ARTIST: ARTificial Intelligence for Seasonal forecast of Temperature extremes

Description

Seasonal Forecasts are critical tools for early-warning decision support systems, that can help reduce the related risk associated with hot or cold weather and other events that can strongly affect a multitude of socio-economic sectors. Recent advances in both statistical approaches and numerical modeling have improved the skill of Seasonal Forecasts. However, especially in mid-latitudes, they are still affected by largeuncertainties that make their application often complicated.

The ARTIST project aims at improving our knowledge of climate predictability at the seasonal time-scale, focusing on the role of unexploreddrivers, to finally enhance the performance of current prediction systems. This effort is meant to reduce uncertainties and make forecasts efficiently usable by regional met-services and private bodies. A statistical/dynamical hybrid model will be designed through the synthesis of

- a cuttingedge dynamical Seasonal Prediction System and
- a statistical model based on advanced Machine Learning (ML) techniques.

Such a hybrid approach may become critical to improve climate forecasts, because it combines the theoretical foundation and interpretability of physical modeling with the power of Artificial Intelligence (AI), that can reveal unknown or disregarded spatio-temporal features.

ARTIST will focus on seasonal prediction of temperature hot/cold extremes in Europe, but its scalable nature can make it applicable across a wide range of variables and geographical areas. Besides the employment of AI, a strength of the action stands in the use of local land surface predictors to instruct the empirical model. The fellowship, which includes a variety of training activities, will be mainly conducted at the Barcelona Supercomputing Centre (Spain), a world renowned institute for climate predictions and applications. A secondment period is projected at the Max Planck Institute for BGC (Germany), prominent in land studies and ML employment in earth science.

Barcelona Supercomputing Center - Centro Nacional de Supercomputación