Extra explanation to create time-series from spatial monthly mean fields:

This document contains a step-by-step explanation how to generate a timeseries from the spatial data stored in this repository, namely:

- GLEAM dataset (global evaporation): E_1985-2014_GLEAM_v3.0a_NH_monmean.nc
- CPC dataset (precipitation over USA): precip.V1.0.US.1985-2014.monmean.nc
- EOBS dataset (precipitation over Europe): rr_0.25deg_reg_v12.0.nc

The following steps need to be taken:

1. Create a mask from the shapefiles of the Mississippi basin and Rhine basin
    a. Load in the wribasin shapefile saved at the repository into your program
    b. Rhine basin relates to number 37,
       and Mississippi basin relates to number 45
2. For every timestep take the average over the mask created in step 1
3. You have a timeseries with monthly mean values
4. If you want to create a timeseries with yearly mean monthly mean values you have to average all the months of the years available in the dataset. For the EOBS dataset you have to create monthly means first.

The time-series of observed discharge are given in the repository (Lobith, Rhine: **6435060_extended.xlsx** and Vicksburg, Mississippi: **4127800_extended.xlsx**). Yearly averages of monthly averages can be generated over the correct time period to reproduce the results shown in Benedict et al., 2018.

Benedict, I., van Heerwaarden, C. C., Weerts, A. H., and Hazeleger, W.: An evaluation of the importance of spatial resolution in global climate and hydrological models based on the Rhine and Mississippi basins, Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2018-437, in review, 2018.