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Towards the detection of a human influence on observed precipitation changes in Europe

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Various studies have been published concluding successful detection (and attribution) of a human induced change in global scale climatic parameters including surface air or sea surface temperature. As a consequence of the increasing availability of model experiments with sufficient resolution, recently, continental and sub-continental scale detection and attribution has come into focus. Recently published studies on the response of precipitation to anthropogenic forcing (mainly rising greenhouse gas concentrations) suggest that changes in the far end of the probability distribution should be easier to detect. However, in this study, we are focussing on the detection of an emerging human signal in seasonal mean precipitation changes in Europe.

An ensemble of model experiments has been used to estimate possible anthropogenic climate change signals. These model derived signals have been compared to the observed trends in several gridded and station data sets. First results show high correspondence between predicted and observed patterns in Europe for all seasons except for autumn (SON). Furthermore, the temporal evolution of the pattern similarity has been investigated using pattern correlation and optimal fingerprint methods. Preliminary results point towards an increasing human influence. However, depending on the combination of model experiment and observational data set, this influence is not always clearly distinguishable from natural variability. Generally, clearest evidence for an increasing human influence is found in winter and spring. In addition to the continental scale analysis, several regions in Europe such as Scandinavia or the Mediterranean have been investigated separately.