

Godiva2: Interactive visualization of environmental data on the web

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<http://www.reading.ac.uk/godiva2>

Introduction

Visualization is a very important tool for helping scientists to understand the ever-growing volumes of diverse environmental data, and for communicating scientific results within and beyond the scientific community.

Godiva2 is a dynamic website that provides visual access to several terabytes of physically-distributed environmental data. Among the 40 datasets that can currently be explored are four-dimensional numerical model outputs (including operational ocean forecast data), satellite analysis products and data from NERC research projects in the atmospheric, ocean and climate sciences.

Users can explore these datasets interactively using only a web browser, without the need to download or understand large, complex data files.

Choose a dataset and variable

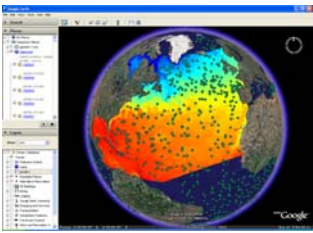
Select a dataset and variable from the left-hand menu. When you click on a variable it is instantly displayed on the map view.

Pan and zoom the map

The map can be dragged to pan around the data and the zoom controls can be used to zoom in and out. Alternatively, shift-click and drag to draw a box containing your area of interest.

View the data in Google Earth

Click "Open in Google Earth" to view the current map view or animation in Google Earth. In Google Earth, many datasets from different providers can be loaded and viewed simultaneously. Here we show the numerical model data from Godiva2 being viewed alongside the locations of Argo floats [6].



How can I view my own data in Godiva2?

Currently Godiva2 can only be used to view gridded data such as numerical model output or satellite data. Support for other data types is planned for the future. Contact resc@reading.ac.uk with any queries.

My data are in NetCDF files: We can test your files for compatibility then, if successful, your local system administrator can install the Godiva2 software on a suitable server. Your files must comply with the CF conventions [7].

My data are hosted on an OPeNDAP server: Tell us the location of your OPeNDAP server and we can add your datasets to the central Godiva2 server. Again, metadata must conform to the CF conventions.

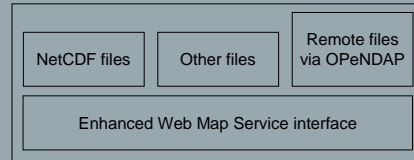
My data are in some other file format: It may still be possible for you to use the Godiva2 system but this will usually require some extra effort to create adapters. Contact us for more details.

The importance of standards

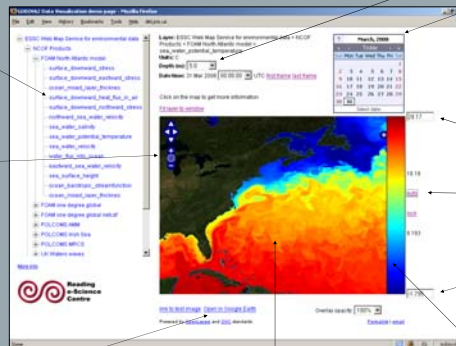
The Godiva2 system is based upon open, international standards throughout, ensuring interoperability with third-party tools such as Geographic Information Systems and allowing data that are exposed through Godiva2 to be intercompared with other data sources.

The use of these standards for serving geospatial data is mandated by the recent EU INSPIRE directive [1]. Godiva2 has been adopted by major European operational oceanography projects to provide an INSPIRE-compliant data visualization system.

Godiva2 server



Images and metadata



How it works

The Godiva2 system consists of a dynamic website and a server-side Java web application. All complex operations are handled by the server, allowing the application to be lightweight and easy to use.

The server is based upon a custom implementation of the OGC Web Map Service specification [2]. Data are read from NetCDF files, OPeNDAP servers and other sources and are transformed into images. The dynamic website uses AJAX technologies [3] to provide a responsive interface and displays images on an interactive OpenLayers map [4].

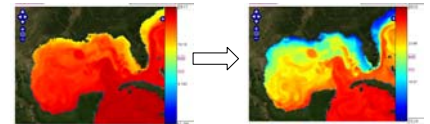
More technical details – and the complete code for the Godiva2 website and server – can be found at the project website [5].

Select the vertical level and time value and create animations

Use the drop-down box of vertical levels and the calendar control to select the z and t values of the data you wish to see. By selecting a range of time values you can create an animation.

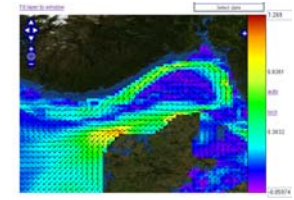
Adjust the colour contrast

Use the input boxes next to the colour scale to manually adjust the colour contrast by setting the data values corresponding with the extremes of the colour scale. Alternatively, click "auto" to reveal features by automatically maximizing the contrast range.



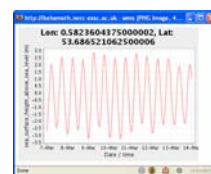
View vector fields

If you choose a vector field such as sea water velocity, the data will be automatically displayed as arrows superimposed on top of the magnitude of the velocity field.



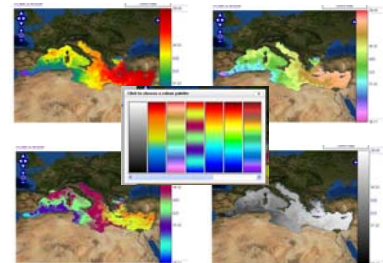
Find the data value at a point

Click at any point on the map to reveal the data value at this point. If you have selected a time range a timeseries plot will be shown.



Choose a colour palette

Click on the colour scale bar to choose from a range of colour palettes. Changing the palette can reveal new features that were previously hard to see.



References and definitions

- [1] <http://inspire.jrc.it/>
- [2] <http://www.opengeospatial.org/standards/wms>
- [3] http://en.wikipedia.org/wiki/Ajax_%28programming%29
- [4] <http://www.openlayers.org>
- [5] <http://ncwms.sf.net>
- [6] <http://w3.jcoomps.org/FTPRoot/Argo/Status/status.kml>
- [7] <http://www.cfconventions.org/>