



Water vapour source regions of extreme flood events in Central Europe

Amelie Krug, Praveen Kumar Pothapakula, Cristina Primo, and Bodo Ahrens
Goethe Universität Frankfurt, IAU, Frankfurt am Main, Germany (krug@iau.uni-frankfurt.de)

The North Atlantic, the Mediterranean Sea, the North, and the Baltic Sea are important sources of water vapour and thus precipitation in Europe. Furthermore, during summer, evaporation over the continent plays an important role. For example, during Vb-events the water vapour is transported not only from the Mediterranean Sea to the eastern part of Central Europe, but also evaporation along the cyclone track plays an important role. These processes can cause extreme precipitation and flooding in the Elbe catchment.

It is of interest to analyse the evaporative source regions of extreme flood events which cause large damage and economic losses. Increasing sea surface temperatures in source regions due to climate change causes more evaporation and might favour more intensified precipitation and flooding.

In this study, extreme flood events in Central Europe during the past century were selected. With Lagrangian trajectories flow structures in extratropical cyclones like Vb-cyclones can be analysed as well as the evaporative source regions. We backtracked the air masses leading to heavy precipitation during selected events.

In addition, we investigate the evaporative source regions of precipitation in Central Europe with an Information Theory approach. The so-called information flow and transfer entropy approach are derived from the Shannon entropy and are useful tools to analyse complex dynamical systems. For example, the application of the information flow method to the sea surface temperature over the North West Mediterranean Sea and precipitation over Europe showed a significant information flow from the Mediterranean Sea to regions in Central Europe which are already known as pathways of Vb cyclones.