- **Title –** Data associated with "Atmospheric water recycling an essential feature of critical natural asset stewardship"
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- **Recommended data citation –** Keys, P. (2022). Data associated with "Atmospheric water recycling an essential feature of critical natural asset stewardship." Colorado State University. Libraries. http://dx.doi.org/10.25675/10217/234391
- **Associated manuscript –** Keys, Patrick W., Collins, Pamela M., Chaplin-Kramer, Rebecca, and Wang-Erlandsson, Lan (2023) "Atmospheric water recycling an essential feature of critical natural asset stewardship". *Global Sustainability*.
- **Format of data files –** Matlab format, i.e. .mat files
- **Data sources –** Data were processed using the Water Accounting Model 2 layers (hereafter, WAM-2layers). This model (available here: https://github.com/ruudvdent/WAM2layersPython; DOI: 10.5281/zenodo.6029408). The original driving data for the model are reanalysis data from the ERA-Interim archive, produced by the European Centre for Mesoscale Weather Forecasting[1] (ECMWF; originally obtained from: https://apps.ecmwf.int/datasets/data/interim-full-daily/levtype=sfc/; available at: https://confluence.ecmwf.int/display/CKB/ERA-Interim%3A+documentation as of November 2023). These data were downloaded at the 1.5 degree x 1.5 degree resolution, including: 6-hourly zonal and meridional winds, surface pressure, and humidity; and 3-hourly evaporation and precipitation. These ERA-Interim data were processed in the WAM-2layers, first calculating the "fluxes_and_states" (see linked model description), and second using the backtracking procedure to identify the evaporative origins of precipitation for a given sink region. The data span nearly the entire planet, excluding the Antarctic continental region in the south and the extreme Arctic in the north. Additional data include the regional files corresponding to the specific CNA regions that we analyzed, a set of ERA-Interim constant data, and a data file containing the upscaled Anthrome data.
- **Temporal coverage –** The time period of analysis is from 1999-01-01 to 2014-12-31.
- **File Information –**

    A. *Moisture recycling data:* There are 12 data files in Matlab (.mat) format containing either evaporation or precipitation tracking information. Each .mat file contains a tracked evaporation (or precipitation variable), a total evaporation variable, and a total precipitation variable that is the source or sink of the tracking procedure; the dimensions of the three files correspond to [year,month,latitude,longitude], with dimensions of [16,12,108,240].

    B. *Global and Continental CNA region files:* There is one data file containing six region files, corresponding to Global and five continental CNA regions. Each file contains a grid of

[1] Disclaimer: ECMWF does not accept any liability whatsoever for any error or omission in the data, their availability, or for any loss or damage arising from their use.

ones and zeros, with ones corresponding to the Region of interest, and each file has the dimensions [108,240].

C. *ERA Interim constants:* This file contains data on latitude [108,1], longitude [240,1], and the area of each gridcell [108,240].

D. *Upscaled Anthromes:* There is one file containing upscaled Anthromes. The dimensions of this file are: [108,240]

- **Variable information** –

A. *Moisture recycling variables*

1. Tracked evaporation or precipitation. The units of these data are in cubic meters, and the dimensions of the data are [16,12,108,240].

2. Total evaporation. The units of these data are in cubic meters, and the dimensions of the data are [16,12,108,240].

3. Total precipitation. The units of these data are in cubic meters, and the dimensions of the data are [16,12,108,240].

B. *Global and Continental CNA region files:* These data are captured as ones or zeros depending on whether the individual gridcell corresponds to a CNA region (or not). Original data for the CNA analysis is available https://www.biorxiv.org/content/10.1101/2020.11.08.361014v2

C. *Upscaled Anthromes*. These data are categorical with numbers corresponding from 1 to 17. The numbers and Anthromes match according to the table below.

Number	Anthrome name
1	Rice villages
2	Irrigated villages
3	Rainfed villages
4	Pastoral villages
5	Residential irrigated villages
6	Residential rainfed crops
7	Populated rainfed crops
8	Remote crops
9	Residential rangelands
10	Populated rangelands
11	Remote rangelands
12	Residential woodlands
13	Populated woodlands
14	Remote woodlands
15	Inhabited barrens
16	Wild woodlands
17	Wild barrens

- **Method(s)** – Please see the original published article for the Methods used.
- **Software** – Matlab (version 2020b)
- **License –** The data are licensed undera Creative Commons Attribution 4.0 International (CC BY 4.0) license
- **Limitations to reuse** – I recommend contacting the author (Patrick Keys) of this work before use, simply to ensure that the user understands the output properly.
- **Date dataset was last modified –** February 2022