### Global reconstructed water use data for 1971-2010: Version 1

About:

The dataset constitutes the first reconstructed global water use data product at sub-annual and sub-national/gridded resolution that is derived from different models and data sources; it was generated by spatially and temporally downscaling country-scale estimates of sectoral water withdrawals from FAO AQUASTAT (and state-scale estimates of USGS for the US). In addition, the industrial sector was disaggregated into manufacturing, mining and cooling of thermal power plants by using historical estimates from GCAM. Downscaling was performed using the output of various models and new modeling approaches, which includes the spatial and temporal downscaling methodologies for water withdrawal in previous studies (Wada et al., 2011; Voisin et al., 2013; Hejazi et al., 2014). For the consumptive water use, irrigation water consumption is reconstructed based on estimates by 4 GHMs and consumptive water use efficiency (the proportion of water consumption to water withdrawal), which is calculated based on simulation of Flörke et al (2013) and USGS estimates, is used to generated global consumptive water use for the remaining sector. Therefore, a global monthly gridded (0.5 degree) sectoral water use dataset for the period 1971–2010, which distinguishes six water use sectors, i.e. irrigation, domestic, electricity generation (cooling of thermal power plants), livestock, mining, and manufacturing, was reconstructed. The detailed descriptions for this dataset are presented in Huang et al. (in review).

Content:

This dataset includes the global monthly gridded (0.5 degree) water use dataset in the period 1971–2010 for irrigation, domestic, electricity generation (cooling of thermal power plants), livestock, mining, and manufacturing. For irrigation sector, 4 different datasets were generated based on estimates from 4 different Global Hydrological Models (GHMs), i.e. WaterGAP, LPJmL, H08, and PCR-GLOBWB. 6 files are included:

1. domestic water use.7z:

withd\_dom.nc: reconstructed global gridded monthly domestic water withdrawal;

cons\_dom.nc: reconstructed global gridded monthly domestic water consumption;

1. electricity water use.7z

withd\_elec.nc: reconstructed global gridded monthly water withdrawal for electricity generation;

cons\_elec.nc: reconstructed global gridded monthly water consumption for electricity generation;

1. irrigation water use.7z

withd\_irr\_h08.nc: reconstructed global gridded monthly irrigation water withdrawal based on estimates from H08;

withd\_irr\_lpjml.nc: reconstructed global gridded monthly irrigation water withdrawal based on estimates from LPJmL;

withd\_irr\_pcrglobwb.nc: reconstructed global gridded monthly irrigation water withdrawal based on estimates from PCR-GLOBWB;

withd\_irr\_watergap.nc: reconstructed global gridded monthly irrigation water withdrawal based on estimates from WaterGAP.

cons\_irr\_h08.nc: reconstructed global gridded monthly irrigation water consumption based on estimates from H08;

cons\_irr\_lpjml.nc: reconstructed global gridded monthly irrigation water consumption based on estimates from LPJmL;

cons\_irr\_pcrglobwb.nc: reconstructed global gridded monthly irrigation water consumption based on estimates from PCR-GLOBWB;

cons\_irr\_watergap.nc: reconstructed global gridded monthly irrigation water consumption based on estimates from WaterGAP.

1. livestock water use.7z

withd\_liv.nc: reconstructed global gridded monthly water withdrawal for livestock;

cons\_liv.nc: reconstructed global gridded monthly water consumption for livestock;

1. manufacturing water use.7z

withd\_mfg.nc: reconstructed global gridded monthly water withdrawal for manufacturing;

cons\_mfg.nc: reconstructed global gridded monthly water consumption for manufacturing;

1. mining water use.7z

withd\_min.nc: reconstructed global gridded monthly water withdrawal for mining;

cons\_min.nc: reconstructed global gridded monthly water consumption for mining;

References:

Huang et al., Reconstruction of global gridded monthly sectoral water withdrawals for 1971-2010 and analysis of their spatiotemporal patterns (in review);

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