



Project:
GEOCARBON

Project full title:
Operational Global Carbon Observing System

European Commission - FP7
Collaborative Project (large scale integrating project) - for specific
cooperation actions (SICA) dedicated to international cooperation partner countries
Grant agreement no.: **283080**

Del. no: 8.2

Deliverable name: Ocean data streams for the CCDAS

Version: V1

WP no: 8

Lead beneficiary: UiB

Delivery date from Annex I (project month): 6

Actual delivery date (project month): 6

1. Introduction

1.1 Short summary

Marine carbon data streams giving access to chemical and physical parameters from the surface ocean, deep ocean and remote sensing are being made available to the GEOCARBON community.

1.2 Rationale for this deliverable

Data is available to model community in a uniform format and can be used as input for model assimilation within WP8.

1.3 Problems encountered and envisaged solutions

None

2 Full description

2.1 GEOCARBON Ocean data streams

Oceanic data is not centrally archived at a single data center for historical, political and funding reasons – data from measurements is mainly archived at CDIAC (Carbon Dioxide Information Analysis Center) in the USA and PANGAEA (Data Publisher for Earth and Environmental Science) in Germany. Data synthesis are available for underway and discrete sample measurements.

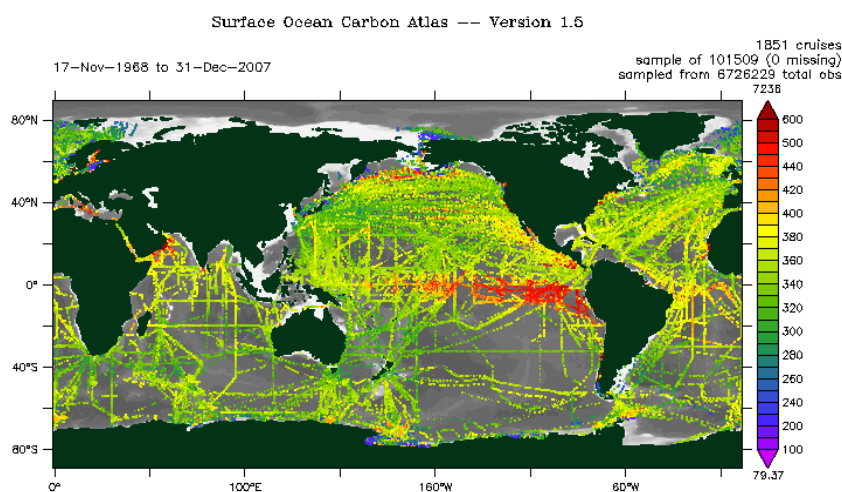
All relevant data synthesis products that have been developed within the past years are available for Geocarbon in its latest version. In addition have those synthesis products been eased making them available in uniform file format (netCDF).

2.2 Surface carbon dioxide and physical oceanographic data from underway measurements

Those data are obtained underway from voluntary observing ships (VOS), research vessels, buoys, and moorings. Surface Ocean CO₂ Atlas (SOCAT) provides quality controlled underway CO₂ and physical oceanographic (eg sea surface temperature and salinity) data for the time frame 1968-2007. All data is in the same format and available on a cruise by cruise level, as one large data set and as a gridded product (1 by 1 deg, monthly mean). Furthermore users can query, subset and download data by space and time via a SOCAT Live Access Server called Cruise Viewer (http://ferret.pmel.noaa.gov/SOCAT_cruise_viewer/) or using World Data Center PANGAEA's data warehouse¹.

The following parameters relevant for GEOCARBON are available within SOCAT: fugacity of carbon dioxide, temperature, salinity, and atmospheric pressure. The error estimates for fCO₂ within SOCAT is approx. 2 uatm.

Data is available via the SOCAT website (www.socat.info).



Subsampled fCO₂ (4 times daily) from SOCAT Version 1.5

¹

<http://pangaea.de/advanced/datawarehouse.php?q=socat&minlat=&minlon=&maxlat=&maxlon=&mindate=&maxdate=&env=All> - you have to request a user name

2.3 Carbon, nutrients and physical oceanographic data from discrete measurements

Carbon Dioxide in the Atlantic (CARINA) and Global Ocean Data Analysis Project (GLODAP) are synthesis databases making carbon, nutrient and tracer samples from research vessels available in a uniform format with performed secondary quality controlled. Those datasets provide the best coverage with the best quality available.

More details about CARINA and GLODAP can be obtained at CDIAC (<http://cdiac.ornl.gov/oceans/>). In addition will PACIFICA (Pacific Ocean Interior Data) be shortly available.

Those data synthesis for the interior ocean contain the following parameters: total carbon, alkalinity, pH, nutrients, oxygen, temperature, salinity and tracers (SF₆, CFC). Due to primary and secondary quality control are the error estimates for both products below the accuracy of the measurement devices and quality flags indicate the certainty of measurements. More information on

this topic can be found in the respective publication of the respective data synthesis (Key et al. 2004, Key et al 2009).

2.4 Sea surface temperature and sea ice concentration from remote sensing

Users can choose between two global remote sensing products depending on resolution for both time and space:

1) NOAA Optimum Interpolation Sea Surface Temperature Version 2.0 (NOAA OISST V2) by Reynolds and colleagues makes weekly and monthly data remote sensing data available on a 1 by 1 deg grid from 1981 up to present.

It provides SST, sea ice concentration, error estimates. For data access and further information please visit <http://www.esrl.noaa.gov/psd/data/gridded/data.ncep.oisst.v2.html>

1) The Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA) system produces daily high resolution SST and sea ice concentration data on a 1/20 deg grid for the time frame 1985-2007. Data is available via MetOffice and MyOcean. A detailed description is available via http://ghrsst-pp.metoffice.com/pages/latest_analysis/ostia.html.

NetCDF is available for GLODAP, CARINA and SOCAT

www.socat.info/upload/GLODAP-v1-1_bottle.nc

www.socat.info/upload/CARINA_V1-2.nc

www.socat.info/upload/SOCAT-v1.5.nc

3 References

Key, R.M., A. Kozyr, C.L. Sabine, K. Lee, R. Wanninkhof, J.L. Bullister, R.A. Feely, F.J. Millero, C. Mordy and T.-H. Peng. 2004. A global ocean carbon climatology: Results from Global Data Analysis Project (GLODAP). *Global Biogeochemical Cycles* 18, GB4031, doi:10.1029/2004GB002247.

Key, R.M., T. Tanhua, A. Olsen, M. Hoppema, S. Jutterström, C. Schirnick, S. van Heuven, A. Kozyr, X. Lin, A. Velo, D. Wallace and L. Mintrop. 2009. The CARINA data synthesis project: Introduction and overview. *Earth System Science Data*.