nasaaccess - User's Guide

Overview

nasaaccess is a software tool built in R that streamlines the retrieval and processing of the global NASA earth observation data products (GPM and GLDAS) for use in models such as SWAT. The core functionality of nasaaccess can be summarized as:

- Access the NASA Goddard Space Flight Center (GSFC) servers to download earth observation data
- Clip needed grids to an input shapefile of a user study watershed
- Handle temporal and spatial inconsistencies
- Generate daily climate gridded data files and definition files compatible with SWAT and other models

nasaaccess was built as an R library containing the four separate data processing functions described in the table below. It is a very efficient system for accessing earth observation data. The nasaaccess web application was built to allow users to access the full functionality of the nasaaccess package without needing a working knowledge of R.

Function	Definition
GLDASwat	Generates SWAT compatible air temperature files
GPMswat	Generates SWAT compatible precipitation files
GLDASpolycentroid	Generates an air temperature station file at the centroid of each polygon within the input watershed boundary
GPMpolycentroid	Generates a precipitation station file at the centroid of each polygon within the input watershed boundary

How the app works

The nasaaccess web application is simply a user interface for passing arguments into the nasaaccess functions.

Using a combination of dropdowns, datepickers, and checkboxes, the app allows you to select a watershed boundary, DEM, daterange, and nasaaccess function(s) to pass to the server for running the selected nasaaccess function(s).

User Instructions

1) Select function inputs

    a. Select a watershed
        i. After selecting a watershed, the map will automatically update to show the selected watershed
        ii. Note: the larger the watershed is (and the more subbasins the watershed has), the longer the functions will take to run

    b. Select a DEM
        i. After selecting a DEM, the map will automatically update to show the DEM.
        ii. IMPORTANT!! Make sure that the selected DEM extent completely encompases the selected watershed boundary

    c. Select a Date Range
        i. Make sure that the second date is either the same day as or later than the first date
        ii. Note: the longer the date range is, the longer the functions will take to run

These three values (watershed name, DEM name, and daterange) will be passed into the nasaaccess functions for processing.

2) Select functions

    a. Select at least one nasaaccess function to run.
        i. Note: If the selected watershed contains a large number of subbasins, the polycentroid functions will likely take much longer than the SWAT functions to run

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3) Submit your request

    a. Click the [Run nasaaccess] button
    b. Enter your email for notification when your data is ready to download

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Contact Information   ✕

Depending on the watershed size and the date range you selected, the nasaaccess process may take some time. Please provide your email here and we will contact you with a 6 digit access code for downloading your data when the process is complete.

Email Address: [Email]

Your email will only remain in our database until your access code has been sent out. The access code you receive will then be valid for 3 days.
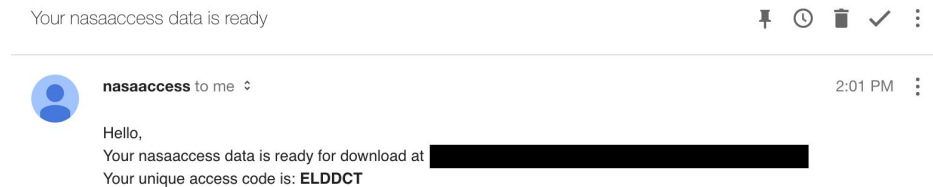
[Submit] [Cancel]

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    c. Click [Submit]
        i. This will initiate the nasaaccess functions that you selected
    d. Wait for the app to notify you that the job has been submitted.
        i. After this alert appears you can close the app or submit another request

SUCCESS! Your request has been submitted. An email will be sent to you when the data is ready to download.
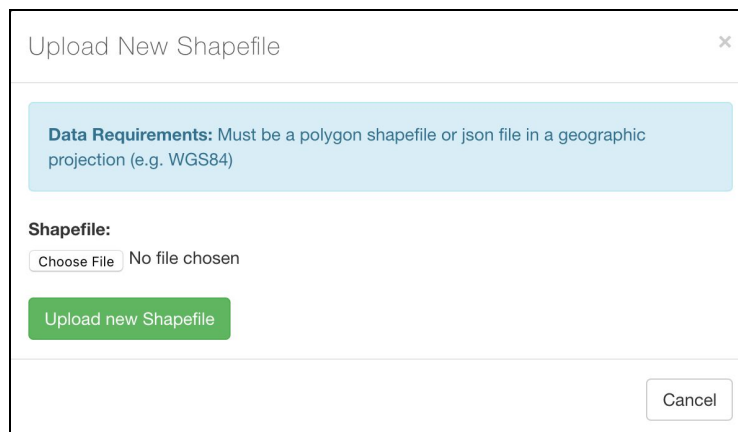
4) Download data

    a. Wait to receive an email notifying you that your data is ready for download (shown below).

Your nasaaccess data is ready

nasaaccess to me

2:01 PM

Hello,
Your nasaaccess data is ready for download at
Your unique access code is: **ELDDCT**

    b. Follow the link in the email or navigate back to the nasaaccess app that you submitted the request on.

    c. Click the [Download Data] button

    d. Enter your unique access code and click [Download]

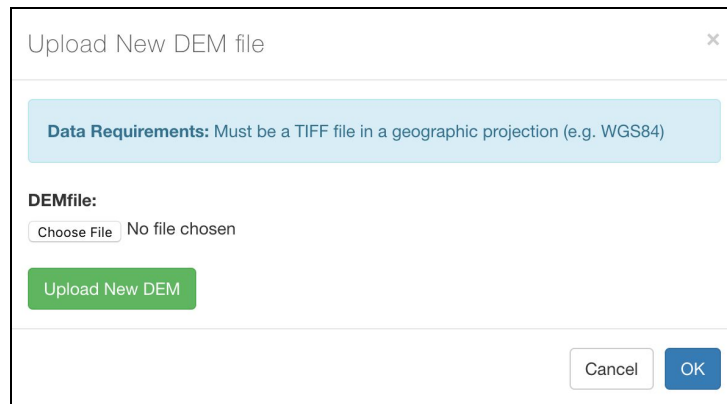## 5) Uploading a new shapefile

    a. Prepare a zip file containing the .shp, .shx, .prj, and .dbf components of the shapefile
        i. File requirements
            1. Must be a polygon shapefile
            2. Must be in a geographic coordinate system
            3. The name of each of the four files should be the same
            4. The name of the .zip file must match the shapefile files
                a. This name will be what you see in the "Select Watershed" dropdown menu

    b. Click the [⊕ Upload New Watershed] button

Upload New Shapefile ✕

Data Requirements: Must be a polygon shapefile or json file in a geographic projection (e.g. WGS84)

Shapefile:
[Choose File] No file chosen

[Upload new Shapefile]

[Cancel]

c. Click the [Choose File] button and select the zip file that you created

d. Click [Upload new Shapefile] to submit the files to the app for processing. This watershed file will now appear in the "Select Watershed Boundary" dropdown menu each time you use the app (as long as you are logged in as the same user).

6) Uploading a new DEM

a. Prepare your DEM tif file
   i. File requirements
      1. Must be a TIFF file
   2. Must be in a geographic coordinate system

b. Click the [⊕ Upload New DEM] button

Upload New DEM file   ✕

> **Data Requirements:** Must be a TIFF file in a geographic projection (e.g. WGS84)

DEMfile:
[Choose File] No file chosen

[Upload New DEM]

                                                    [Cancel] [OK]

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c. Click the [Choose File] button and select the TIFF file that you want to upload

d. Click [Upload New DEM] to submit the file to the app for processing. This DEM file will now appear in the "Select DEM" dropdown menu each time you use the app (as long as you are logged in as the same user).