Practical exercise on probabilistic event attribution with climate*prediction*.net data – exercise 3 uncertainties and ensemble size for Probabilistic Event Attribution

Data:
Daily precipitation and daily maximum and minimum 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.

Exercises:

1. The further in the tails of your distribution the larger the sampling uncertainty when you are actually quantifying the change in risk. How would you calculate error bars that represent this uncertainty?
   With the bootstrapping functionality of R it seems relative straight forward to calculate errorbars for the return times you have calculated for the ensemble, using the function sample() and plotting the 5-95%iles of the values you have bootstrapped for each returntime.

2. Last question: Is your ensemble big enough to answer the question you are interested in? The errorbars will give you an idea, but also you might like to play with the data you have used before and the same data but for a much larger ensemble of ~10,000 ensemble members with ~10,000 for the all forcings run and ~10,000. This is an open research question but playing with the data you might want to think about what determines the number of ensemble members required to get robust results?