OVER 70% TO 25%
- BETTER ROC SCORES? [ZHU ET. AL. 2002]
- CRPSS DOUBLED FROM 0.3 TO 0.6.
- TESTED AGAIN IN JULY 2008 WITH SIMILAR RESULTS.

RESULTS IN CALIBRATED PROBABILITY FORECASTS ON A 1×1 GRID!

REFINING NGR → NGR-TD

- IMPLEMENT A TIME-DELAYING AVERAGING METHOD INSTEAD OF SIMPLE AVERAGING OVER THE TRAINING DATA.
- CAUSES THE REGRESSION COEFFICIENTS TO BE INFLUENCED MORE BY RECENT FORECAST ERRORS.

PROCEDURE FOR 50 DAY WINDOW:

- GET AUG CRPS FOR DAYS -50 TO -30
- FOR DAY -29:

$$CRPS = W CRPS_{-29} + (1-W) CRPS_{-50:-30}$$

↓ WEIGHT OF 0.1

↓

DO THIS FROM DAYS -29 TO -1, SO FOR -28:

$$CRPS = W CRPS_{-28} + [1-W]\left[W CRPS_{-29} + [1-W] CRPS_{-50:-30}\right]$$

IF I UNDERSTAND THIS CORRECTLY, 90% OF CRPS IS THE MOST RECENT CRPS... DOESN'T THIS MAKE IT LIKE A TRAINING DATA OF WINDOW LENGTH 1? I MUST BE MISSING SOMETHING.

APPLYING NGR TO ECMWF-EPS USING ANALYSIS AS TRUTH:

- ECMWF-EPS IS MORE CALIBRATED, HAS LITTLE BIAS, REDUCED ERROR & MORE SPREAD THAN RAW, BUT NOT AS GOOD AS CALIBRATED CAEF.

∴ DYNAMIC DOWNSCALING STILL SEEMS TO BE IMPORTANT, & THEY USE AN 18 KM MODEL.