

Improving drought prediction by coupling local and remote drivers

Background

This poster presents plans and some initial results of my NWO funded Veni-project that will start in January 2017 at the Copernicus Institute of Utrecht University. The aim of the project is to analyse the atmospheric part of the water cycle, and to assess its anomalies during drought periods of several months. The output of this knowledge could be a better understanding of the seasonal predictability of droughts.

Drought processes



Are droughts caused and/or prolonged due to local or remote processes?

The atmospheric moisture cycle



By analysing the total atmospheric water cycle, we aim to get a more complete view of droughts

Assessing the water cycle: moisture tracking

To diagnose what the atmospheric anomalies are during droughts, precipitation, evaporation and atmospheric humidity flows will be analysed. Moreover, an atmospheric moisture tracking model is used to determine the previous evaporation location of the precipitation in a given location. During droughts, this upstream evaporation may be located differently than during months with normal precipition.



Moisture tracking scheme^{1,2} and April moisture sources for western Europe

Classification of moisture cycle during droughts



Local, moisture transport and upstream evaporation dominated droughts

Objective: classify droughts in reanalysis period into different drought types.

Seasonal prediction of droughts



Seasonal predictions (S2S) for August precipitation in France

Objective: improve understanding of seasonal predictability Why do some (sets of) ensemble members produce better forecasts? Is that due to the initial conditions? If so, upstream, or locally? Does this vary for different drought types?

Typical Research Questions

Droughts:

Models:

- What forecast frequency?

Faculty of Geosciences Copernicus Institute

Obbe Tuinenburg 0.A.Tuinenburg@uu.nl

• What is the typical drought type in this location?

• How well are droughts predicted here? What lead-time?

• What processes influence this predictability?

• Where are observations (soil moisture, sst, ice) needed to constrain model ensemble?

• How many ensemble members do we need per model? • How many different models do we need?

• High or low resolution? Ocean coupling