Practical exercise on probabilistic event attribution with climate*prediction*.net data – exercise 2 data validation for Probabilistic Event Attribution

Data:
Daily precipitation and daily maximum and temperatures in January 2014 in Southern UK from ~1000 model simulations from an initial condition regional climate modelling ensemble (50km resolution, 19 vertical levels) and from ~1000 simulation of January 2014 as it might have been in a world without anthropogenic GHG and aerosol emissions.
Observed daily precipitation and daily maximum and minimum temperatures of January 2014 in Southern UK from the HadUK and eobs datasets.

A logical next step to analyse the data would be to look at the extremes from a statistical point of view. You can do that using the R-packages for extRemes and repeat the exercises from last week with this data. But before you do that, and can actually interpret it, we need to find out how this data relates to reality, i.e. how good the model is in simulating the data.

Exercises:

1. The FAR you have calculated tells you something about the model world, but now we need to establish how this relates to the observed world. So the first question is, is the model biased with respect to temperature or with respect to precipitation? As a very first step, just plot the raw model output from an ensemble member and have a look, does it look as you expect it to look?
2. Do the time series of single ensemble members have a comparable mean and standard deviation to the observed data over the same timeframe or is there an obvious offset or lack of variability? Plot monthly time series of observations (would you average over the 5 years or just compare to single years?) and mean and the 5 and 95%tiles of the model data.
3. What we are really interested in are however the extreme events. What can you learn from the data you've been given about extremes? What would be other ways of analysing the output to find out more about extremes? Other ways of plotting the data? (e.g. empirical quantile-quantile plots)
4. If the aim of your attribution study would be to say how the risk of a specific event from January 2014 in the UK has been made more or less likely you might want to do some bias correction. What were the biases you would like to correct for? Are there biases you do not need to correct for or would you do any bias correction at all?