Verification of C3S Seasonal Forecasting Systems over Europe and the Mediterranean region

Sánchez-García, E. (esanchezg@aemet.es), Voces-Aboy, J. (jvocesa@aemet.es), Rodríguez-Camino, E. (erodriguezc@aemet.es)
AEMET, Spanish Meteorological Agency, Spain

1.- OBJECTIVE

Production of real-time seasonal forecasts faces a choice of forecasts from various seasonal forecasting systems (SFS). Such choices require consideration of which approaches should be followed for the selection of models and blending of forecasts in developing consolidated seasonal forecasts over a particular region (WMO 2019). Selection of models is related to regional performance of seasonal forecasting systems.

The main objective of this poster is to show the skill of the latest versions of the five SFS currently contributing to the Copernicus Climate Change Service (C3S). This poster updates results on verification of SFS developed in the context of Mediterranean Climate Outlook Forum (MedCOF) activities (Sanchez-García et al. 2018).

Precipitation and temperature are the parameters verified over several domains in Europe and Northern Africa (see map). A few probabilistic (ROC Area and RPSS) and deterministic skill scores (correlation) are selected for communicating differences in skill depending on numerical model, variable, region and season.

2.- DATA

Hindcast of the following seasonal coupled atmosphere-ocean models have been used for their verification in a common period (1994-2015) at seasonal time scales: ECMWF SEAS5 (ECMWF-S5), Météo-France System 6 (MF-S6), German Climate Forecast System 2.0 (DWD-S2), Met Office Global Seasonal Forecast System 13 (UKMO-S13) and Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC-S3). Also a multi-model system developed in the MEDSCOPE project and built with all these models has been verified (MMC3S-S0). The original anomaly data were three monthly averaged and up-scaled to a common 2.5º x 2.5º lat-lon grid for the computation of seasonal models verification scores.

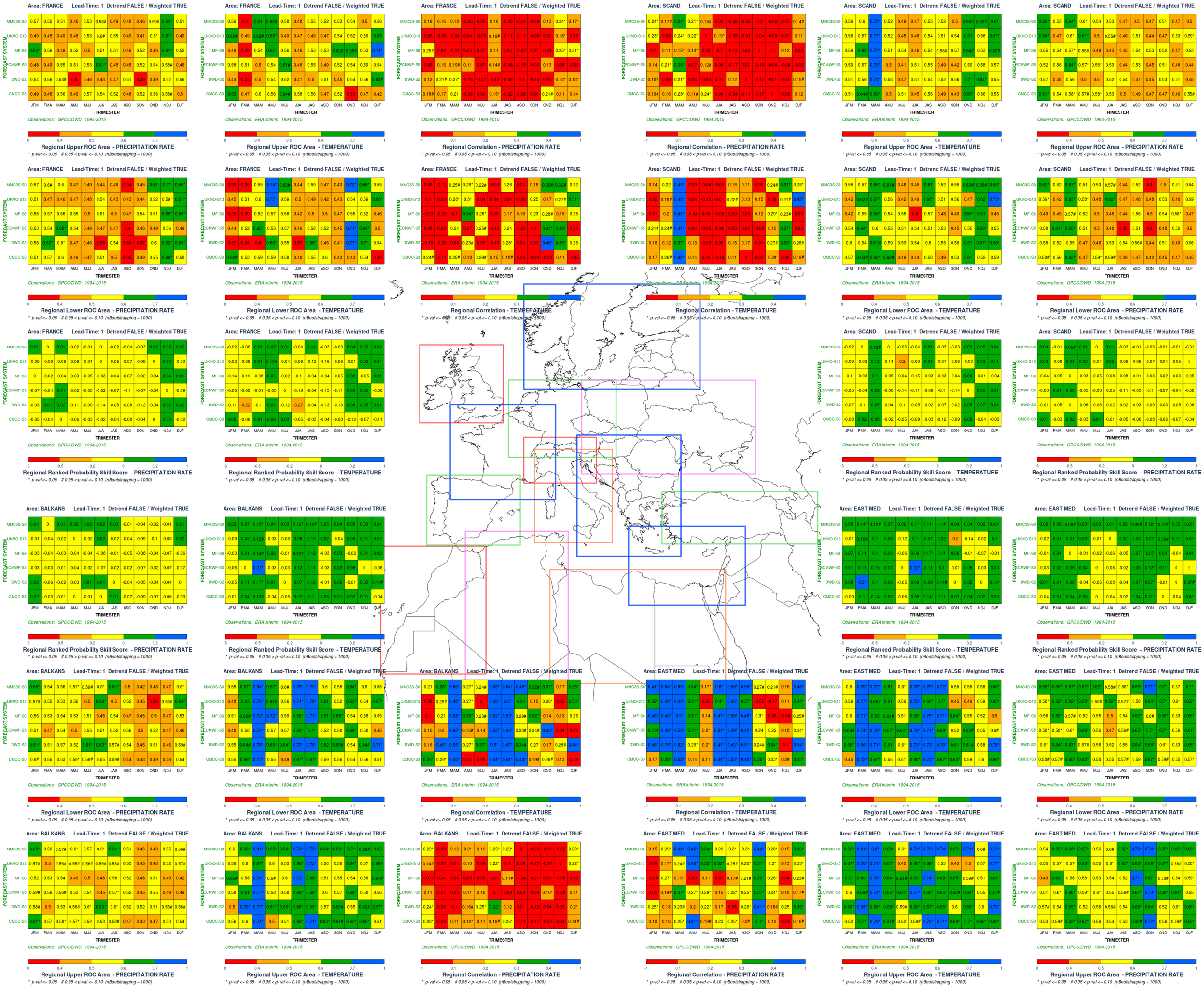
ERA-Interim monthly temperature and GPCC v8.0 precipitation datasets have been used as observational data to verify the seasonal forecasts.

3.- METHODOLOGY

Due to space constrains, only one month lead time verification of seasonal forecasts for temperature and precipitation anomalies is shown here using a selection of deterministic and probabilistic skill scores. The anomalies --computed as the difference between the forecasted and climatological values for each system-- are obtained by cross-validated forecasts on data not used in the estimation. The anomalies of the observation datasets have been computed in a similar way.

- 14 Domains over Europe and Northern Africa.
- 12 three-month periods
- 4 scores (Wilks 1995) have been computed:
  - Ranked Probability Skill Score (RPSS) for terciles
  - Lower/Upper Relative Operating Characteristic (ROC) area
  - Lower/Upper Brier Skill Score (BSS)
  - Correlation

4.- SUMMARY OF SCORES (Correlation / RPSS / ROC over France / Scandinavia / East Mediterranean / Balkans)



5.- RESULTS

- Although, skill is highly dependent on the region, parameter and season and at a lesser extent on the forecasting system, one may conclude that depending on the region, some seasons/parameters are clearly more predictable than others for all the systems.
- As also shown in previous versions of the SFS, there is generally higher skill for temperature than for precipitation and for Eastern Mediterranean than for Europe. The multi-model system tends to show –as expected- higher skill.
- A general improvement is detected for every system over its previous version (not shown in the tables)
- In absolute terms there is no system better than everyone else, however once focused on certain seasons and regions one may assign more credibility to certain systems.
- In the context of MedCOF operations and for the selection of models to be used at a regional level, it is a good practice to generate these tables for each region of interest, for different variables, seasons and models.

6.- REFERENCES

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Photography encouraged

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