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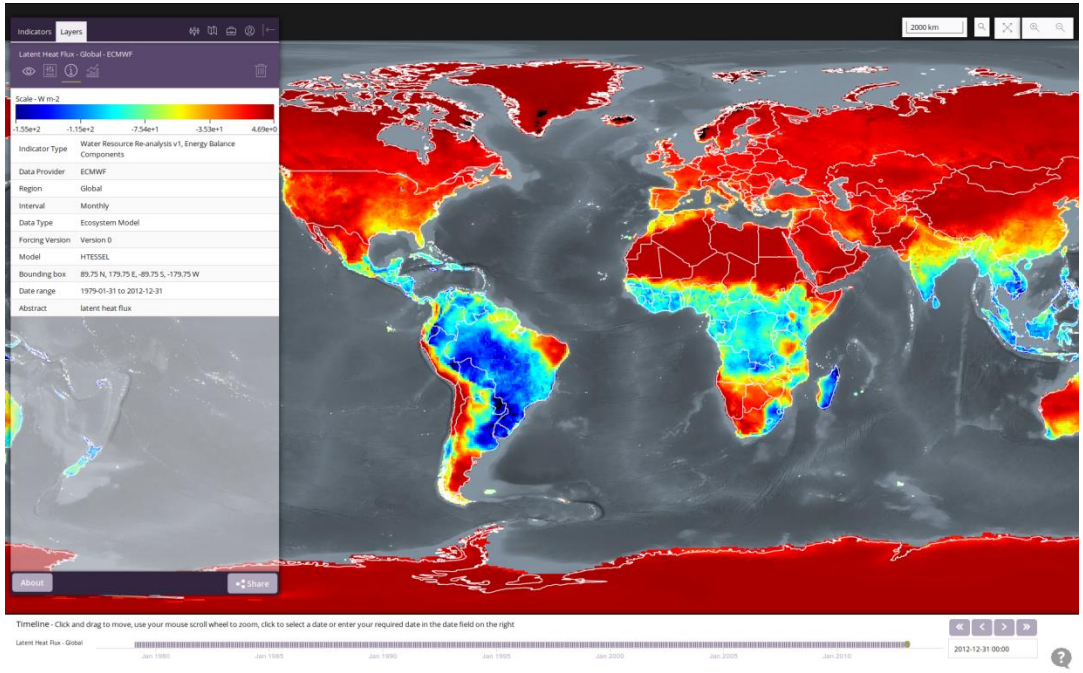
Web Based Geographic Information System

Oliver Clements, Ben Calton

Summary

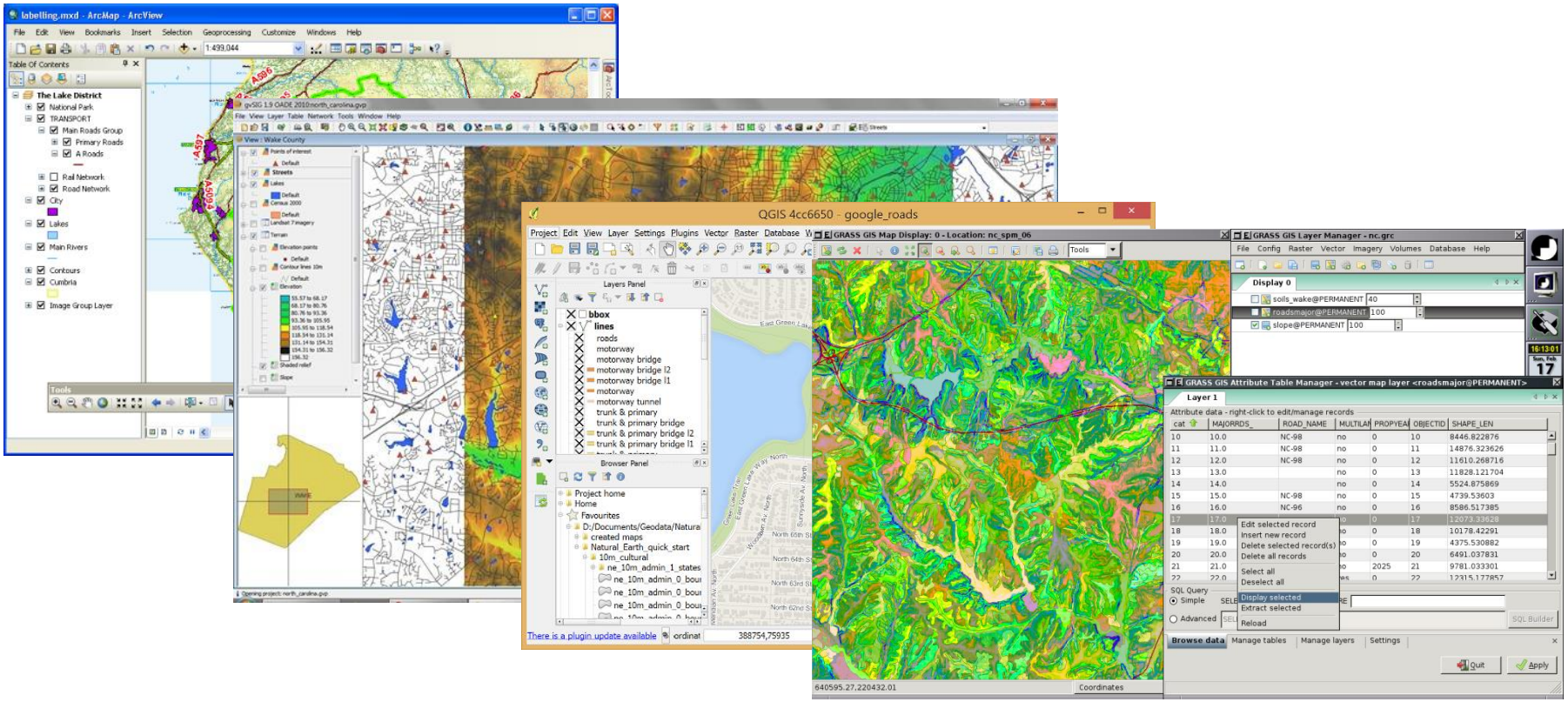
- What is GIS?
- Why web based?
- Portal overview
- Analysis overview
- Data download
- Collaboration
- Portal administration
- Future additions
- Questions



What is GIS?

"A geographic information system (GIS) is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface. GIS can show many different kinds of data on one map. This enables people to more easily see, analyze, and understand patterns and relationships."

Wikipedia https://en.wikipedia.org/wiki/Geographic_information_system



Why Web Based?

- Browsers are ubiquitous and available on all operating systems
- Internet connections & browser processing are becoming faster allowing more rich web applications
- The users do not need to download / install any software or dependencies
- Updates of the system get to users quicker so a rapid iterative development is possible

Issues to overcome with web based

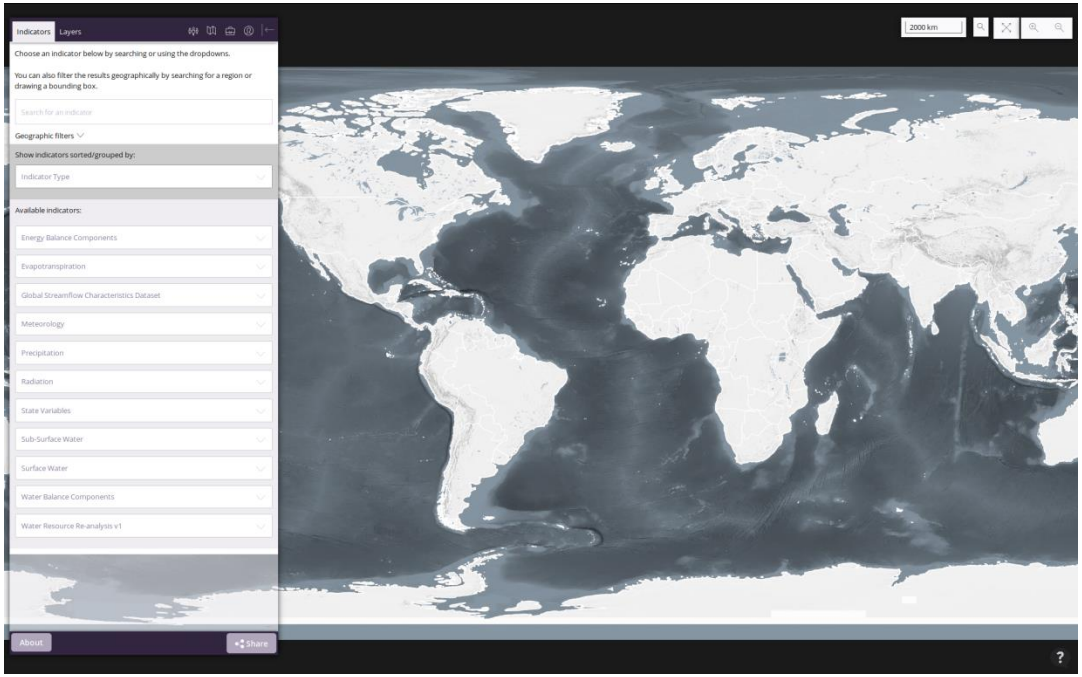
- Browser vendor specific bugs
- Limited bandwidth in developing areas
- No control of the way users access and interact with the GIS

Our Solution

- Standards based
  - We utilise known Open Geospatial Consortium standard interfaces
    - WMS for map tiles
    - WFS for vector data
    - WCS for data analysis
  - This allows new data to be added with minimal effort
- Open Source
  - We use GitLab internally to track issues/branches
  - Every commit is pushed to our public github repo
  - Slight overhead but benefit from fixes and ideas being contributed

Portal Overview

The portal aims to provide a simple user interface to potentially large collections of data.



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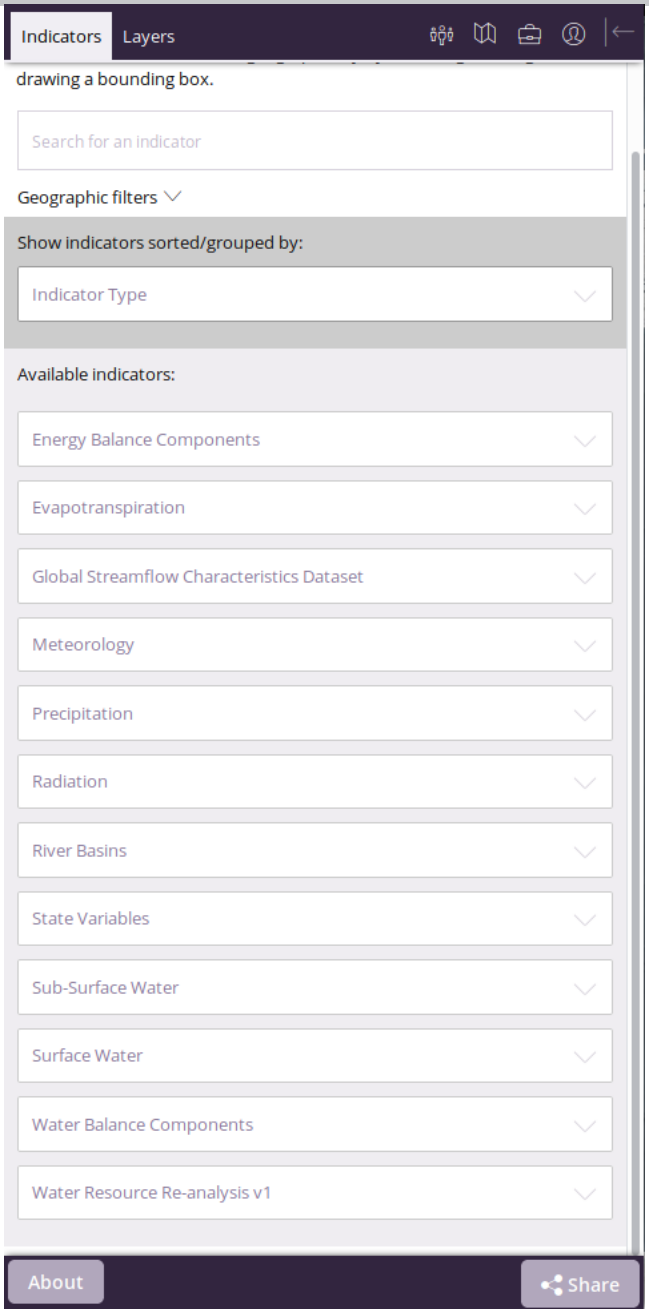
Offering users multiple top level categories to choose from



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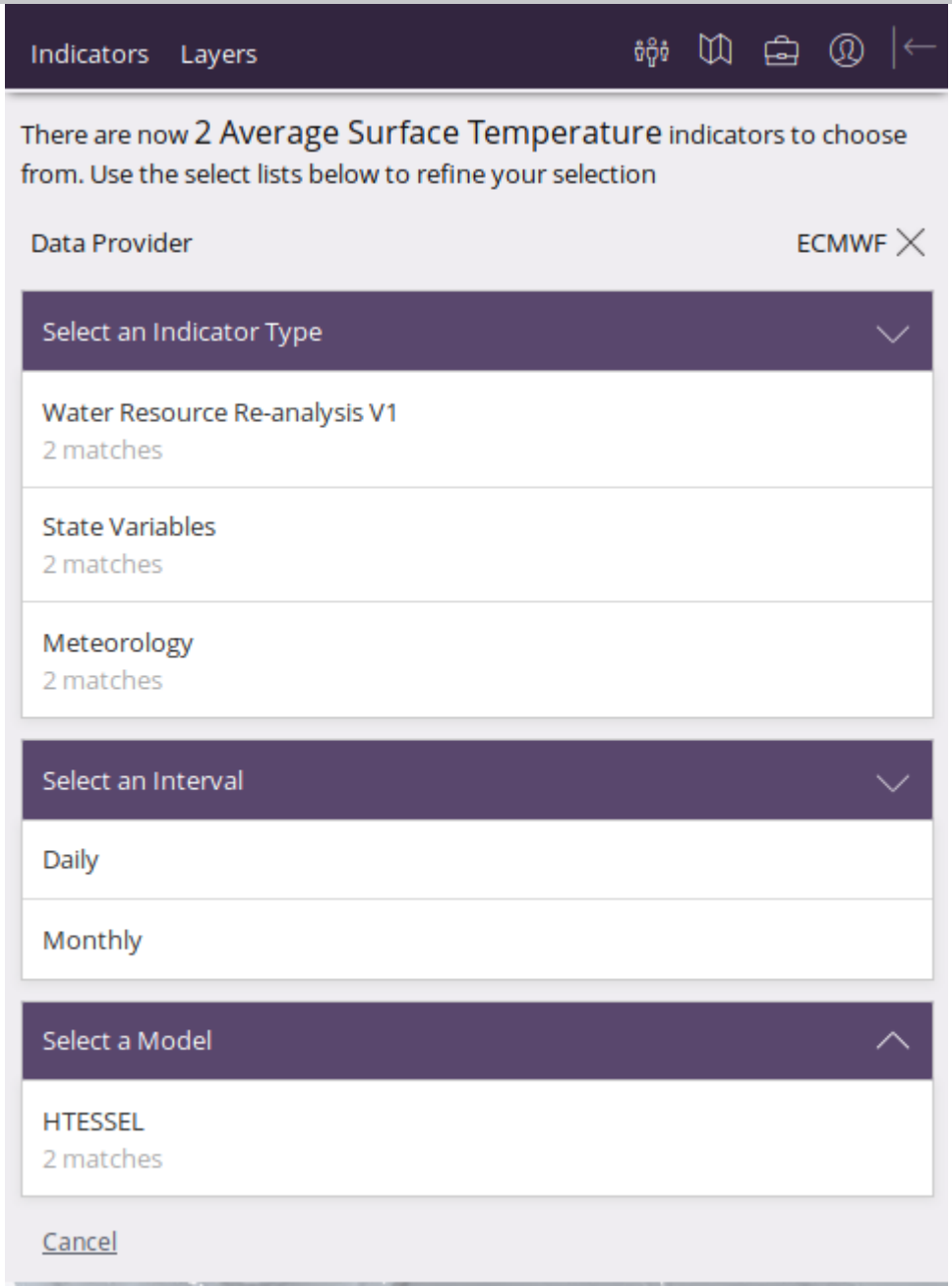
When multiple options still remain these are provided allowing users to get quickly to the data they want



Portal Overview

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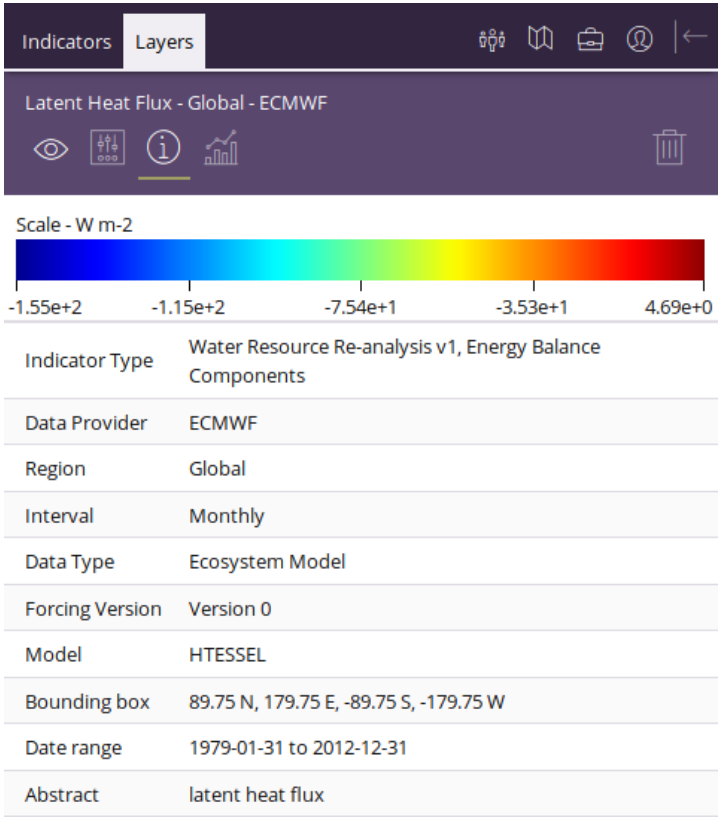
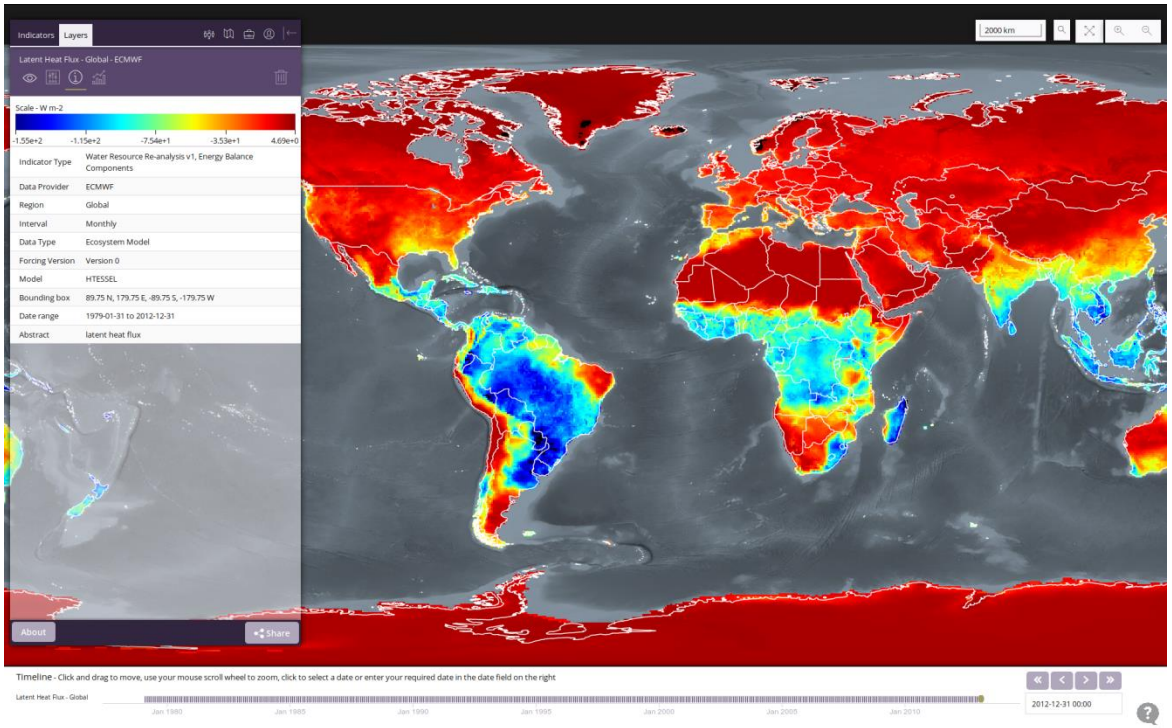
Once the user has selected their chosen layer it is displayed on the map and summary information given to the user in the “layer panel”



Portal Overview

Layers are loaded from WMS and if a time dimension is available the most recent data are loaded by default.



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The available dates/times for a layer are shown on a timebar at the bottom of the page. The purple background shows the temporal extent and dark lines show individual images

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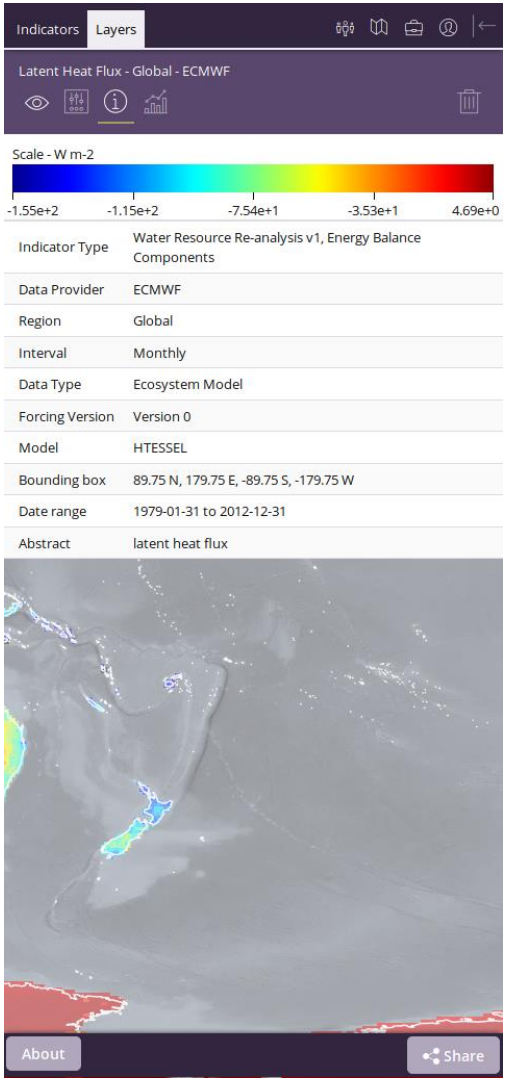
The available dates/times for a layer are shown on a timebar at the bottom of the page. The purple background shows the temporal extent and dark lines show individual images

The user can navigate by simply clicking on the timebar for the date they need. There is also the option to move the currently shown image by both single steps or blocks of ten using the forward and back controls

Layer Metadata

Layer information is provided in two ways. Basic information is shown in a table on the layer info panel



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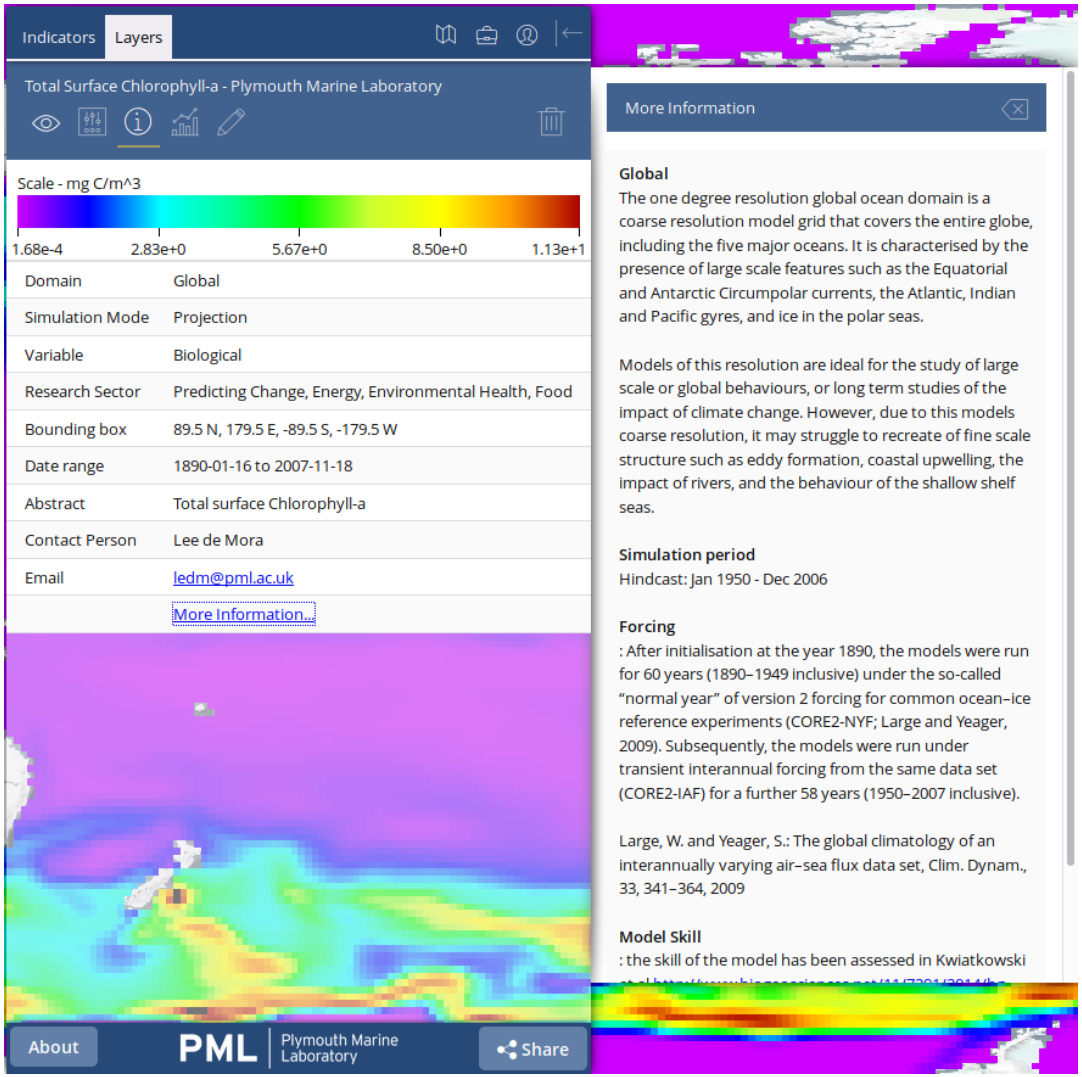
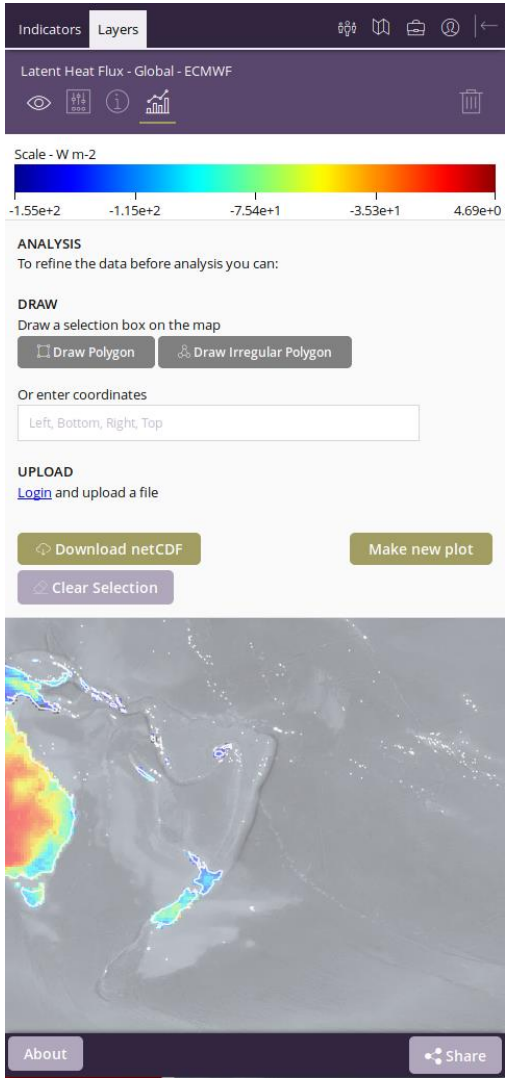
More in depth information is available in a slide out panel. This info is stored as markdown and then rendered to the browser as HTML.

These panels of information give the user all they need to understand what the data are and where they have come from. This is also where any citations needed to be included in data reuse are available.



Analysis Overview

Alongside visualisation data analysis is a major use case of a GIS and being web based doesn't change this.



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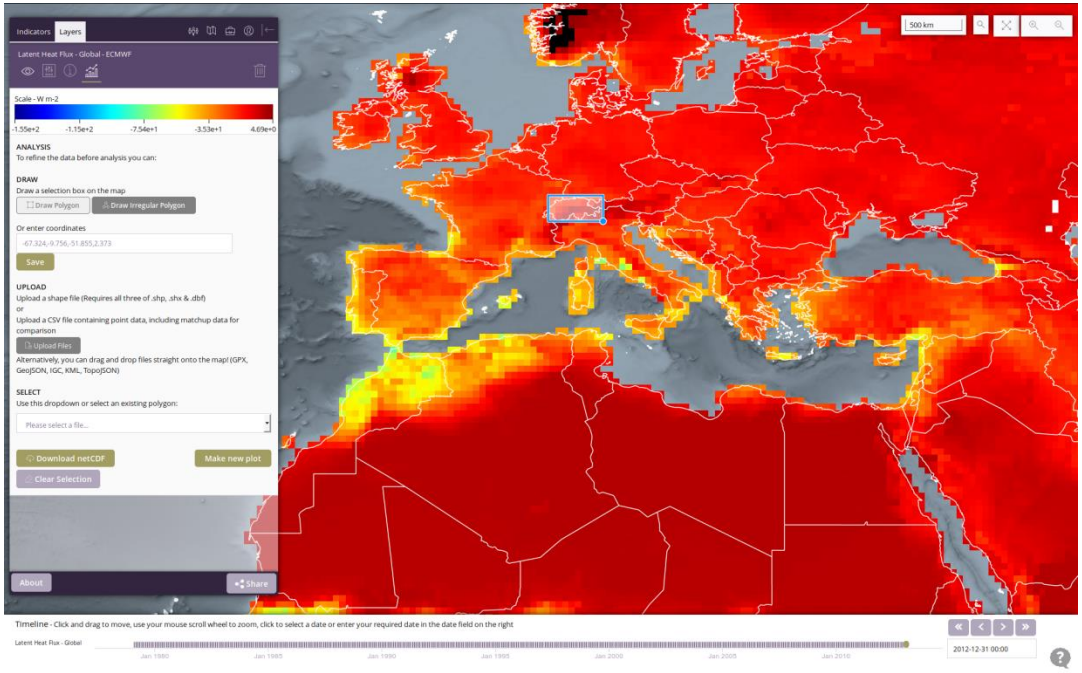

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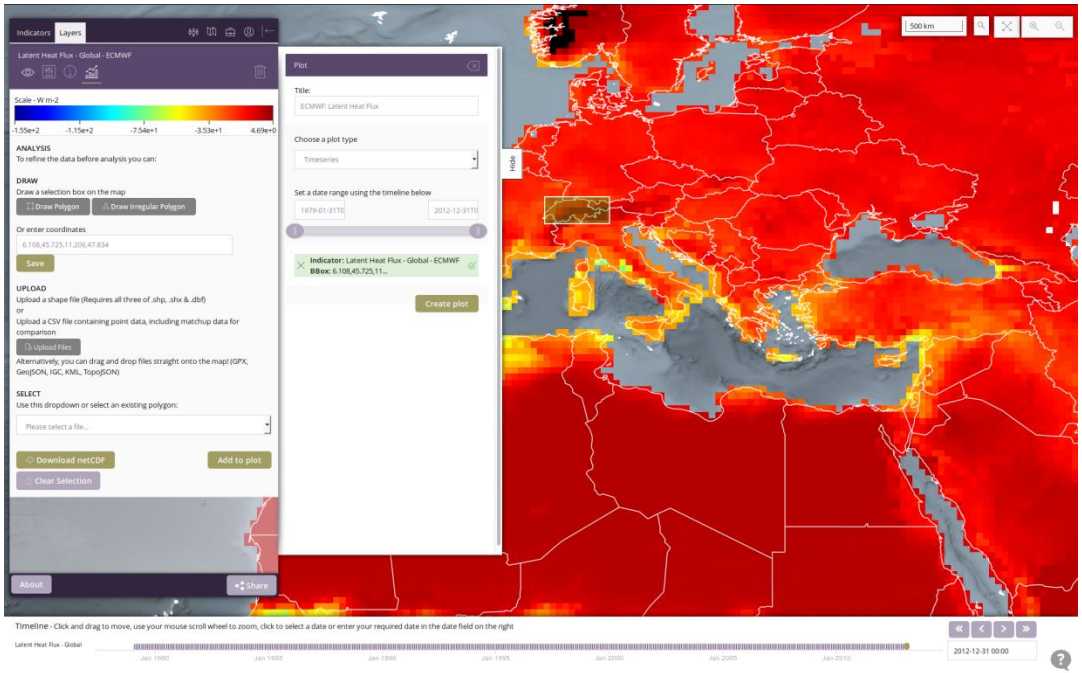

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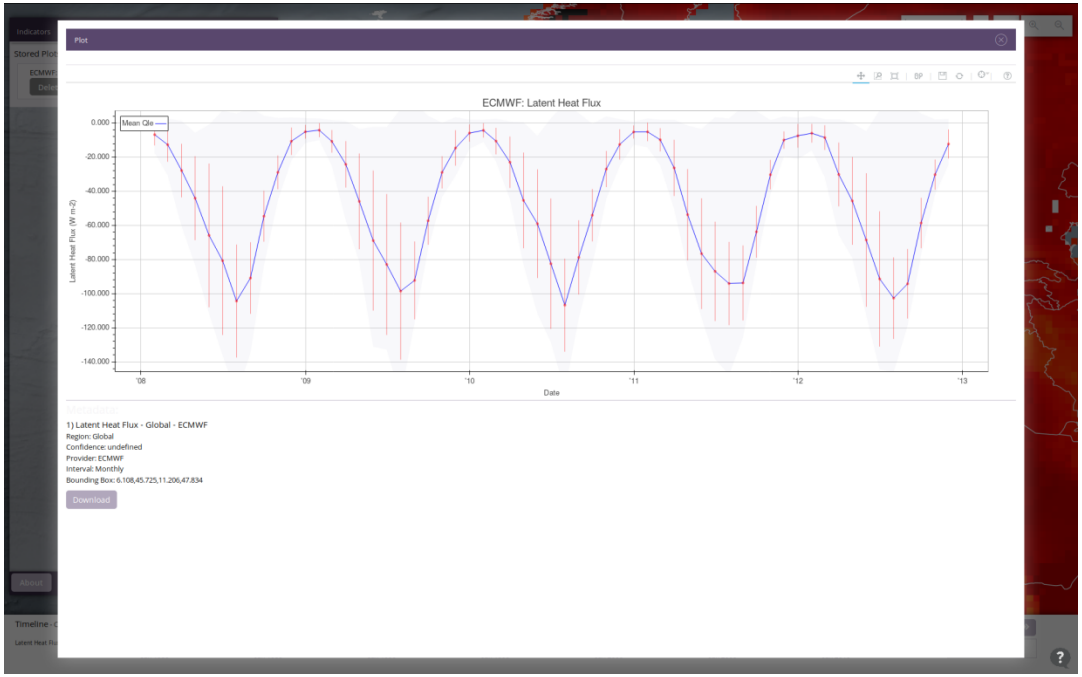
- Timeseries



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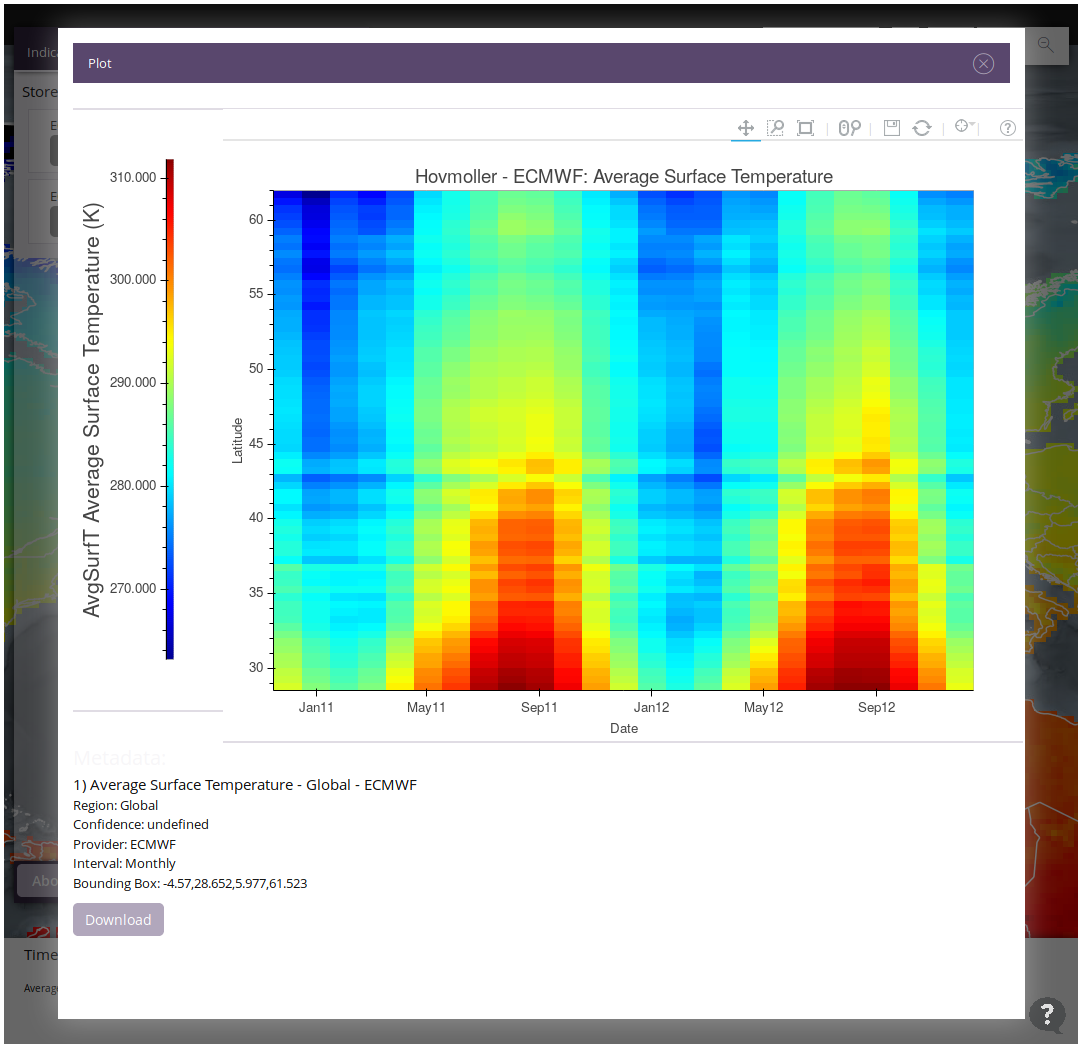
- Hovmoller



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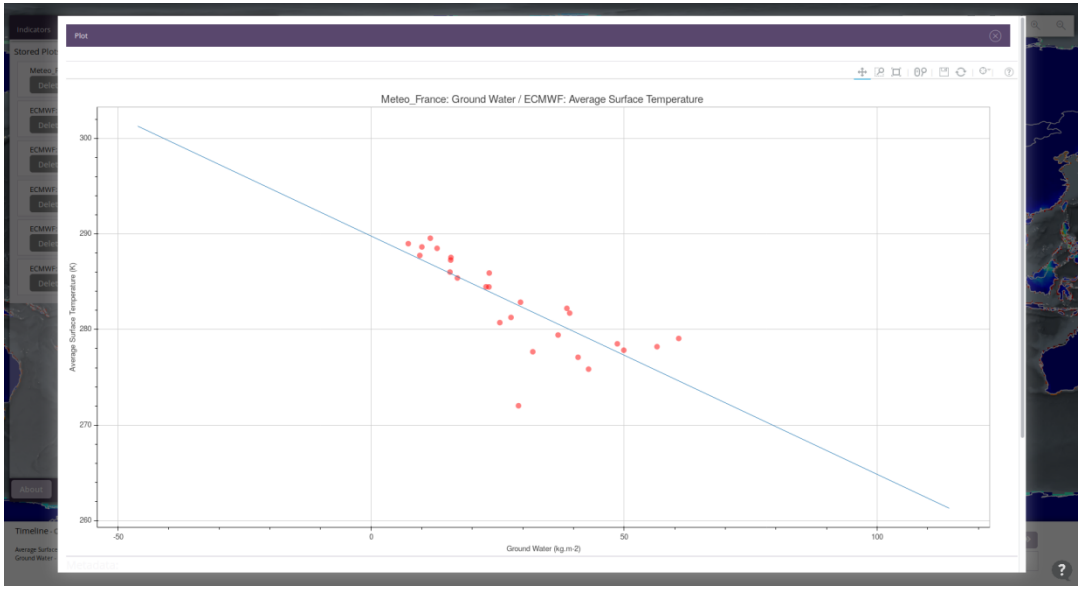
- Timeseries
- Hovmoller
- Scatter/Regression



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- Timeseries
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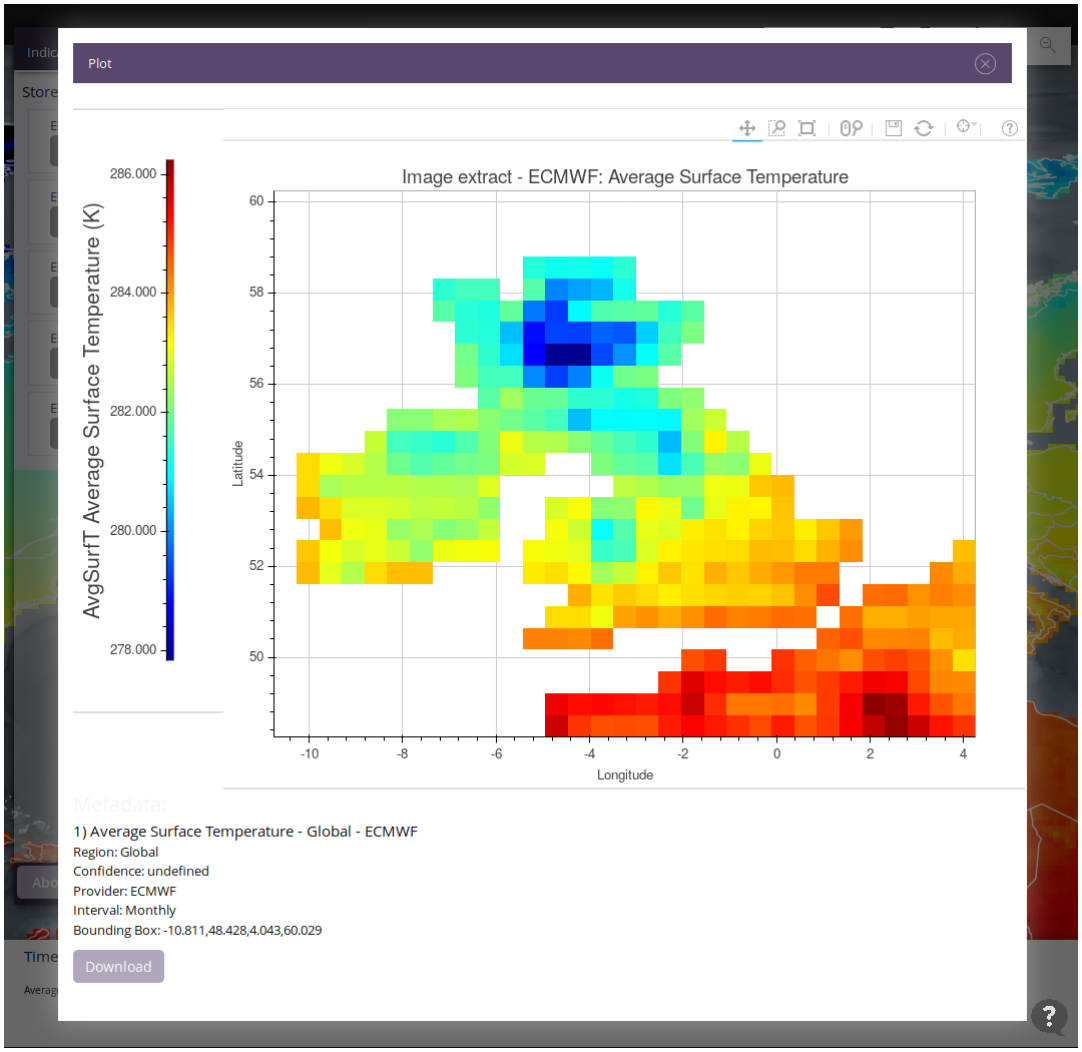
- Scatter/Regression
- Composite



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- Timeseries
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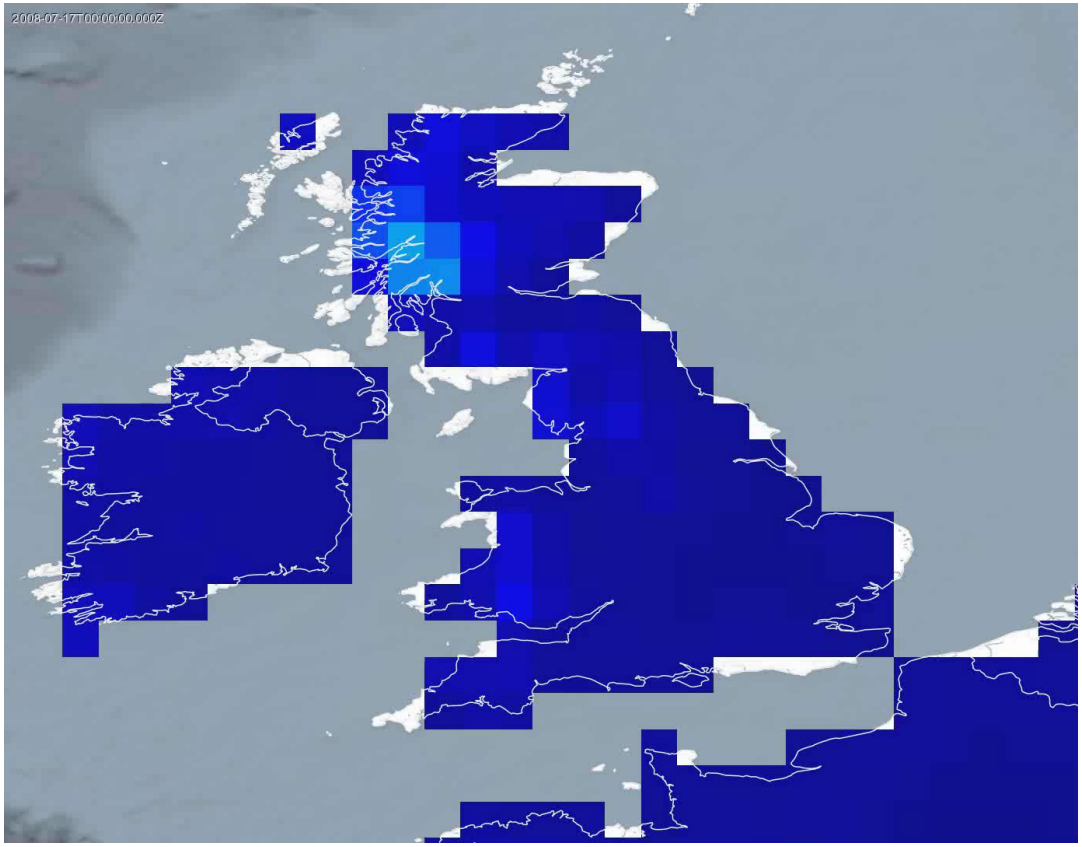
- Animation



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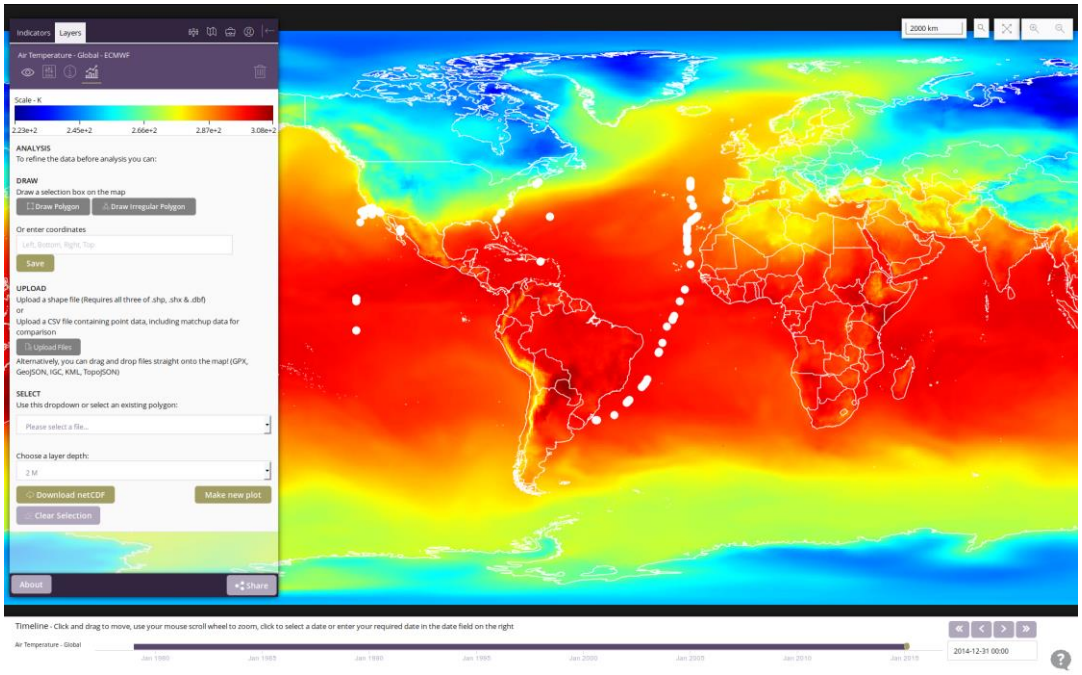
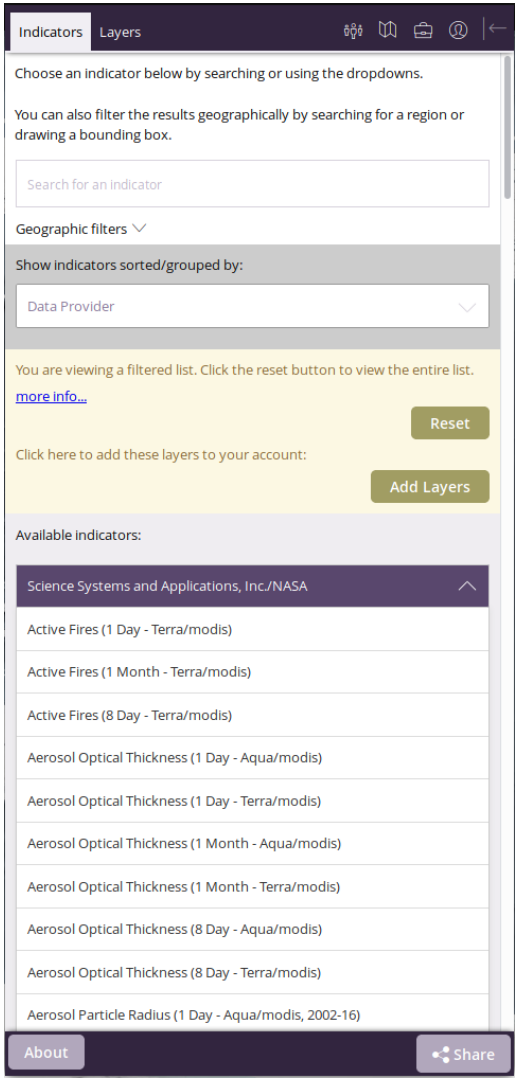
- Match Ups



Using Additional Data

Users are not limited to visualising data already registered in the portal.

If a users has data available through a WMS they have the ability to add the layers through a simple form. By adding the base URL for the data service the portal will parse the GetCapabilities XML document and make all suitable layers available.



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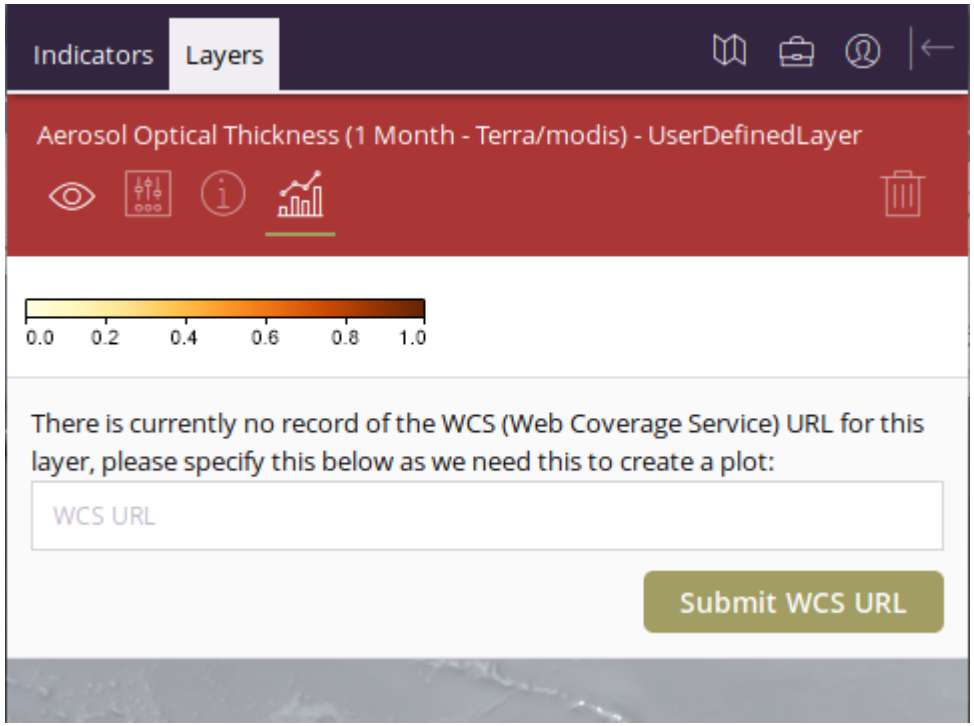
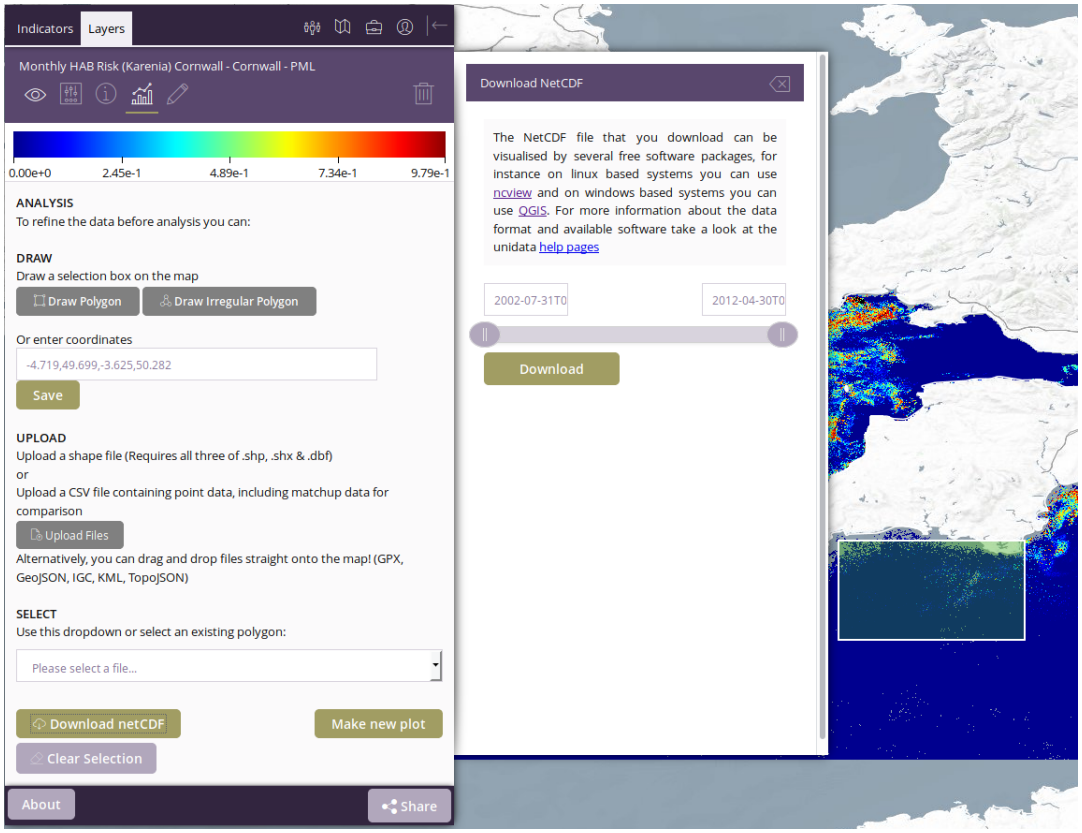
If the user wishes to carry out analysis they are prompted for the WCS endpoint that corresponds to the data within the WMS layer they are analysing.



Data Access / Download

Data download is still key to most of our users. Although web services and online analysis provide many features there will always be a subset of users that p[refer to work locally and have the hardware to do this.

For these people we offer the data they select for plotting as a straight netcdf download. This works with both regular and irregular polygons.



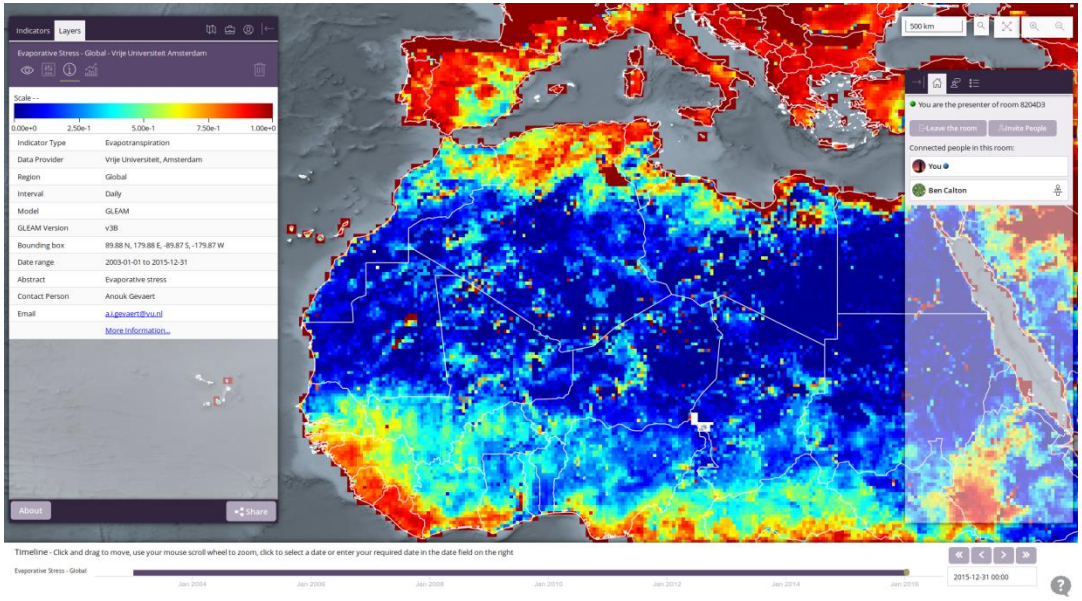
Collaboration

The portal also allows users to either create a collaboration session or join an existing one.

In the context of the GISportal a collaboration session is similar to a screen sharing session using something like webEx.

The prime difference being that you are not just seeing an image of the presenters screen. The actions they carry out are mirrored in your browser.

This gives the benefit that once the session has ended all attendees have working portals with all work done available to them.



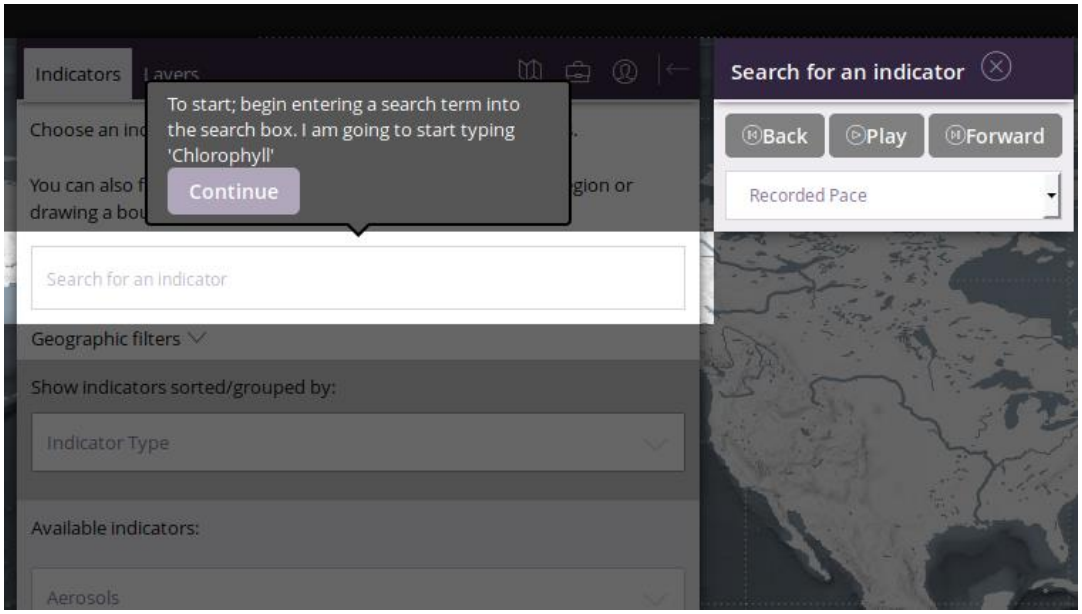
Help Walk-through

The portal provides a system by which administrators can create and save *walk-throughs.*

These are predefined work flows with additional textual pointers added.

The purpose of the system is to provide guidance to new users or to highlight specific features.

The creator can specify what text is shown at each step, which element is highlighted and how long each step should be displayed for (if auto play is enabled)



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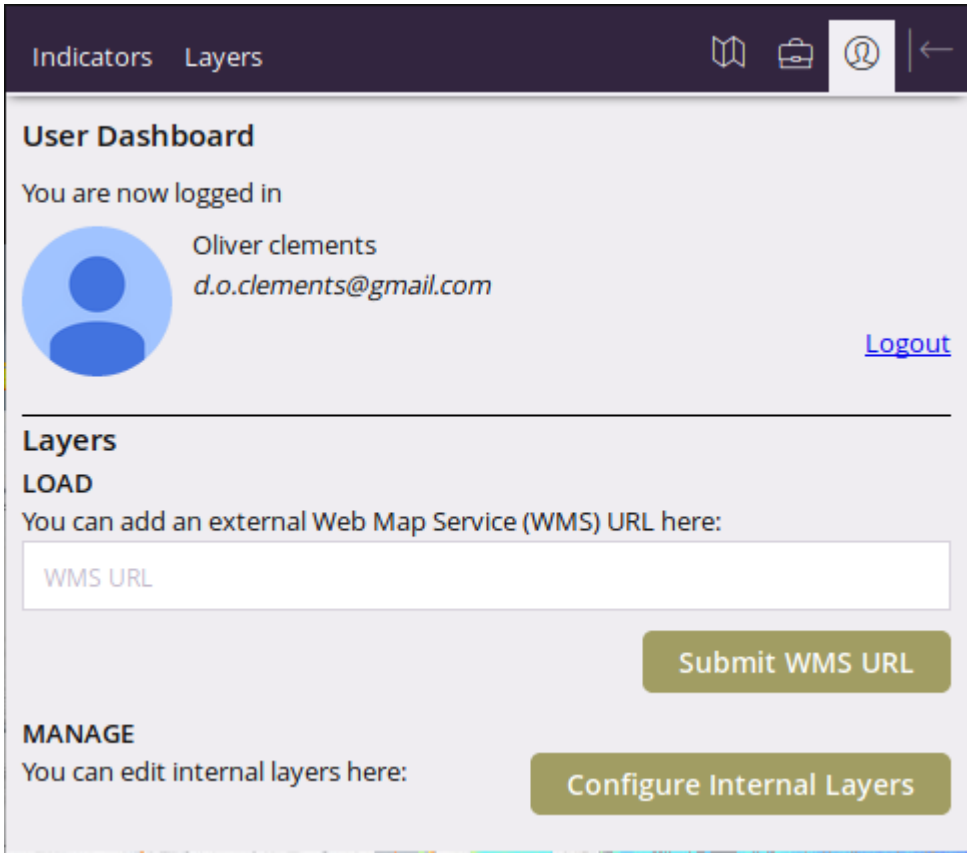

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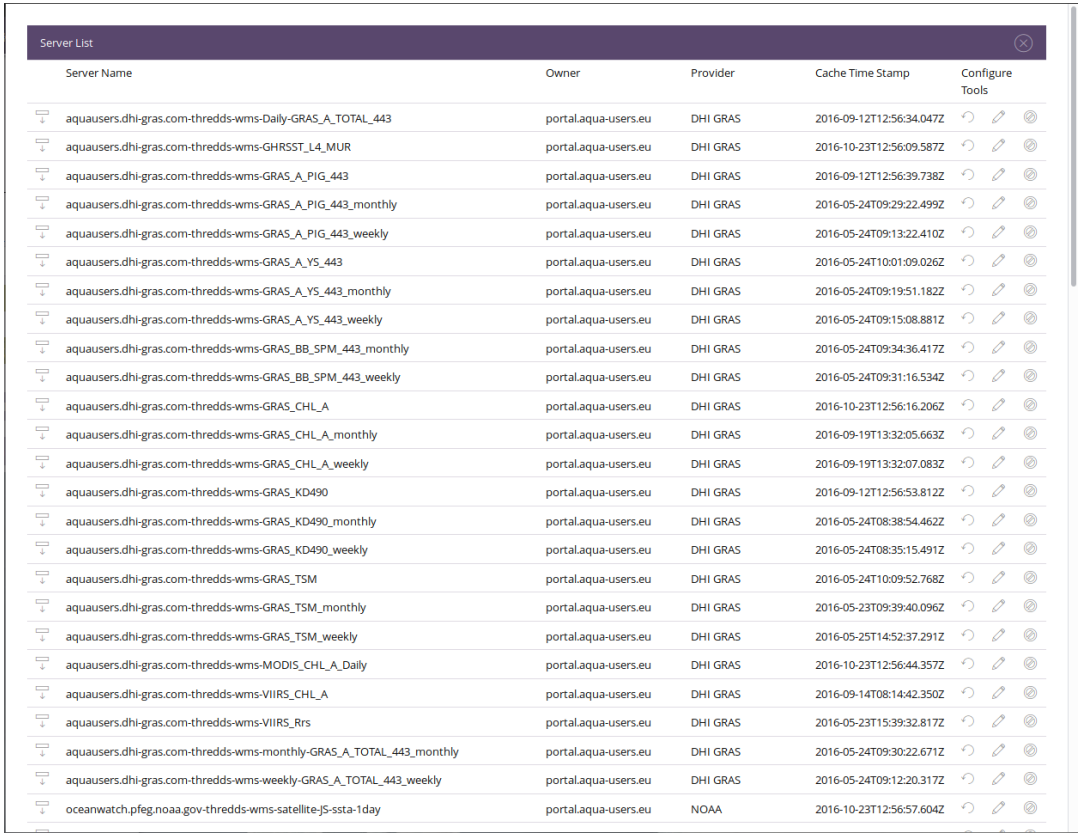

Server List

Server Name	Owner	Provider	Cache Time Stamp	Configure Tools
aquausers.dhi-gras.com-thredds-wms-Daily-GRAS_A_TOTAL_443	portal.aqua-users.eu	DHI GRAS	2016-09-12T12:56:34.047Z	
aquausers.dhi-gras.com-thredds-wms-GHRSST_L4_MUR	portal.aqua-users.eu	DHI GRAS	2016-10-23T12:56:09.587Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_A_PIG_443	portal.aqua-users.eu	DHI GRAS	2016-09-12T12:56:39.738Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_A_PIG_443_monthly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:29:22.499Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_A_PIG_443_weekly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:13:22.410Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_A_YS_443	portal.aqua-users.eu	DHI GRAS	2016-05-24T10:01:09.026Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_A_YS_443_monthly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:19:51.182Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_A_YS_443_weekly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:15:08.881Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_BB_SPM_443_monthly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:34:36.417Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_BB_SPM_443_weekly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:31:16.534Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_CHL_A	portal.aqua-users.eu	DHI GRAS	2016-10-23T12:56:16.206Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_CHL_A_monthly	portal.aqua-users.eu	DHI GRAS	2016-09-19T13:32:05.663Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_CHL_A_weekly	portal.aqua-users.eu	DHI GRAS	2016-09-19T13:32:07.083Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_KD490	portal.aqua-users.eu	DHI GRAS	2016-09-12T12:56:53.812Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_KD490_monthly	portal.aqua-users.eu	DHI GRAS	2016-05-24T08:38:54.462Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_KD490_weekly	portal.aqua-users.eu	DHI GRAS	2016-05-24T08:35:15.491Z	
aquausers.dhi-gras.com-thredds-wms-GRAS_TSM	portal.aqua-users.eu	DHI GRAS	2016-05-24T10:09:52.768Z	
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aquausers.dhi-gras.com-thredds-wms-GRAS_TSM_weekly	portal.aqua-users.eu	DHI GRAS	2016-05-25T14:52:37.291Z	
aquausers.dhi-gras.com-thredds-wms-MODIS_CHL_A_Daily	portal.aqua-users.eu	DHI GRAS	2016-10-23T12:56:44.357Z	
aquausers.dhi-gras.com-thredds-wms-VIIRS_CHL_A	portal.aqua-users.eu	DHI GRAS	2016-09-14T08:14:42.350Z	
aquausers.dhi-gras.com-thredds-wms-VIIRS_Rrs	portal.aqua-users.eu	DHI GRAS	2016-05-23T15:39:32.817Z	
aquausers.dhi-gras.com-thredds-wms-monthly-GRAS_A_TOTAL_443_monthly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:30:22.671Z	
aquausers.dhi-gras.com-thredds-wms-weekly-GRAS_A_TOTAL_443_weekly	portal.aqua-users.eu	DHI GRAS	2016-05-24T09:12:20.317Z	
oceanwatch.pfeg.noaa.gov-thredds-wms-satellite-JS-ssta-1day	portal.aqua-users.eu	NOAA	2016-10-23T12:56:57.604Z	

Portal Administration

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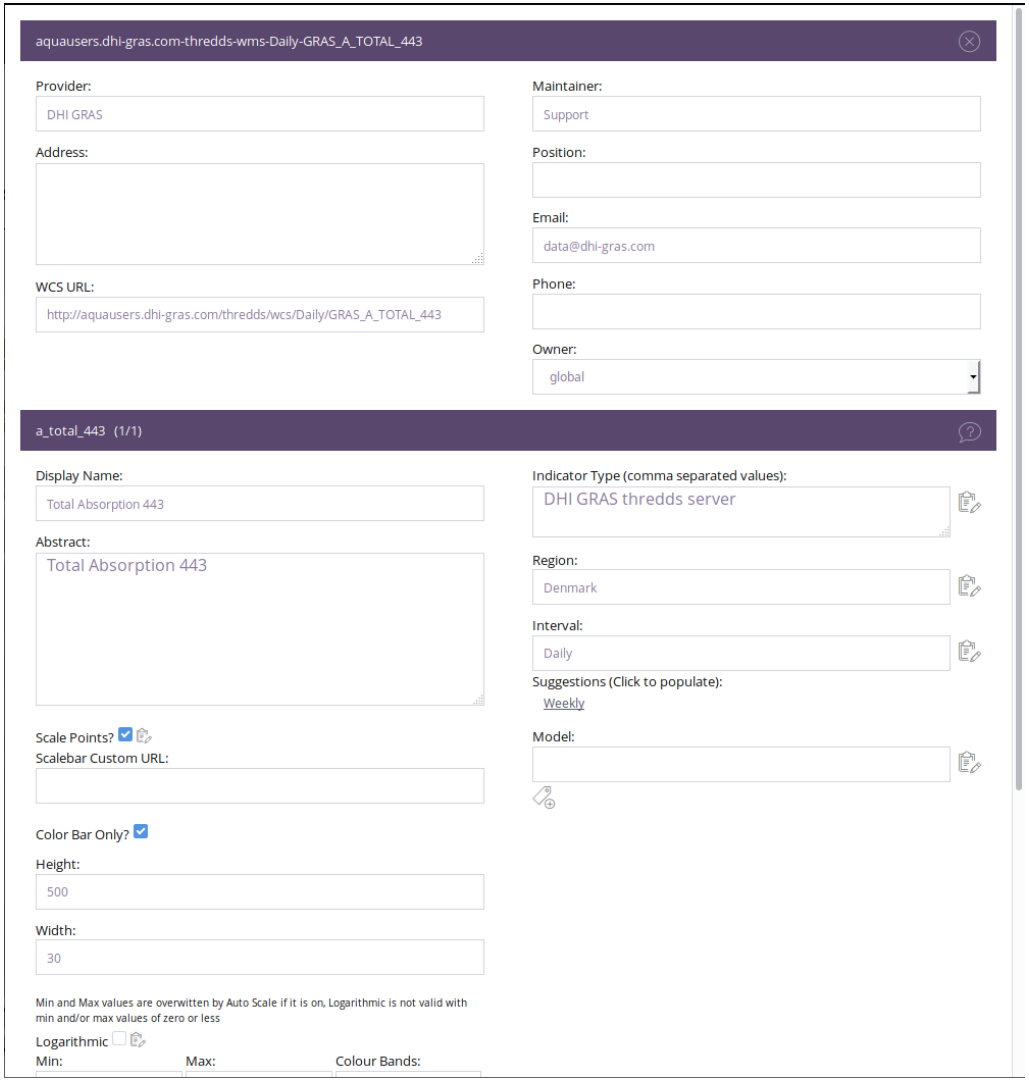
Once logged in users are able to look at and edit the currently configured layers as well as add new data to the portal.

Each entry is based of a single WMS server, each individual layer offered can be configured or excluded from the set offered to users. Admins can set the labels for layers as well as the categories it belongs to.



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- Improving the analysis options
  - More charts available
  - Better comparison options, i.e. create diff layer on the fly and view on map
  - In situ data visualisation and use in analysis

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  - In situ data visualisation and use in analysis
- Admin tools for adding different data sources
  - SOS
  - WFS
- Admin tools for editing layer “extra information”

Getting involved

- The project is Open Source and available on GitHub
  - http://github.com/pmlrsg/GISportal
- Documentation on installation and configuration are available on the GitHub wiki
  - http://github.com/pmlrsg/GISportal/wiki
- Please don’t hesitate to contact our team if you have any further question
  - olcl@pml.ac.uk
  - bac@pml.ac.uk

Thank you – Questions?