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The fate of land evaporation - A global dataset

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Various studies investigated the fate of evaporation and the origin of precipitation. The more recent studies among them were often carried out with the help of numerical moisture tracking. Many research questions could be answered within this context such as dependencies of atmospheric moisture transfers between different regions, impacts of land cover changes on the hydrological cycle, sustainability related questions as well as questions regarding the seasonal and inter-annual variability of precipitation. In order to facilitate future applications, global datasets on the fate of evaporation and the sources of precipitation are needed. Since most studies are on a regional level and focus more on the sources of precipitation, the goal of this study is to provide a readily available global dataset on the fate of evaporation for a fine-meshed grid of source and receptor cells. The dataset was created through a global run of the numerical moisture tracking model WAM-2layers and focused on the fate of land evaporation. The tracking was conducted on a $1.5^\circ \times 1.5^\circ$ grid and was based on reanalysis data from the ERA-Interim database. Climatic input data were incorporated in 3- respectively 6-hourly time steps and represent the time period from 2001 to 2018. Atmospheric moisture was tracked forward in time and the geographical borders of the model were located at $\pm 79.5^\circ$ latitude. As a result of the model run, the annual and monthly average as well as the inter-annual average fate of evaporation was determined for 8684 land grid cells (all land cells except those located within Greenland and Antarctica) and provided via source-receptor matrices. The gained dataset was complemented via an aggregation to country and basin scales in order to highlight possible usages for areas of interest larger than grid cells. This resulted in data for 265 countries and 8223 basins. Finally, five types of source-receptor matrices for average moisture transfers were chosen to build the core of the dataset: land grid cell to grid cell, country to grid cell, basin to grid cell, country to country, basin to basin. The dataset is, to our knowledge, the first ready-to-download dataset providing the overall fate of evaporation for land cells of a global fine-meshed grid in monthly resolution. At the same time, information on the sources of precipitation can be extracted from it. It could be used for investigations into average annual, seasonal and inter-annual sink and source regions of atmospheric moisture from land masses for most of the regions in the world and shows various application possibilities for studying interactions between people and water such as land cover changes or human water consumption patterns. The dataset is accessible under [https://doi.org/10.5194/egusphere-egu2020-3674](#) and comes along with example scripts for reading and plotting.

