Multi-variable statistical downscaling approaches: improvement to hydro-climatic variables

EDF **climate impact studies** are based on the IPCC climate projections. These studies aim at developping adaptation plans. However, these dataset cannot be used as is in impact studies since they are associated to biases related to any modelling exercice and the climate model spatial resolution is too large to suit EDF needs. **Bias correction and downscaling methods** have been being developed in the international community. At **EDF Climate Service**, the statistical CDF-t approach is used and regularly improved to set up climate projections that feed models to assess **impacts on the hydrological cycle**, renewable production, load, etc.

Even though this method proved high performances on the variables statistical distribution, it does not account for **the inter-variable dependency** or the **spatial and temporal auto-correlation** of climate projections. Yet **hydrological extreme events**, such as floods and droughts result from meteorological situations showing series of wet days for floods and dry and hot days for droughts. Other **multi-variable statistical methods** that account for these dependencies are being developed, particularly at IPSL, that show promising improvement to our approaches.

EDF supervisors: Lila Collet & Hiba Omrani
lila.collet@edf.fr
hiba.omrani@edf.fr
Location : EDF-Lab saclay

Main objectives

- State of the art and selection of statistical bias correction and downscaling methods
- Set up of a climate/bias correction/hydrological modelling chain for each selected method
- run of each modelling chain for various contrasted catchments (mountainous and plane)
- Analysis of extreme event hydro-climatic indicators for each catchment to evaluate the new approaches performances compared to CDF-t