

MAJIC

Expanding access to JULES

Emma Robinson, Eleanor Blyth, Alberto Martinez,
Doug Clark, Matt Fry, Maliko Tanguy,
John Holt, Matthew Kendall, Duncan Watson-Parris

JULES Meeting, Reading, 30th June 2015

Motivation

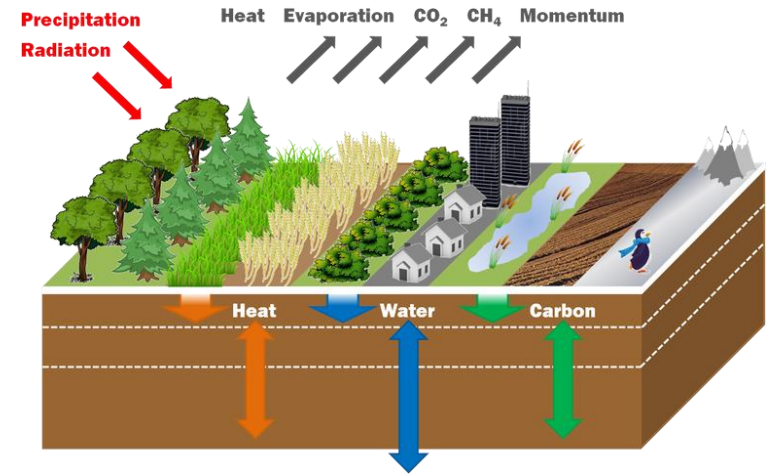
- How to run JULES without technical/computing expertise
- How to allow people to run JULES with their own met data
- How to view and disseminate JULES output

... use MAJIC

Managing Access to JULES in the Cloud

<http://majic.ceh.ac.uk>

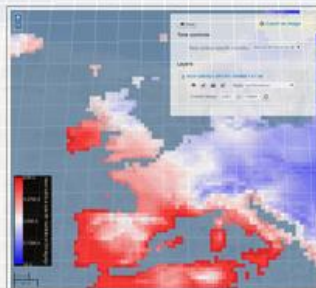
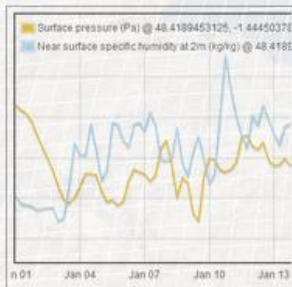
- Web interface
- Run in parallel on JASMIN
- Export data and maps



Welcome to Majic

Managing Access to Jules in the Cloud

Majic is a web application that allows users to run the JULES land-surface model within a high performance computing environment over the web. You can create new model runs, easily customise some of the main JULES parameters, and view and download results for new and existing model runs.



[Learn more](#)

Existing User

CEH user? Use your login here

[Log In](#)

New User

Majic is freely available to any researcher for non-commercial use, as set out in the [Majic Terms & Conditions](#).

[Request Majic Account](#)

Cookies: Majic uses a cookie to store a random string on your computer to enable session state between pages. We do not collect any information about you except that required for system administration of the web server. By using this site you agree to our [Cookie Policy](#)

Welcome to Majic

Request an account

Majic is freely available to researchers and other non-commercial users as set out in the [Majic Terms and Conditions](#). Please ensure you have read and understood these Terms and Conditions before requesting an account.

To request an account for Majic, please complete the form below. Any information supplied will be used in accordance with the [Majic privacy policy](#).

First Name

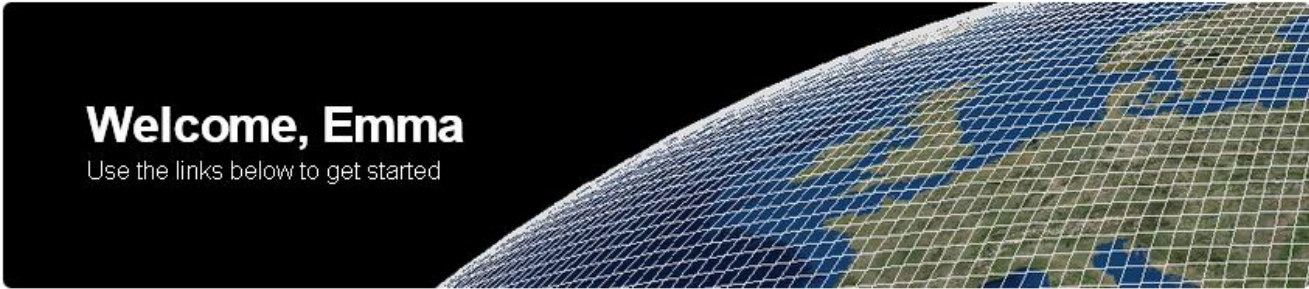
Last Name

Email Address

Institution

How will you use Majic?
Give a brief but specific description of what you intend to use Majic for. This will help us to understand our user needs when planning new functionality.

I agree to the [Majic Terms & Conditions](#)



Explore

Look at map data in the web viewer



New Model Run

Run a model on map datasets



Model Runs

Review existing analysis results, publish results to the public repository



Creating a new model run

Create Model Run

Choose some basic starting information for your model run.

Name

Description
Describe the main purpose of the run and major input parameters.

Scientific Configuration
Choose a pre-configured set of options for your model run.

- Energy-Water-Photosynthesis** - this configuration includes the full water and energy budgets, and also includes photosynthesis. However, it uses a fixed soil and vegetation carbon pools, so the carbon budgets are not closed. It includes a five year spin up.
- Full carbon cycle** - this configuration includes updated soil and vegetation carbon budgets as well as the full water and energy budgets. It includes a 100 year spin up.

Next

Continuing with the creation of your model run

Select Driving Data

Choose a meteorological driving data set to run your model.

	Geographic Region	Spatial Resolution	Temporal Resolution	Start / End Date
<input checked="" type="radio"/> WATCH Forcing Data 20th Century A sub-diurnal meteorological forcing dataset: based on ERA-40 for the sub-monthly variability, tuned to CRU monthly observations. See Weedon et al, 2011, Journal of Hydrometeorology, doi: 10.1175/2011JHM1369.1	Global	0.5 Degrees	3 Hours	1901-01-01 to 2001-12-31
<input type="radio"/> UK CHESSE Forcing Data A daily meteorological forcing dataset: based on MORECS at 40km and downscaled to 1km using sub-grid scale topography. See Robinson et al, 2014, manuscript in prep.	UK	1 km	24 Hours	1961-01-01 to 2012-12-31
<input type="radio"/> Use My Own Single Cell Driving Data Choose this option if you wish to use your own uploaded driving data for a single cell site	-	-	-	-

You'll need to upload some driving data (below) before you can use this.

Previous

Next

[Upload / Download Single Cell Driving Data](#)

Previous

Next

Upload / Download Single Cell Driving Data

Upload

Download

Optionally, upload your own single cell driving data to use for your JULES run (you don't need to do this to run single cell calculations using the driving data already supplied by Majic).

Location

[I want to enter this in British National Grid coordinates](#)

Specify the location of the single cell site you wish to upload for.

Latitude (°N)

Longitude (°E)

Time span

Specify the start and end date-times for the first and last rows of driving data you are uploading.

Start date-time

End date-time

Driving data file

Upload a driving data file.

No file selected.

Specify Model Run Extents

Choose the area and time period you'd like to run JULES over. Your chosen driving data dictates the maximum area and time period you can use.

Spatial Extent

- Type of extent
- Continuous Region** - JULES will model across a large spatial area.
 - Single Location** - JULES will only model at one specific location

Site Location

Identify the location you wish to run JULES for. The selected location must fall within the boundaries of your chosen driving data.

[I want to enter this in British National Grid coordinates](#)

Boundary	Driving Data Range	This Model Run
Latitude (°N)	-56.0 to 84.0	<input type="text" value="51.44"/>
Longitude (°E)	-180.0 to 180.0	<input type="text" value="-0.94"/>

Note: Majic will automatically adjust this site location to align with the JULES model grid.

Use single point data

Use driving data from a single point instead of averaged data over the whole cell in which your chosen site is located

Temporal Extent

Timeline

The time line you wish to run your model over. This must fall completely within the boundaries of your chosen driving data.

Time	Driving Data Value	This Model Run
Start Date	1901-01-01	<input type="text" value="1961-01-01"/>
End Date	2001-12-31	<input type="text" value="2001-12-31"/>

Edit Land Cover

Optionally edit the existing land cover map for your JULES run. Select a region of the map to apply the change over, and the type of land cover to change that region to, then click 'Add'. Remove an edit by clicking the 'remove' icon on that edit, or reorder them by dragging an edit up or down.

These changes **will not** be applied to cells whose land cover type is **ice**.

Category:	Region:	Change to:	
<input type="text" value="Countries"/>	<input type="text" value="Germany"/>	<input type="text" value="C3 Grass"/>	<input type="button" value="+ Add"/>

Start with the base land cover map for **WATCH 2D Driving Data**

then

Change **United Kingdom (Countries)** to **Broad-leaved Tree**

Previous

Next

Select Output Variables

Choose which variables you'd like JULES to output. You can also choose how frequently you'd like those variables to be output.

+ Start typing to see matching output variables

Gridbox moisture flux from surface (kg m-2 s-1).

fqw_gb

Yearly Monthly Daily Hourly

Gridbox surface sensible heat flux (W m-2).

ftl_gb

Yearly Monthly Daily Hourly

Gridbox surface temperature (K).

tstar_gb

Yearly Monthly Daily Hourly

Gridbox total soil moisture in column (kg m-2).

smc_tot

Yearly Monthly Daily Hourly

Previous

Next

Select Output Variables

Choose which variables you'd like JULES to output. You can also choose how frequently you'd like those variables to be output.

+ runoff

- Gridbox runoff rate (kg m-2 s-1). - *runoff*
- Gridbox sub-surface runoff (kg m-2 s-1). - *sub_surf_runoff*
- Gridbox surface runoff (kg m-2 s-1). - *surf_runoff*

~~Gridbox surface sensible heat flux (W m-2).~~
ftl_gb

Gridbox surface temperature (K).
tstar_gb

Gridbox total soil moisture in column (kg m-2).
smc_tot

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yearly	Monthly	Daily	Hourly		X
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yearly	Monthly	Daily	Hourly		X
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yearly	Monthly	Daily	Hourly		X































Previous

Next

Model Runs

Mine Published

Storage quota 1.1GB 1000GB

- | | | | |
|---|---|---|---|
|  | Wales urban - 29 Jun 2015
Run WFD for wales with original land cover |     | Running
29 Jun 2015 at 15:25:04 |
|  | Wales orig (Copy) - 29 Jun 2015
Run WFD for wales with original land cover |     | Running
29 Jun 2015 at 15:25:04 |
|  | Wales orig - 25 Jun 2015
Run WFD for wales with original land cover |     | Running
29 Jun 2015 at 15:20:11 |
|  | Reading Soil - 15 Jun 2015
To demonstrate the MAJIC system to the JULES meeting |     | Completed
15 Jun 2015 at 18:40:26 |
|  | Reading CHES - 15 Jun 2015
To demonstrate the MAJIC system to the JULES meeting |     | Completed
15 Jun 2015 at 18:20:26 |
|  | Reading - 15 Jun 2015
To demonstrate the MAJIC system to the JULES meeting |     | Completed
15 Jun 2015 at 18:40:15 |

- Gridbox moisture flux from surface (kg m-2 s-1). - Yearly, Monthly
- Gridbox net primary productivity (kg C m-2 s-1). - Yearly, Monthly
- Gridbox runoff rate (kg m-2 s-1). - Yearly, Monthly
- Gridbox surface sensible heat flux (W m-2). - Yearly, Monthly
- Gridbox surface temperature (K). - Yearly, Monthly
- Gridbox total soil moisture in column (kg m-2). - Yearly, Monthly

Download Output

Hourly and Daily data can only be downloaded one calendar year at a time. ?

Year: 1961 Format: NetCDF

Gridbox surface temperature (K).

- Yearly (NetCDF, 1961 to 2001)
- Monthly (NetCDF, 1961 to 2001)

Gridbox net primary productivity (kg C m-2 s-1).

- Yearly (NetCDF, 1961 to 2001)
- Monthly (NetCDF, 1961 to 2001)

Gridbox runoff rate (kg m-2 s-1).

- Yearly (NetCDF, 1961 to 2001)
- Monthly (NetCDF, 1961 to 2001)

Gridbox total soil moisture in column (kg m-2).

- Yearly (NetCDF, 1961 to 2001)
- Monthly (NetCDF, 1961 to 2001)

Gridbox moisture flux from surface (kg m-2 s-1).

- Yearly (NetCDF, 1961 to 2001)
- Monthly (NetCDF, 1961 to 2001)

Gridbox surface sensible heat flux (W m-2).

- Yearly (NetCDF, 1961 to 2001)
- Monthly (NetCDF, 1961 to 2001)

Bookmarks

- 10m
- ☑️ Surface incident longwave radiation
 - ☑️ Surface incident shortwave radiation
 - ☑️ Rainfall rate
 - ☑️ Snowfall rate
 - ⚙️ Soil Properties
 - ⚙️ Land Cover Fractions

OUTPUT DATASETS -

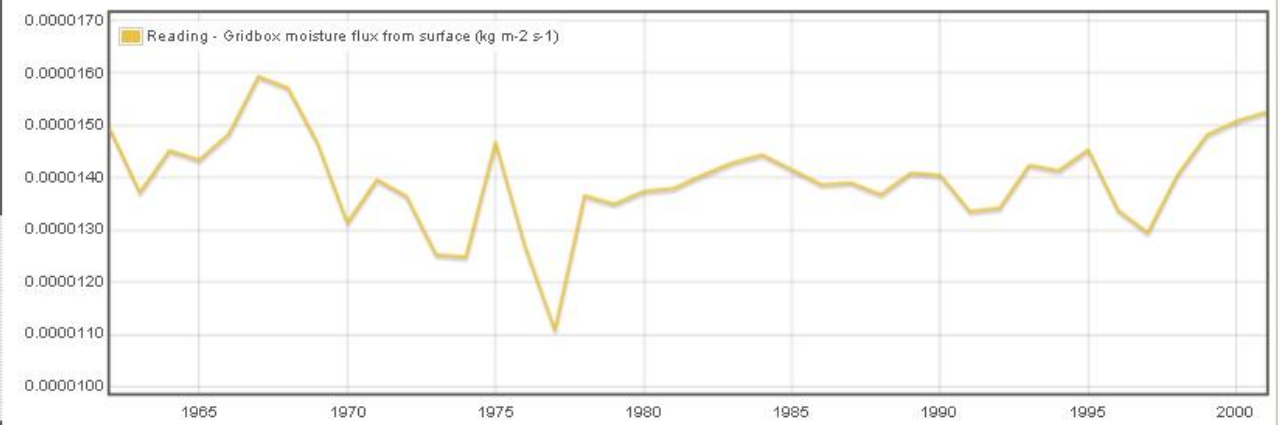
- 📍 Gridbox net primary productivity (Yearly)
- 📍 Gridbox net primary productivity (Monthly)
- 📍 Gridbox surface temperature (Yearly)
- 📍 Gridbox surface temperature (Monthly)
- 📍 **Gridbox moisture flux from surface (Yearly)**
- 📍 Gridbox moisture flux from surface (Monthly)
- 📍 Gridbox surface sensible heat flux (Yearly)
- 📍 Gridbox surface sensible heat flux (Monthly)
- 📍 Gridbox runoff rate (Yearly)
- 📍 Gridbox runoff rate (Monthly)
- 📍 Gridbox total soil moisture in column (Yearly)
- 📍 Gridbox total soil moisture in column (Monthly)

READING WFD SINGLE +

Clear All Datasets



Measurements at Lat: 51.25, Lon: -0.75



Visualise Model Runs

Mine **Published**

READING SOIL +

READING CHES5 +

READING +

READING WFD SINGLE +

Clear All Datasets

Reset Graph Zoom

Close Graph

Dimension controls

Graphing is limited to the 1000 closest points to times chosen below:

Reading CHES5 - Gridbox moisture flux from surface (Yearly):

2000-01-01T00:00:00.000Z

Reading - Gridbox moisture flux from surface (Yearly):

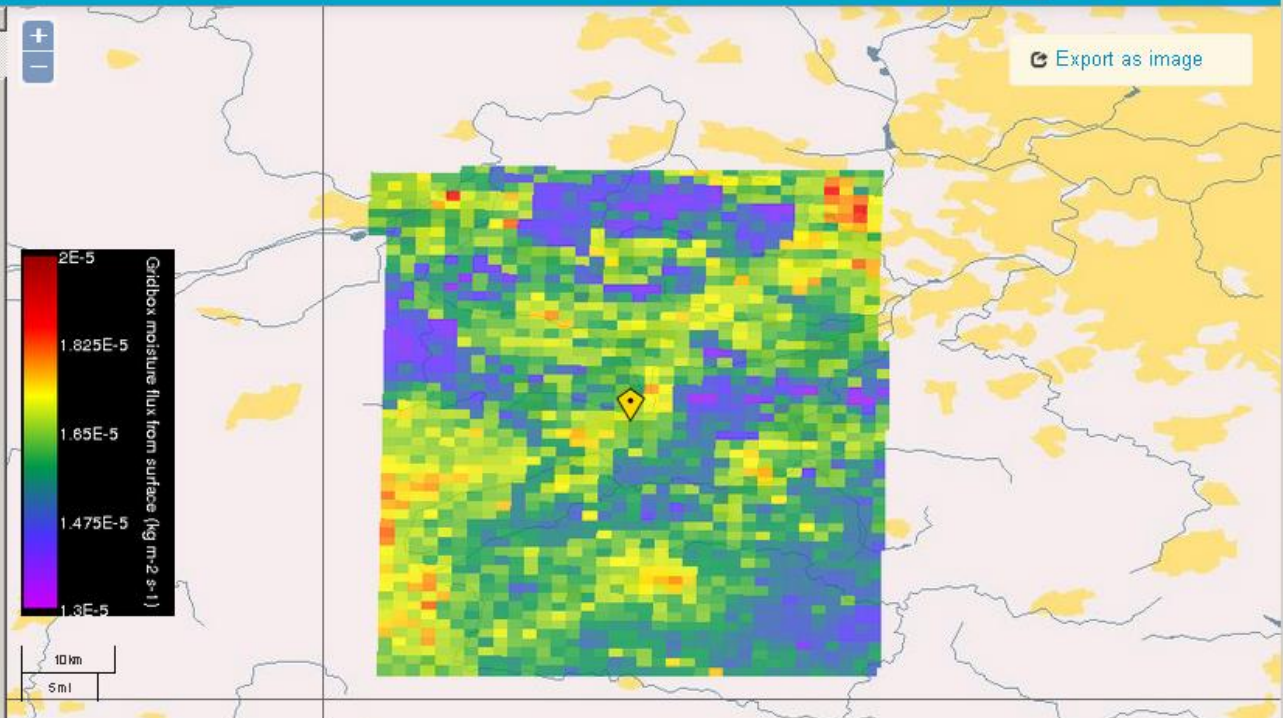
2000-01-01T00:00:00.000000Z

Layers

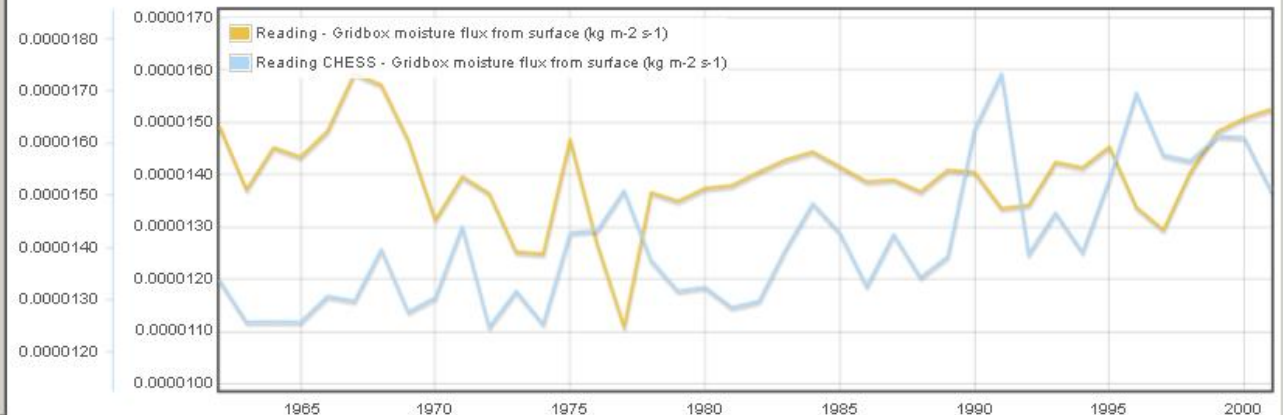
READING CHES5 - GRIDBOX MOISTURE FLUX FROM SURFACE (YEARLY)

Style: boxfill/ferret

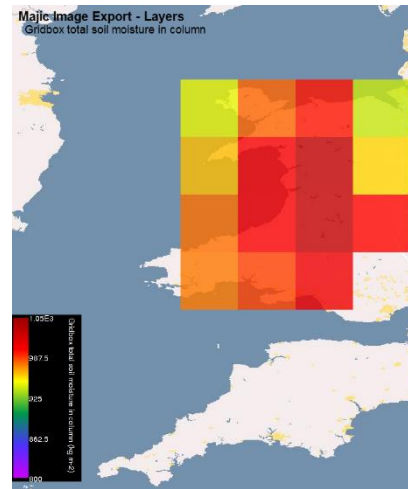
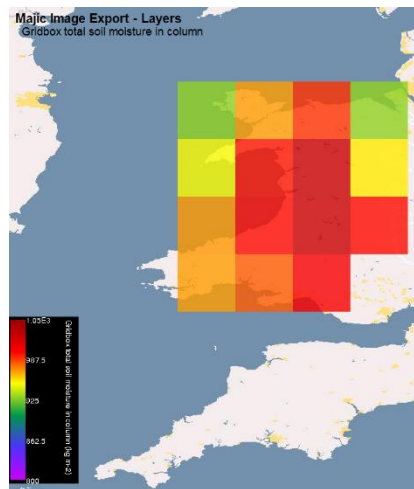
Colour range: 1.3e-5 to 2.e-5



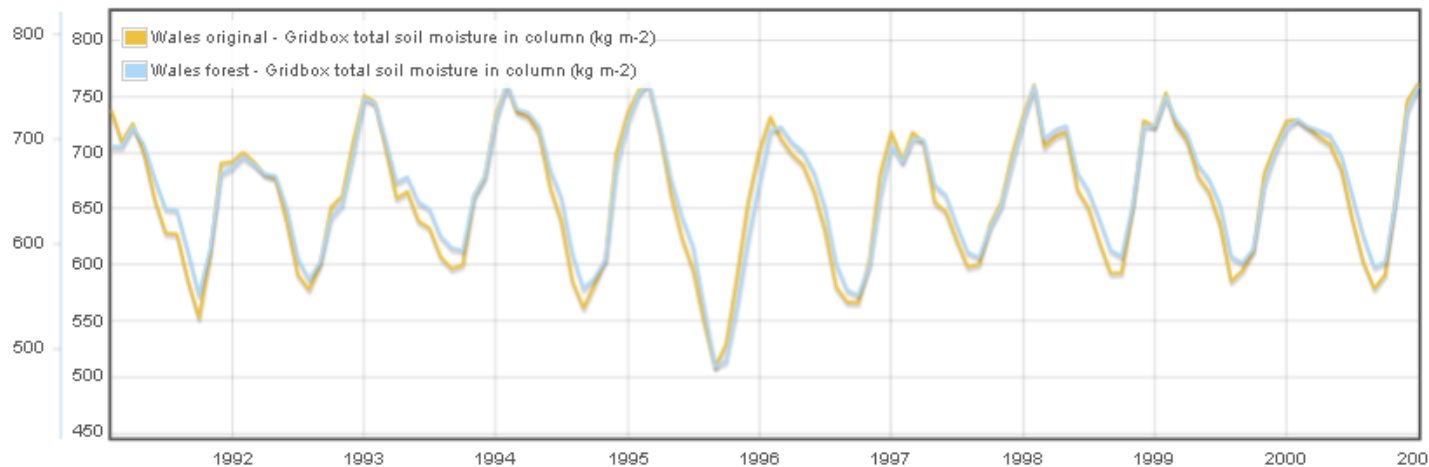
Measurements at Lat: 51.25, Lon: -0.75



Example: afforestation of Wales

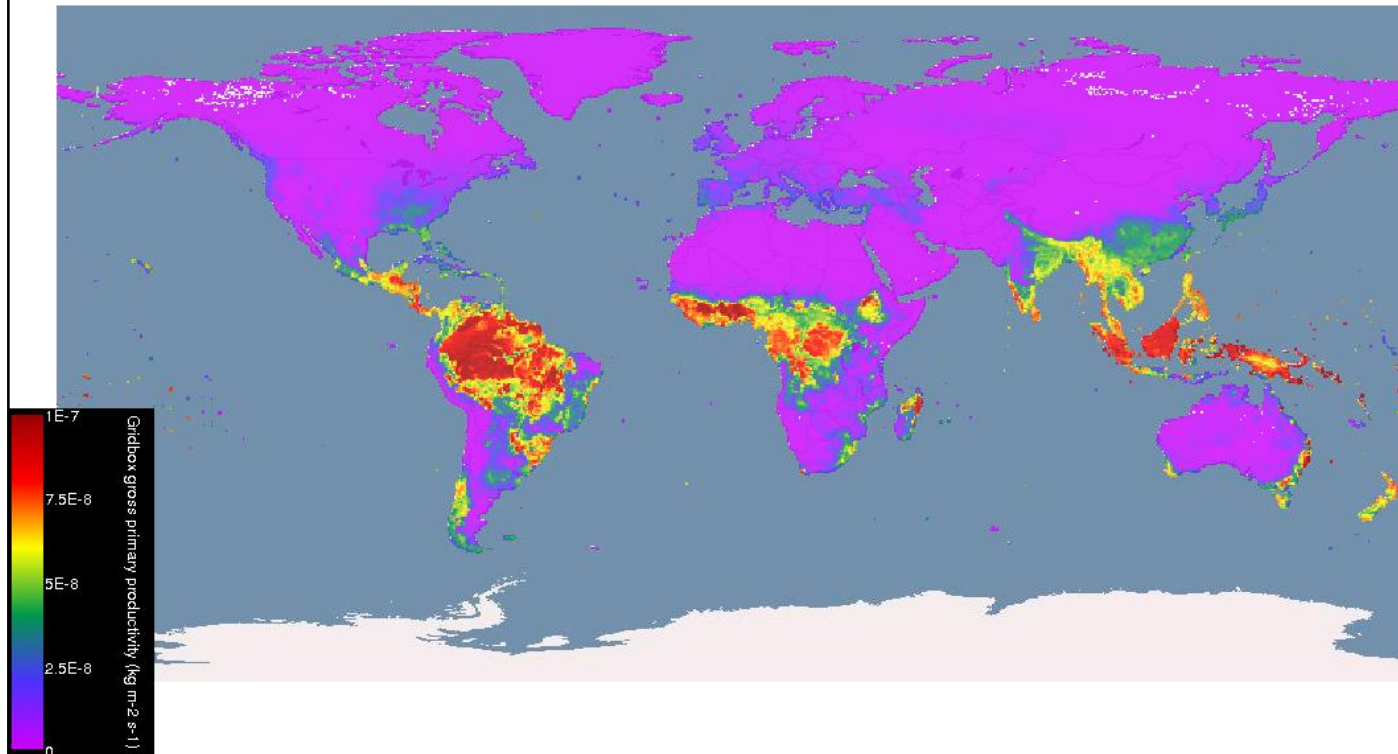


Measurements at Lat: -0.075073242187486, Lon: 0.16656494140619



Published runs

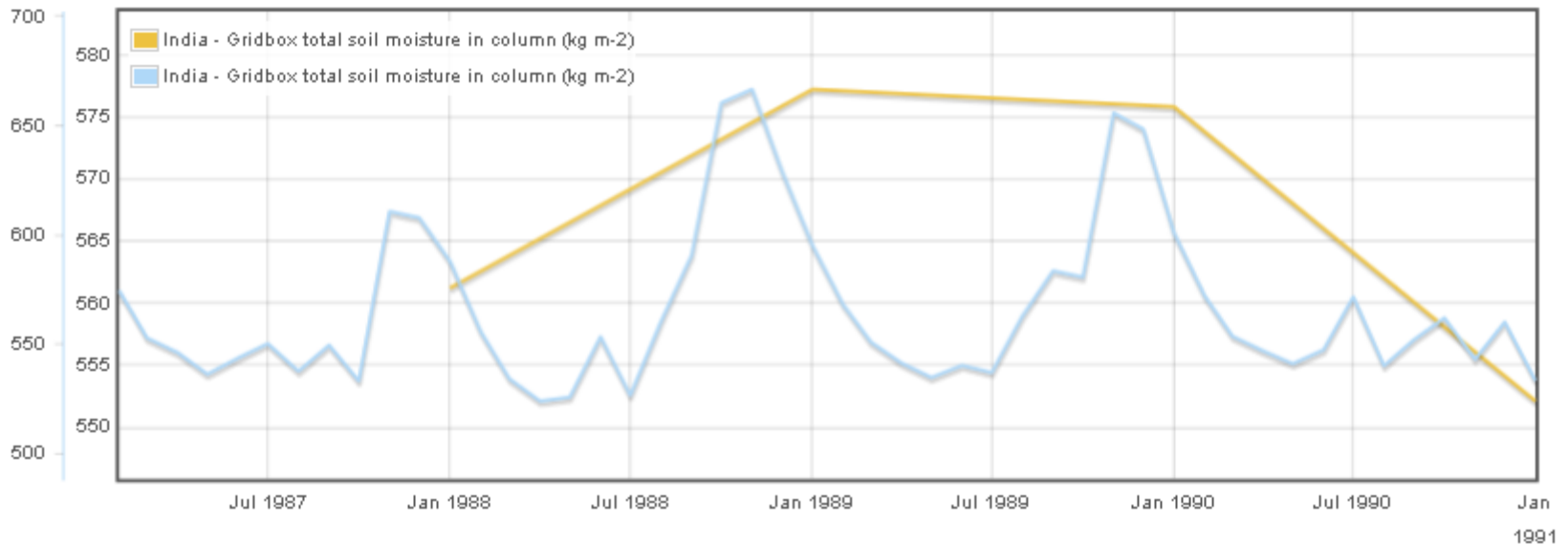
Majic Image Export - Layers
Gridbox gross primary productivity



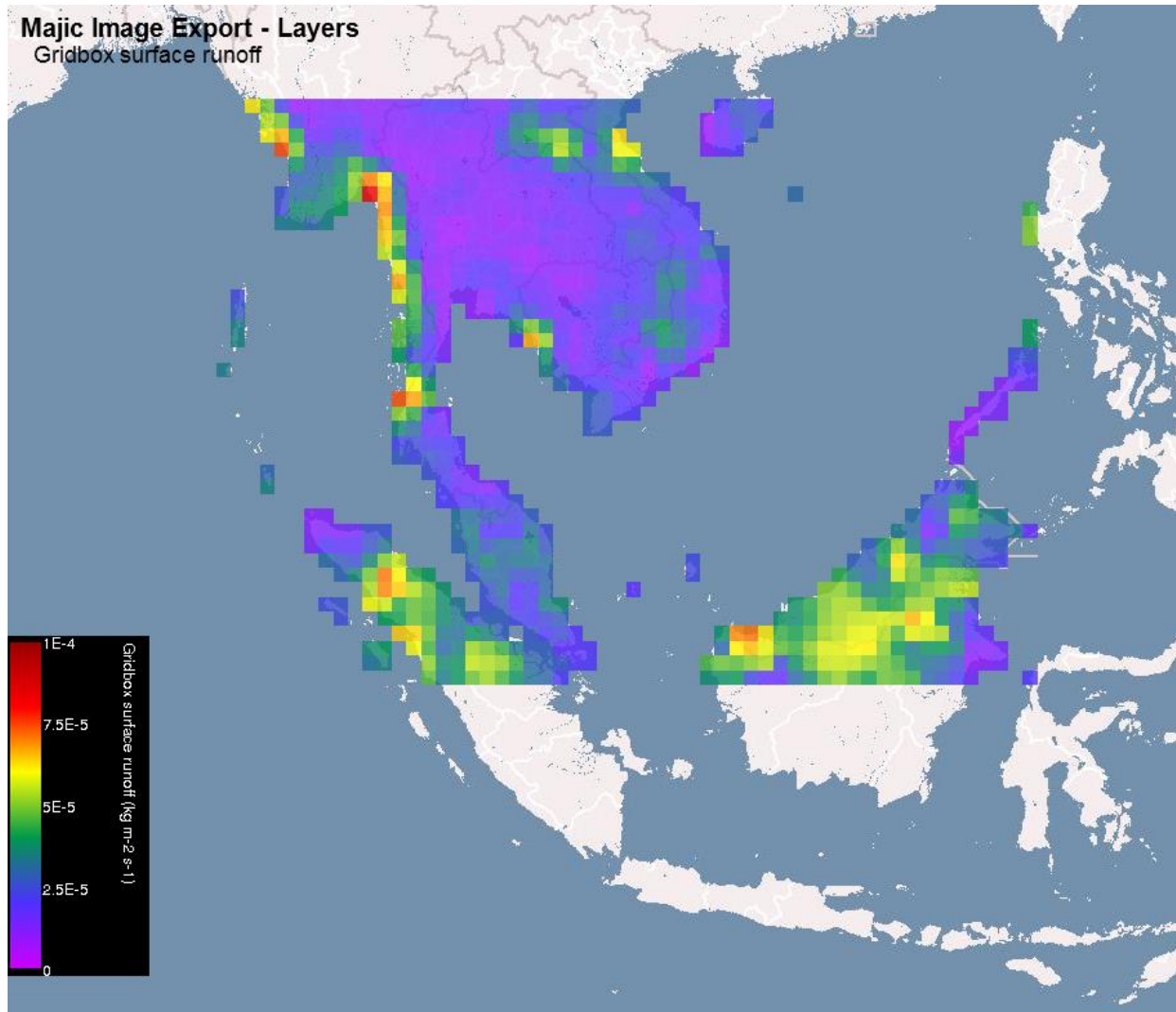
Users: Indian soil moisture



Measurements at Lat: 12.75, Lon: 77.75



Users: deforestation experiment



MAJIC

- Simple to use, no technical knowledge required
- Fast runs using JASMIN parallel capabilities
- Easy interface to plot and/or download data
- Teaching tool
- Runs with custom driving data
- Please sign up and have a go!
- Feedback and suggestions welcome



MAJIC

<http://majic.ceh.ac.uk>