Potential for downscaling other essential climate variables

Mejora de skill pensando los miembros (comparando información empírica y dinámica)

Best NAO weighted and downscaled members



Best NAO weighted members

Evaluación de resultados: análisis del skill de partida y de cada elemento de la cadena



Temperatura

Precipitación

For **CMIP6**, a comprehensive evaluation of ML methodologies have been conducted. A dedicated package (<u>https://github.com/ahernanzl/pyClim-SDM</u>) have been developed, and several papers on statistical methods have been published (see references). Improvements have been found for precipitation using methods based on decision tres, and bias correction quantile mapping based methods.



GCMs selected

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Work in progress:

One fundamental limitation of **statistical downscaling** (SD) have been that **usually it was limited to precipitation and temperature** downscaling. SD have been tested over other essential climate variables against RCMs used in EUROCORDEX, with promising results. Coherence among variables have been tested using a composite index like CANADIAN FWI. **Results show potential for extending for using this methodology for downscaling wind, relative humidity or solar irradiance**, **paving the way for the development of related climate services**, given the existence of **training datasets**

Daily correlation (for all domain points within EUROCORDEX domain) for six essential climate variables. Every coloured pair represent one model, purple (left) xGB.

For every model, results are showed with (right) and without (left) bias correction.

Observations: EOBS



BIAS



Results III: extremes and spells



Results III: extremes and spells



fwi 95p_days



Fig 6: Bias for spell-related indexes (days): WSDI (top-left), CSDI (top-right), CDD (bottom-left) and CWD (bottom-right)

Fig 5: Bias for extreme-related indexes: Tx (°C), Tn (°C) and R01 (%) at first row, Rx1day (%), R20mm (%) and R95p (%) at second row and SFCWINDx (m/s), FWI p95 (%) and FWI 95p_days (days) at third row.