**MINUTES WORLD CAFÉ**

**Discussed questions:**

* What means multi (i.e. how many)? What are the limitations?
* Effect of multi on downscaled spread: current and future climate
* Is there an optimal configuration of multi? Selection instead of “only” multi?
* Equality of datasets within each “M” (incl. uncertainties)

**Multiple observations**

* Different observational datasets exist
  + Coverage: continental vs national datasets
  + Spatial representativeness: Gridded (from observations) vs. station datasets
  + Different models: Reanalysis datasets (numerical models) vs. gridded observational datasets (statistical interpolation)
  + Different measurement: in-situ vs. remote sensing data (satellite, radar) and combination (e.g. radar- rain gauge combination)
* Uncertainty
  + Modelled data (i.e. re-analysis datasets and gridded observations) strongly depend on which data are assimilated during simulation (re-analysis datasets) or which statistical methods were used to interpolate station data (gridded observations)
  + Gridded data represent average information for an entire grid cell. Representativeness problems may occur for regions with complex topography, coastal regions etc.
  + The use of regional ensembles of re-analysis datasets with different members and different assimilation schemes may help to quantify the uncertainty related to re-analysis datasets.
* Limitations
  + Gridded observational data do not necessarily correctly represent temporal trends and auto-correlation structures as well as inter-variable consistency is not maintained, since often individual variable are gridded independently.
  + Gridded observational datasets and re-analysis datasets are both based on models
  + Availability of data (i.e. national station and gridded observational data)
* Choice of observational dataset
  + Statistical downscaling method should be applied to same observational dataset, that is used for the calibration of the impact model.

**Multiple statistical downscaling methods**

* Different classes of SD methods
  + Perfect prog (PP)
  + Model output statistics (MOS)
  + Weather generators (WG)
  + Linear vs. non-linear transfer functions
  + deterministic vs. stochastic methods
* Uncertainty
  + Does the incorporation of multi SD methods really gives a “true” picture of the uncertainty
  + Ensemble of opportunities
* Limitations
  + End-users might have practical and computational limitations in processing large amounts of downscaled data.
* Choice of SD method
  + Tailored to what impact users need/ look at
  + Depends on impact study, region, variable
  + Needs intermediate consultant for end-users
  + Is the SD method selection comparable to climate model selection in terms of uncertainty
  + Are there differences in the selection when downscaling is applied to a GCM compared to when it is applied to a RCM?
  + bias correction vs downscaling step.
* Equality
  + Data derived with MOS technique might be different from data derived with PP, since different information from climate models were used.
  + Different MOS techniques use same climate change signal and will probably show similar results in the mean??

**Multiple climate simulations**

* Many types of different ensembles of climate simulations exist
  + GCM-RCM ensembles
  + Perturbed physics ensembles 🡺 parametrization uncertainty
  + Perturbed initial condition ensemble 🡺 internal variability
* Limitations
  + Sparse model matrix
  + End-users often only use 1-4 climate models
* Choice of climate models
  + Depends on region and impact study
  + Only use “independent” models, without being overconfident
  + Only models that capture governing processes relevant for impact studies
* Equality
  + Climate models share same code