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Statistical tools for Mediterranean Seasonal Forecast

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Seasonal forecasts are essential tools to offer early-warning decision support, that can help to reduce the socio-economics related risk associated with anomalous events. Advances in statistical prediction are often linked with the enhance of understanding that usually leads to improve dynamical forecast. Thereby, both approaches are frequently combined in order to increase the robustness of the forecast.

MEDSCOPE project (MEDiterranean Services Chain based On climate PrEdictions) aims to improve the predictability of climate predictions from seasonal to decadal timescales over the Mediterranean area. One of the main lines of research of MEDSCOPE is to improve the extraction of relevant information from climate prediction systems and assess their robustness and uncertainty through a toolbox "CSTools". In this Toolbox, we are developing methodologies to extract usable information from predictions, producing tools for prediction verification, calibration, downscaling, ensemble member combination and selection that will be publicly released in a R-package and a Gitlab webpage.

Here we present the CMCC contribution to CSTools using two case studies of seasonal forecast: Spain and Italy. We show a new method for Bias correction conditioned by the dynamical properties of the underlying attractor. In this method we make use of recent advances in dynamical systems theory to estimate two instantaneous dynamical properties of SST/SLP fields for the North Atlantic sector: the local dimension and the persistence. We also present a Statistical Downscaling and a statistical Orographic Downscaling, and some tools for visualization and forecast verification. The dynamical forecast of precipitation is provided by the new Copernicus C3S Seasonal Prediction System.