Project No. 249024

NETMAR

Open service network for marine environmental data

Instrument: *Please tick*	CA	✓ **STREP**	IP	NOE

ICT - Information and Communication Technologies Theme

D5.1.2 Data Delivery Services – Semantically Enabled Data Services

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PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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	**NETMAR** Open service network for marine environmental data Project Reference: 249024 Contract Type: Collaborative Project Start/End Date: 01/03/2010 - 31/01/2013 Duration: 36 months
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Document approval

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Draft 2	2012-07-11	Second draft incorporating input from partners	Peter Walker Øystein Torget Torill Hamre Declan Dunne Vincent Gouriou
Draft 3	2012-07-30	Incorporate review feedback.	Peter Walker
1	2012-07-31	Final version approved by coordinator.	Torill Hamre

Executive Summary

The NETMAR project will develop a pilot European Marine Information System (EUMIS) that will enable users to search, download and integrate satellite, in situ and model data from ocean and coastal areas. EUMIS will be a user-configurable system offering flexible service discovery, access and chaining facilities based on open and widely adopted web GIS standards. To support smart search, it will use a semantic framework coupled with ontologies for identifying and accessing distributed data, such as near-real time, forecast and historical data, which are marked up using different, but semantically related, keywords. To support dynamic generation of new composite products and statistics suitable for decision-making, it will use web processing services that can be chained together to form workflows that perform a series of operations on input data chosen by the user.

The EUMIS pilot will target the needs of four user communities:
- Arctic operators, environmental authorities and fishery management
- Oil spill drift forecast and shoreline cleanup assessment services in France
- Ocean colour – Marine Ecosystem, Research and Monitoring users
- The International Coastal Atlas Network (ICAN)

Each user community will have a customised pilot that provides the products and services needed for their line of work. The NETMAR partners have had close contact with selected users in each community to identify and document their needs. These user requirements have been described as a series of use cases and a joint list of requirements [NM10], which forms the basis for the EUMIS development. As part of this process, the NETMAR partners have also identified a number of data delivery and processing services that are necessary for each pilot.

This document identifies the semantic data services which are provided by the NETMAR partners for the EUMIS pilots. A data service may provide satellite imagery, in situ or model data. A *semantic* data service provides, in addition, semantic metadata which specifies the type of data the service provides, for instance Chlorophyll. In order to be useful to automated processing services the metadata must be able to be accessed via defined, standard, methods and use a defined vocabulary. This means that in the Chlorophyll example all services which provided Chlorophyll would use an agreed name, say CHLA, to signify this. A service providing a specific type of measurement might use a different name, say CHLMOOC5, but the semantic resource would be able to identify this as a type of Chlorophyll so it could still be used by compatible processes. The addition of semantic metadata should not violate any existing standards and tools which do not understand the convention should be able to process the data as usual.

In general, data services are provided by the NETMAR project partners and where possible are made freely available with no (or few) access restrictions; some, however, may contain sensitive information and are restricted to specific users. Data services will be made available using standard methods allowing access by any compatible applications not just the EUMIS portal itself.

Contents

1 Introduction

1.1 Background

NETMAR aims to develop a pilot European Marine Information System (EUMIS) for searching, downloading and integrating satellite, in situ and model data from ocean and coastal areas. It will be a user-configurable system offering flexible service discovery, access and chaining facilities using OGC, OPeNDAP and W3C standards. It will use a semantic framework coupled with ontologies for identifying and accessing distributed data, such as near-real time, forecast and historical data.

This document builds upon D5.1.1 Data Delivery Services – Basic Data Services [NM13], adding links to semantic metadata for the services. It should be noted that D5.1.1 also provided links to SeaDataNet[1] vocabularies; these links have been updated to use the most recent vocabularies with improved semantics.

A semantically enabled data service is one in which each data item (WFS featuretype, WCS coverage, WMS layer) has within its metadata (normally available thorough calls such as GetCapabilities) information defining its meaning and units of measure.

NETMAR deliverable D5.3.2 [NM13] outlines a method for attaching semantic metadata to WxS services (Web Map Service, Web Feature Service and Web Coverage Service) by providing links to terms in common vocabularies within the metadataURL element. This allows processing services and tools for chaining them to ensure that a process designed to work with one data type is not provided with input of a different (incompatible) type. For example a processing service designed to combine temperature values and threshold them should not be input with salinity data; however a more sophisticated process might be able to accept data in Kelvin, Celsius and Fahrenheit and convert its input accordingly. Semantic metadata may also be used to enable the user to choose only services providing specific parameters, for instance Chlorophyll.

Semantic concepts may be nested so that one concept describes Chlorophyll in general whilst another would describe a specific method of measurement. This means that a process expecting general Chlorophyll (CHLA) as input that received a data marked as CHLMOOC5 would be able to query the semantic resource to check if this was a type of Chlorophyll. This idea of “broad” and “narrow” matches is discussed in more detail in D3.4 Strategy for ontology and tool development to fulfil NETMAR [NM11] which discusses semantic metadata and common vocabularies.

EUMIS will also enable further processing of such data to generate composite products and statistics suitable for decision-making in different marine application domains. A simple to use service chaining editor is being developed as part of EUMIS. The service chaining editor will be run in a common web browser and allow users to compose their own workflows that generate new products customised to their needs. The editor will make use of semantic information provided by data and

[1] http://www.seadatanet.org/

processing services to ensure that service chains have valid input and output parameters. Figure 1-1 illustrates how observations, derived parameters and predictions are retrieved from a distributed service network through standard protocols, and delivered through the EUMIS portal using ontologies and semantic frameworks to select suitable products and where new products can be generated dynamically using chained processing services.

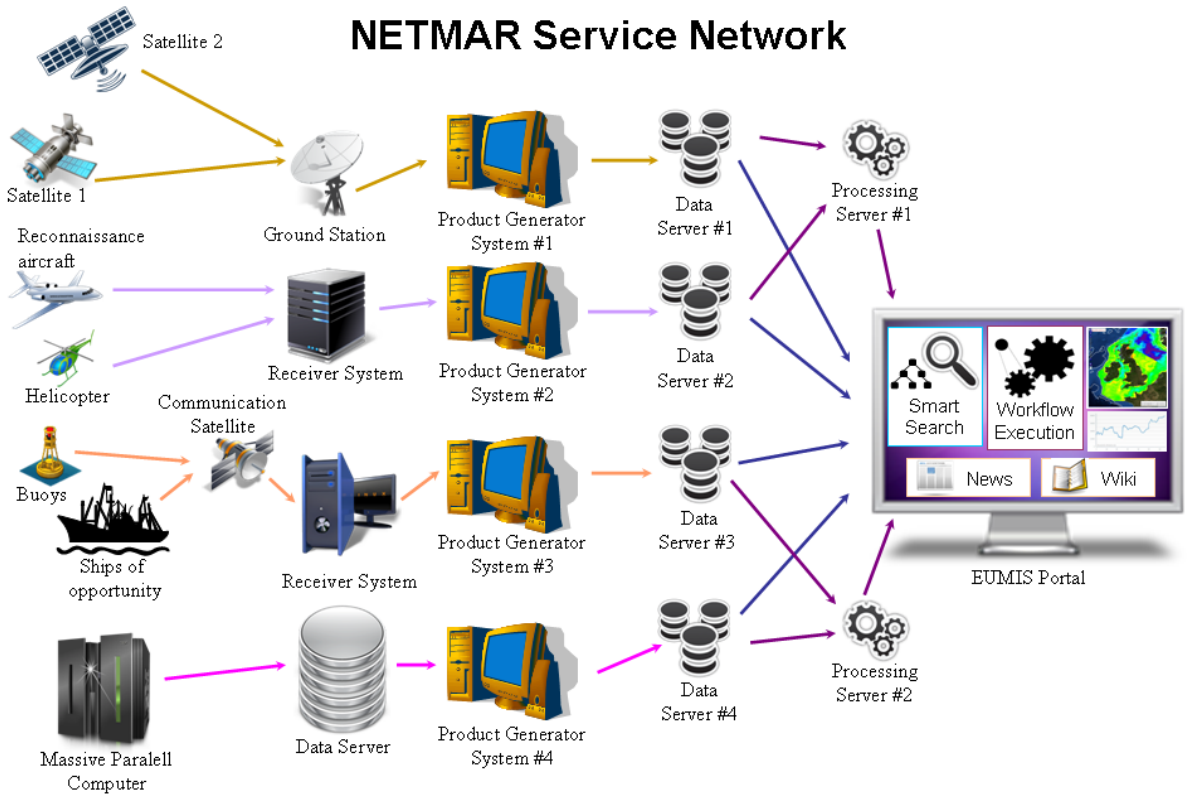

Figure 1-1 The NETMAR Service Network.

The pilot EUMIS will target four user communities by developing the following pilots:

- Pilot 1: Arctic Sea Ice and Metocean Observing System
- Pilot 2: Oil spill drift forecast and shoreline cleanup assessment services in France
- Pilot 3: Ocean colour – Marine Ecosystem, Research and Monitoring
- Pilot 4: International Coastal Atlas Network (ICAN) for coastal zone management

We have had close contact with selected users in each of the targeted communities to identify and document their needs for data search and retrieval, processing and visualisation. The user needs have been defined through a set of concrete use cases specifying how the user will carry out a specific operation to solve a real-world problem and how this functionality will be tested. As part of this analysis we have identified data services required to provide the information needed by the user. These data services cover all the requirements identified during the use case specification process [NM10].

The data services, identified as user requirements through interviews and discussions with users (WP1), analysed and clarified as part of system architecture design (WP2), will feed into the EUMIS development (WP6) as inputs to service chains, and will support the evaluation of the project via the EUMIS portal in the user testing phases.

It is also recognised that, even though defined standards such as OGC WxS and OPeNDAP have been used throughout the project, there are still many details within the methods of access that can differ between providers. This has been addressed in part within D3.4 Strategy for ontology and tool development to fulfil NETMAR [NM11] which discusses semantic metadata and common vocabularies. Formats and vocabularies for semantic metadata are documented in D5.3.2

1.2 Objective of this report

This report documents the semantic data services provided by each of the NETMAR service providers (Table 1-1). It is based upon the earlier deliverable D5.1.1 Data Delivery Services – Basic Data Services [NM13] which contains all data services used by NETMAR; only services which can provide semantic metadata are listed here.

It should be pointed out that semantic metadata is also useful in the discovery process, in fact this is probably its most common use, this area has not been ignored by NETMAR (as evidenced by the EUMIS Semantic search and discovery client [NM14]); however this discovery metadata may be held more efficiently within a CSW and does not fall into the scope of this document.

Table 1-1 User requirements and corresponding NETMAR products.

Scenario	Requirement	Product	Provider	Delivery
Pilot-1: Arctic Sea Ice and Metocean System	Sea ice concentration for the Arctic	Sea ice concentration (multiple sensors), sea ice concentration difference	NERSC	WMS
	Topaz model forecasts for the Arctic	Sea ice concentration (forecasted)	NERSC	WMS/OPeNDAP
	SAR images and derived products for the Arctic	SAR quicklook, SAR-wind	NERSC	WMS
	Ice charts for the Arctic	Manually updated Ice charts based on analysis of data from earth observing satellites	METNO	WMS/FTP
	Daily products from EUMETSAT Ocean and Sea Ice SAF	Ice concentration, ice edge, ice type and ice drift derived from combining satellite and sensor input.	METNO	OPeNDAP/WMS

	Operational atmospheric model (HIRLAM)	Products from the METNO numerical weather production. METNO is running the HIRLAM model.	METNO	OPeNDAP/WMS
Pilot-2: Oil spill drift forecast and Shoreline Cleanup assessment services in France (CEDRE)	Atmospheric model input (ARPEGE and CEPM) Current input (MERCATOR, MFS)	MOTHY results	Météo France	WMS/ WFS
	HYCOM currents NCEP winds PREVIMER current	Oilmap results	Cedre	WMS / WFS
	N/A	POLREP (pollution report)	CROSS (MRCC)	WMS / WFS
	N/A	Shoreline survey	Cedre	WMS / WFS
	N/A	Cleanup site	Cedre	WMS / WFS
Pilot-3: Ocean colour – Marine Ecosystem, Research and Monitoring	EO data (MODIS/MERIS) for Western English Channel	Chlorophyll, nLw	PML	WMS/OPeNDAP
	In Situ data for Western English Channel	Surface Chlorophyll, salinity, oxygen, turbidity, fluorescence	PML	WFS
	EO data (MODIS/MERIS) for North West Shelf	Chlorophyll, nLw	PML	WMS/OPeNDAP
	EO data from MODIS	Chlorophyll, Suspended Particulate Matters, Turbidity	Ifremer	WMS/OPeNDAP
	EO data from MERIS	Chlorophyll, Suspended Particulate Matters, Turbidity	Ifremer	WMS/OPeNDAP
	EO data generated from MODIS/MERIS	Chlorophyll, Suspended Particulate Matters	Ifremer	WMS/OPeNDAP
	In Situ data	Chlorophyll-a, Turbidity, Temperature, Salinity	Ifremer	WMS (location), SOS(data access)

Pilot 4: International Coastal Atlas Network (ICAN) for coastal zone management.	A broad range of data is required to support application areas such as marine spatial planning, governance authorities, general public, etc. Requirement to facilitate distributed and cross-border data sharing to support coastal web atlas development.	Many products covering areas such as: Biological environment, Physical environment, Socio-economic activity, Management, etc.	Various. Each coastal web atlas is responsible for sourcing data from in-house parties and from external 3rd parties. Various data services are provided using these data sources.	ICAN CSW mediator: (connects to local CSW nodes, e.g. MIDA CSW node) ICAN WMS nodes (e.g. MIDA WMS node)

1.3 Terminology

ASAR	Advanced Synthetic Aperture Radar
CSW	OGC Web Catalogue Service.
Geotiff	Georeferenced raster imagery format.
JPEG	Joint Photographic Experts Group image file format.
MERIS	Medium Resolution Imaging Spectrometer.
MODIS	Moderate Resolution Imaging Spectroradiometer.
NORSEX	The Norwegian Remote Sensing Experiment in the marginal ice zone
OGC	Open Geospatial Consortium.
OPeNDAP	Open-source Project for a Network Data Access Protocol.
PNG	Portable Network Graphics format.
SAR	Synthetic aperture radar.
SHP	ESRI Shapefile - a popular geospatial vector data format.
SOS	Sensor Observation Service - an API for managing deployed sensors and retrieving sensor data and specifically “observation” data.
SSMI	Special Sensor Microwave/Imager
WFS	OGC Web Feature Service.
WMS	OGC Web Map Service.
XML	Extensible Markup Language - a set of rules for encoding documents in machine-readable form.

1.4 Organisation of this report

Section 1 provides a summary of the data services provided by the NETMAR partners. The following sections provide detailed breakdowns of the data services provided for each pilot. These will comprise a brief description of the context of the pilot/expected users and all information required to access the service (temporal and geographic coverage, usage restrictions, access URLs, parameter names and links to the semantic resource).

2 Services for Pilot-1: Arctic Sea Ice and Metocean Observing System

2.1 Description of the user group

The users of the Arctic Sea Ice and Metocean Observing System pilot comprises of representatives from offshore and shipping companies, ship and icebreaker captains/ice pilots, national authorities, regional environmental agencies, national ice services and scientists.

Decision-makers and operators in offshore oil and gas industry need access to the latest available sea ice information and forecasts to be able to plan the safe and cost-efficient operation of their installations on a daily basis. Timely and accurate historical and statistical sea ice information is also needed to be able to perform longer term planning of operations in the ice covered waters.

Ship and icebreaker captains and ice pilots makes both selection of sailing routes between ports of destinations as well as tactical decisions on how to penetrate through rough ice conditions when the ship (un)expectedly experience such situations. Decisions need to be made in order to operate safely and efficiently.

Decision- and policy-makers in national authorities and regional organisations also need both recent and historical data. For instance, a decision-maker in the fisheries authorities would need daily data, preferably in near-real time, to be able to assess the current algal situation and if needed decide on mitigation actions for aquaculture installations in a case of a harmful bloom of toxic species. A policy-maker in environmental agencies, on the other hand, would need timely access to long term observation series or derived products such as climate indicators.

To support operational sea ice forecasting, near-real time access to the latest sea ice observations and forecasts is crucial. This is needed to be able to produce detailed and reliable ice charts that can be used in e.g. ship navigation or other offshore activities. Finally, the scientific community would be a large user group of the Arctic Sea Ice and Metocean Observing System pilot. Scientists would be interested in both recent data as well as historical and statistical products. Scientists would also be interested in comparing data from different sources and in trying out different algorithms and models for estimation of sea ice parameters like concentration and drift.

2.2 Work context

The Arctic Ocean and the adjacent sub-Arctic seas, including Europe's northern frontiers, have become more important as a result of increased economic activities related to energy exploration, marine resources and transportation. The economic activities have been stimulated by climate change with warming and sea ice reduction in the Arctic during summer. The EU has a policy for the Arctic where protection of the environment and sustainable use of resources in a unique and vulnerable region are issues of high priority. In the High North Strategy of the Norwegian government, environmental issues and safety are also of high concern

(http://www.regjeringen.no/en/dep/ud/campaign/the-high-north.html?id=450629). The presently observed reduction of the Arctic sea ice extent in particular during the summer months and an increasing demand for natural resources are key mechanisms driving human activities in these areas. Changes in the seasonal ice edge location may also in the longer term shift the location of the high productive fishing and activities. The expected growth in ship traffic, oil and gas exploration, fisheries and tourism in the coming years will increase the need for marine monitoring and forecasting in this region both to support accessibility and to secure safe and efficient operations.

There is an increasing supply of sea ice information from satellites, in situ platforms and modelling systems that can be exploited by several users groups. Both operational users and scientific users need to combine data from the available observing systems as well as from modelling systems in order to make the best possible assessment of the present and forthcoming ice situation, e.g. by assimilation of observations into forecasting models.

The Arctic ice-covered areas, and in particular the Northern Sea Route is expected to become an important area for and exploitation of natural resources such as oil and gas, sea transportation, fisheries, tourism as well as scientific studies. A recent study has categorised the following user groups among Russian users [JAF+06]:

1. Operational users – in need of updated sea ice information on a daily basis, to plan their immediate activities in or nearby ice covered ocean areas.
2. Consultancy or operation planning services – that need statistical ice information enabling them to plan future operations in a time frame from the coming weeks up to multiple years.
3. Scientific users – in need of sea ice information to conduct scientific studies in the field and for their algorithm and model development to advance the understanding of sea ice phenomena and processes.

Improving sea ice monitoring and forecasting, as well as improving the scientific understanding of the sea ice as part of the climate system, is important for many user groups including European agencies and organisations (e.g. EEA, EuroGOOS). Reduced ice extent in this area during the summer period may lead to increased ship transport from and to Europe and Asia, and changes in sea ice conditions have impact on the overall sea ice climate of the Arctic Ocean, as well as increasing the risk for major environmental accidents in this vulnerable environment.

Some data are available in numeric formats (such as NetCDF) whilst other data may only be used as images for mapping and routing purposes. NERSC will make SAR wind data and SSMI ice products (also as data) available in the NORMAP project (funded by Norwegian Research Council). This has a longer timescale than NETMAR; however initial data should become available during the lifetime of the NETMAR project.

2.3 Data Service Descriptions

2.3.1 Sea ice concentration service

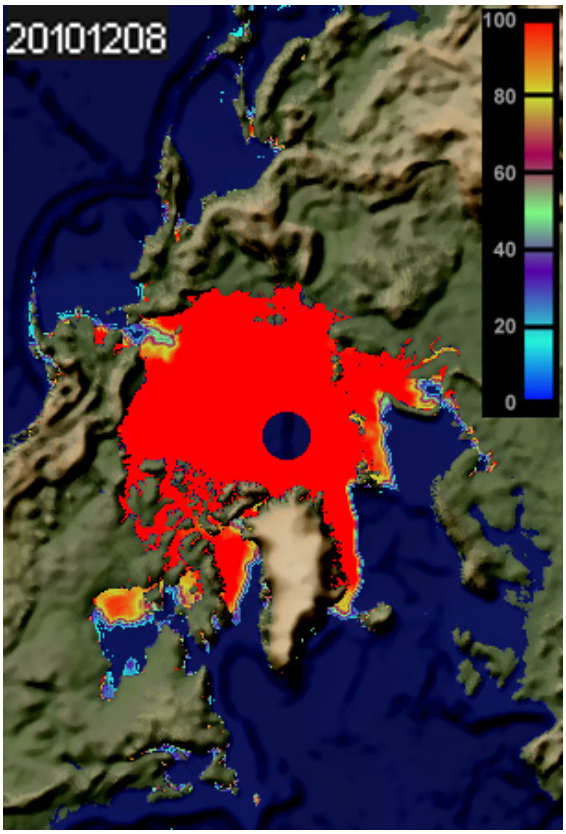

Figure 2-2-1 SSMI sea ice concentration for 8 December 2010 computed by NORSEX algorithm.

Dataset	Sea ice concentration
Service Type	WMS
Description	Daily sea ice concentration maps of the Arctic Ocean; estimated from Special Sensor Microwave/Imager (SSM/I) data using the NORSEX algorithm.
Provider	NERSC
Access Restrictions	Freely available
Status	In preparation
Parameters	Ice concentration
Type of data	Satellite imagery (derived)
Area covered	Arctic: Northern Hemisphere Westernmost longitude = -180.0 Easternmost longitude = 180.0 Southernmost latitude = 34.6865 Northernmost latitude = 90.0
Spatial resolution	25 km
Native projection	Polar Gridded
Output projections	Geographic
Temporal resolution	Daily
Forecast length	N/A
Time span	11 September 2008 and onwards
Update frequency	Daily
Native data formats	NetCDF
Output data formats	PNG
Catalogue Service URL	http://nport.nersc.no:8081/geonetwork/srv/en/main.home

Dataset	Sea ice concentration
Service URL	http://mapsrv.nersc.no/cgi-bin/mapserv?request=GetCapabilities&service=WMS&version=1.3.0&map=/mnt/fritjof/wms/netmar-ssmi.map

Parameter	Sea ice concentration
Description	Sea ice concentration
Units (URN)	SDN:P061::UPCT
Units (Text)	Percent (%)
SeaDataNet Name (URN)	SDN:P01::SICECSAT
SeaDataNet Name (Text)	Coverage (by area) of ice on the water body by image analysis
WMS Layer Name	cice_YYYYMMDD

2.3.2 *Sea ice concentration forecast service*

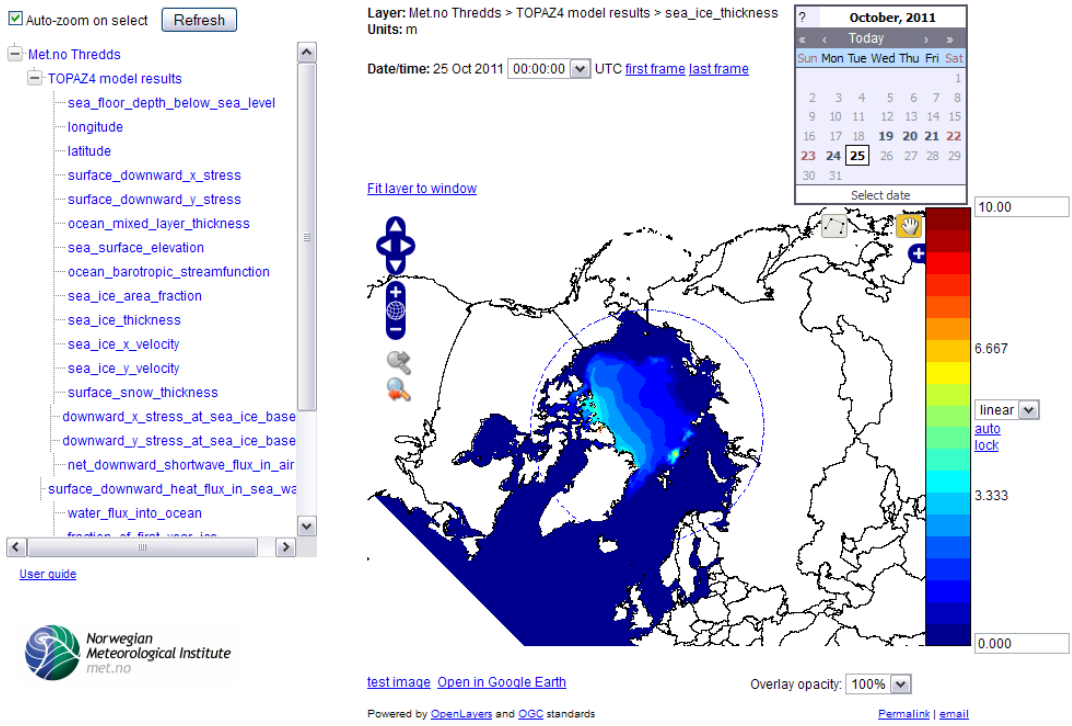

Figure 2-2-2 Topaz ice thickness forecast 25 October 2011.

Dataset	Topaz sea ice concentration forecast
Service Type	WMS
Description	Weekly forecasts of, among others, salinity, temperature, ocean currents, sea ice concentration, sea ice thickness, from the Topaz model.
Provider	NERSC
Access Restrictions	Freely available
Status	In preparation
Parameters	Sea ice concentration
Type of data	Model data
Area covered	Arctic: 0-360 deg.E, 34.6865-90 deg.N
Spatial resolution	25 Km
Native projection	Polar Gridded
Output projections	Geographic
Temporal resolution	Daily averages
Forecast length	10 days

Time span	Weekly fields are available since 20 October 2011
Update frequency	Every 10 days
Native data formats	NetCDF
Output data formats	NetCDF
Catalogue Service URL	http://nport.nersc.no:8081/geonetwork/srv/en/main.home
Service URL	http://thredds.met.no/thredds/myocean/ARC-MFC/myoceanv2-class1-arctic.html

Parameter	**Sea ice concentration forecast**
Description	Forecasted sea ice concentration
Units (URN)	SDN:P061::UPCT
Units (Text)	%
SeaDataNet Name (URN)	SDN:P01::SICECMOD
SeaDataNet Name (Text)	Coverage (by area) of ice on the water body by model prediction
OPeNDAP Layer Name	Bulletin YYYYMMDD - Arctic

2.3.3 *SAR image and derived wind service*

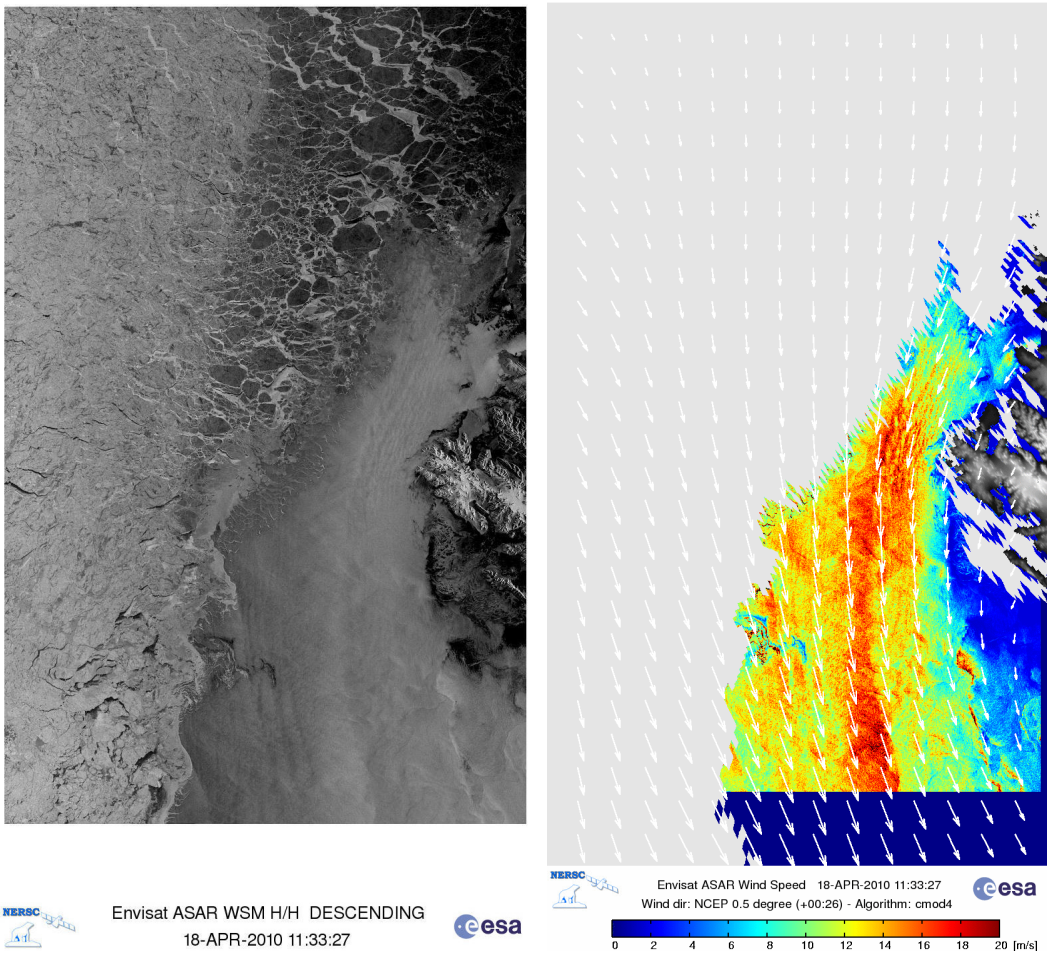

Figure 2-2-3 ENVISAT ASAR image from 18 April 2010 and ASAR-wind field computed with CMOD-4.

Dataset	**SAR image and derived wind**
Service Type	WMS
Description	Satellite radar imagery and derived wind field for the Arctic Ocean; ASAR images from the ENVISAT satellite and wind field derived by the CMOD-4 algorithm.

Provider	NERSC
Access Restrictions	Freely available
Status	In preparation
Parameters	SAR backscatter, wind speed
Type of data	Satellite imagery (and derived product)
Area covered	Arctic: The coverage of each scene depends on mode (wide swath, image mode, etc.) and duration of time the ASAR sensor is turned on.
Spatial resolution	500m
Native projection	Geographic
Output projections	Geographic
Temporal resolution	On average every 3 days
Forecast length	N/A
Time span	A selection of archived ENVISAT ASAR images and derived wind speed if offered. (The ENVISAT satellite failed on 8 April 2012, and no new data has been available since.)
Update frequency	Daily
Native data formats	GeoTIFF
Output data formats	PNG
Catalogue Service URL	http://nport.nersc.no:8081/geonetwork/srv/en/main.home
Service URL	http://mapsrv.nersc.no/cgi-bin/mapserv?request=GetCapabilities&service=WMS&version=1.3.0&map=/mnt/fritjof/wms/netmar-asar.map

Parameter 1	**SAR backscatter**
Description	SAR backscatter
Units (URN)	SDN:P061::UDBL
Units (Text)	Decibel (dB)
SeaDataNet Name (URN)	SDN:P01::RADBSSAR
SeaDataNet Name (Text)	Radar backscatter by synthetic aperture radar
WMS Layer Name	ASAR_YYYYMMDD_HHMMSS

Parameter 2	**Wind speed**
Description	Wind speed from SAR
Units (URN)	SDN:P061::UVAA
Units (Text)	Metres per second (m/s)
SeaDataNet Name (URN)	SDN:P01::WINDSSAR
SeaDataNet Name (Text)	Wind speed in the atmosphere by synthetic aperture radar
WMS Layer Name	ASAR_YYYYMMDD_HHMMSS_wind

2.3.4 *Manual ice chart service*

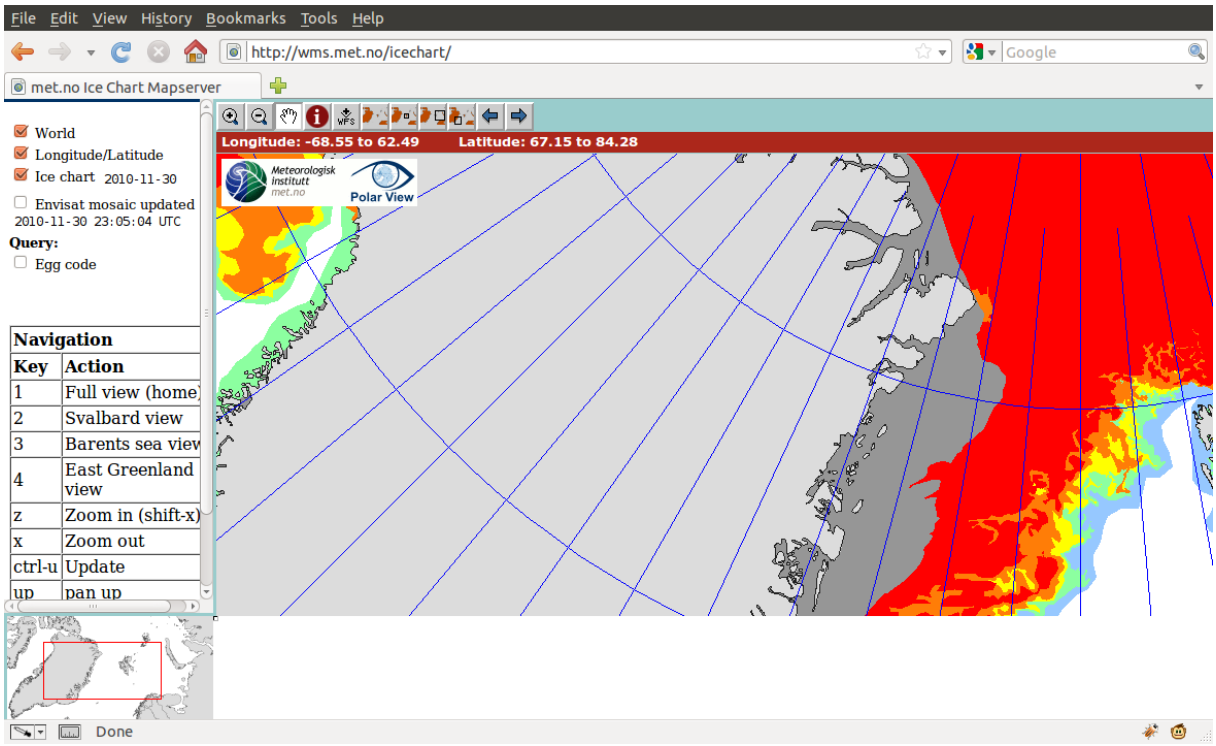

Figure 2-2-4: Ice chart for 30 November 2010

Dataset	Radarsat2, Envisat, Aqua, Noaa, AMSRE
Description	Ice chart based on a manual interpretation of satellite data from earth observing satellites
Provider	METNO
Access Restrictions	Freely available
Status	Operational
Parameters	Ice concentration
Type of data	Vector data
Area covered	Arctic region: Westernmost longitude = -30.0 Easternmost longitude = 80.0 Southernmost latitude = 55.0 Northernmost latitude = 90.0
Spatial resolution	150m – 6.25 km (depends on available data source)
Native projection	Polar Stereographic 90/0
Output projections	Polar Stereographic 90/0
Temporal resolution	Work days
Forecast length	N/A
Time span	Current via WMS, since 2005 via ftp since 1997
Update frequency	Daily
Native data formats	Esri shapefile
Output data formats	png, netCDF jpeg, shp
Catalogue Service URL	NA
WMS URL	http://wms.met.no/cgi-bin/icechart/?SERVICE=WMS&REQUEST=GetCapabilities&VERSION=1.1.1
HTTP URL	http://wms.met.no/icechart/
FTP URL	ftp://ftp.met.no/projects/icecharts/

Parameter	Ice classification
Description	Ice classification
Units (URN)	SDN:P061::UPCT
Units (Text)	[fast Ice, very close drift ice, close drift ice, open drift ice, very open drift ice, open water]
SeaDataNet Name (URN)	SDN:P01::SICECSAT
SeaDataNet Name (Text)	Coverage (by area) of ice on the water body by image analysis
WMS Layer Name	chart_ice

2.3.5 *METNO WMS: OSI SAF Ice concentration*

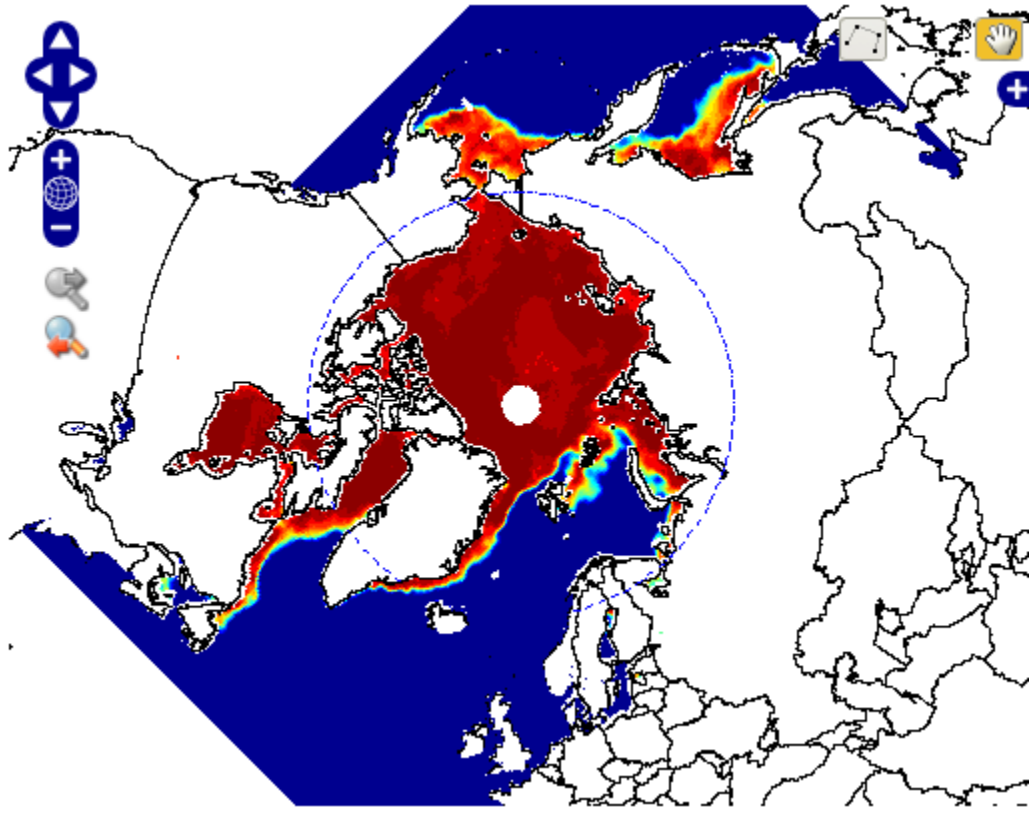

Figure 2-5 Ice concentration for the northern hemisphere shown in Godiva/ncWMS

Dataset	Sea ice concentration
Service Type	WMS (also, data downloadable from HTTP and FTP)
Description	The sea ice concentration product from the EUMETSAT OSI SAF. Ice concentration is computed from atmospherically corrected SSM/I brightness temperatures, using a combination of state-of-the-art algorithms. It is operational since 2005.
Provider	METNO
Access Restrictions	Freely available
Status	Available
Parameters	conc
Type of data	Satellite-product
Area covered	> 32deg north or > 32deg south
Spatial resolution	10km, drift 62.5km
Native projection	Satellite-swath
Output projections	Polar-stereographic

Temporal resolution	daily
Forecast length	-
Time span	Current formats available since 2010-02, archived until 2005, older formats/products since 1978
Update frequency	daily
Native data formats	netcdf
Output data formats	WMS, OPeNDAP,netcdf
Catalogue Service URL	-
WMS URL	http://netmar.met.no/geoserver/ows?service=wms&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://thredds.met.no/thredds/dodsC/osisaf_test/met.no/ice/conc_nh_agg.html and http://thredds.met.no/thredds/dodsC/osisaf_test/met.no/ice/conc_sh_agg.html
FTP URL	ftp://saf.met.no/prod/

Parameter 1	**ice_conc_nh**
Description	Ice concentration for the northern hemisphere
Units (URN)	SDN:P061::UPCT
Units (Text)	Percent
SeaDataNet Name (URN)	SDN:P01::SICEAMSR
SeaDataNet Name (Text)	The proportion of a given sea area covered by ice as determined from passive microwave image from the EOS AMSRE
WMS Layer Name	netmar:ice_conc_nh

Parameter 2	**ice_conc_sh**
Description	Ice concentration for the southern hemisphere.
Units (URN)	SDN:P061::UPCT
Units (Text)	Percent
SeaDataNet Name (URN)	SDN:P01::SICEAMSR
SeaDataNet Name (Text)	The proportion of a given sea area covered by ice as determined from passive microwave image from the EOS AMSRE
WMS Layer Name	netmar:ice_conc_sh

2.3.6 *METNO WMS: OSI SAF Drift*

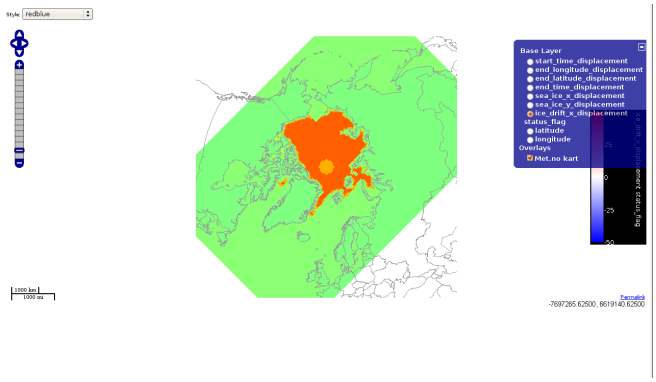

Figure 2-6 Ice drift x-displacement from OSISAF service

Dataset	Sea ice drift
Service Type	WMS (also, data downloadable from HTTP and FTP)
Description	The low resolution sea ice drift product from the EUMETSAT OSI SAF. Ice motion vectors with a time span of 48 hours are estimated by an advanced cross-correlation method (the Continuous MCC, CMCC) on pairs of satellite images. Several single-sensor products are available, along with a merged (multi-sensor) dataset.
Provider	METNO
Access Restrictions	Freely available
Status	Available
Parameters	dX, dY
Type of data	Satellite-product
Area covered	> 32deg north or > 32deg south
Spatial resolution	10km, drift 62.5km
Native projection	Satellite-swath
Output projections	Polar-stereographic
Temporal resolution	daily
Forecast length	-
Time span	Current formats available since 2011-03
Update frequency	daily
Native data formats	netcdf
Output data formats	WMS, OPeNDAP,netcdf
Catalogue Service URL	-
WMS URL	http://netmar.met.no/geoserver/ows?service=wms&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://thredds.met.no/thredds/dodsC/osisaf_test/met.no/ice/drift_lr_nh_agg.html
FTP URL	ftp://saf.met.no/prod/

Parameter 1	dX
Description	Component of the displacement along the x axis of the grid
Units (URN)	SDN:P061::ULKM
Units (Text)	km
SeaDataNet Name (URN)	SDN:P01::ICEXDISP
SeaDataNet Name (Text)	Displacement (over last 48 hours along x-axis) of ice on the water body
WMS Layer Name	netmar:sea_ice_x_displacement_nh

Parameter 2	dY
Description	Component of the displacement along the y axis of the grid
Units (URN)	SDN:P061::ULKM
Units (Text)	km
SeaDataNet Name (URN)	SDN:P01::ICEYDISP
SeaDataNet Name (Text)	Displacement (over last 48 hours along y-axis) of ice on the water body
WMS Layer Name	netmar:sea_ice_y_displacement_nh

2.3.7 *METNO WMS: OSI SAF Ice edge*

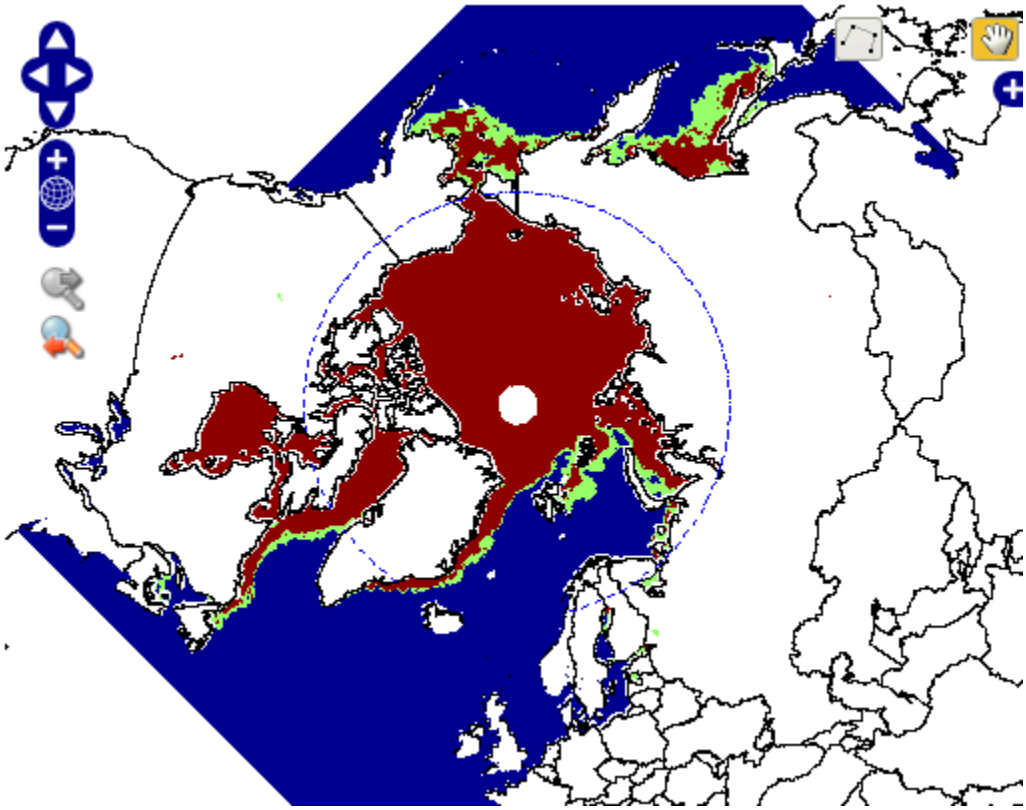

Figure 2-7 Ice edge shown in Godiva/ncWMS

Dataset	Sea ice edge
Service Type	WMS (also, data downloadable from HTTP and FTP)
Description	The sea ice edge product from the EUMETSAT OSI SAF. Ice classes are assigned from atmospherically corrected SSM/I brightness temperatures and ASCAT backscatter values, using a Bayesian approach. It is operational since 2005.
Provider	METNO
Access Restrictions	Freely available
Status	Available
Parameters	edge
Type of data	Satellite-product
Area covered	> 32deg north or > 32deg south
Spatial resolution	10km, drift 62.5km
Native projection	Satellite-swath
Output projections	Polar-stereographic
Temporal resolution	daily
Forecast length	-
Time span	Current formats available since 2010-01, archived until 2005
Update frequency	daily
Native data formats	netcdf
Output data formats	WMS, OPeNDAP,netcdf
Catalogue Service URL	-
WMS URL	http://netmar.met.no/geoserver/ows?service=wms&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://thredds.met.no/thredds/dodsC/osisaf_test/met.no/ice/edge_nh_agg.html

FTP URL	ftp://saf.met.no/prod/

Parameter 1	**edge_nh**
Description	The sea ice edge product from the EUMETSAT OSI SAF. Ice classes are assigned from atmospherically corrected SSM/I brightness temperatures and ASCAT backscatter values, using a Bayesian approach. It is operational since 2005. Covers the northern hemisphere.
Units (URN)	SDN:P061::UUUU
Units (Text)	None
SeaDataNet Name (URN)	SDN:P01::ICEEDGEX
SeaDataNet Name (Text)	Edge (EUMETSAT OSI-SAF) of ice on the water body by classification of brightness temperature and ASCAT backscatter
WMS Layer Name	netmar:ice_edge_nh

Parameter 2	**edge_sh**
Description	The sea ice edge product from the EUMETSAT OSI SAF. Ice classes are assigned from atmospherically corrected SSM/I brightness temperatures and ASCAT backscatter values, using a Bayesian approach. It is operational since 2005. Covers the southern hemisphere.
Units (URN)	SDN:P061::UUUU
Units (Text)	None
SeaDataNet Name (URN)	SDN:P01::ICEEDGEX
SeaDataNet Name (Text)	Edge (EUMETSAT OSI-SAF) of ice on the water body by classification of brightness temperature and ASCAT backscatter
WMS Layer Name	netmar:ice_edge_sh

2.3.8 *METNO WMS: Sea ice type*

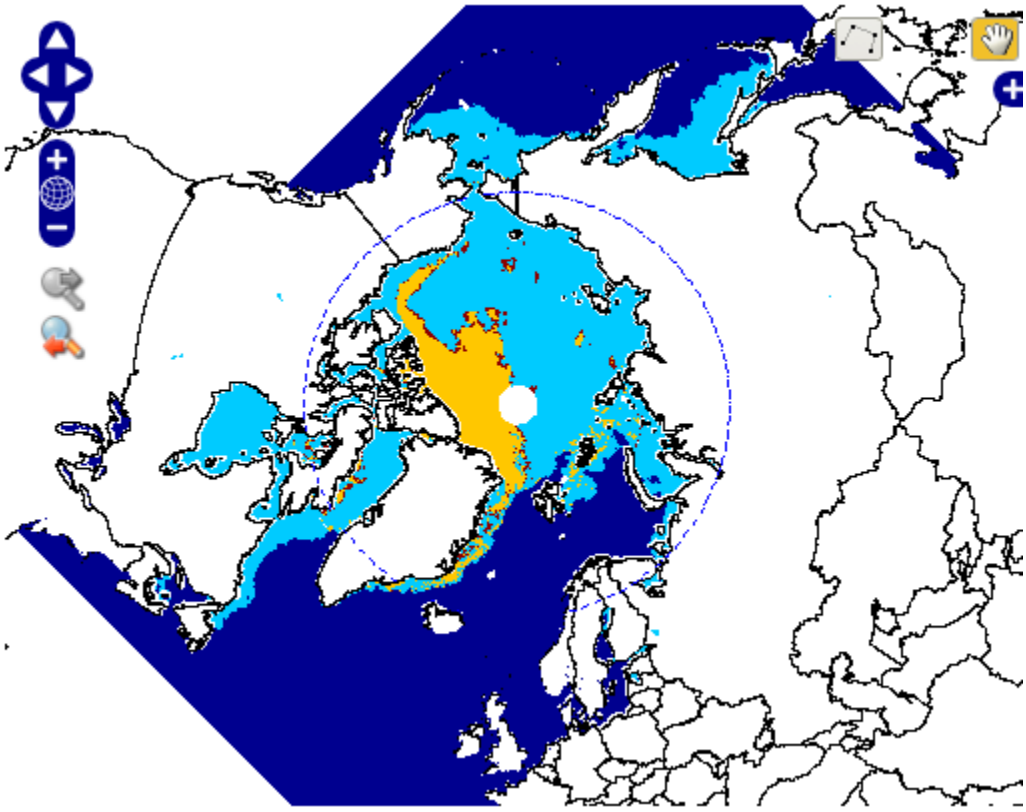

Figure 2-8 Ice type shown in Godiva/ncWMS

Dataset	Sea ice type
Service Type	WMS (also, data downloadable from HTTP and FTP)
Description	The sea ice type product from the EUMETSAT OSI SAF. Ice classes are assigned from atmospherically corrected SSM/I brightness temperatures and ASCAT backscatter values, using a Bayesian approach. It is operational since 2005.
Provider	METNO
Access Restrictions	Freely available
Status	Available
Parameters	type
Type of data	Satellite-product
Area covered	> 32deg north or > 32deg south
Spatial resolution	10km, drift 62.5km
Native projection	Satellite-swath
Output projections	Polar-stereographic
Temporal resolution	daily
Forecast length	-
Time span	Current formats available since 2010-02, archived until 2005, older formats/products since 1978
Update frequency	daily
Native data formats	netcdf
Output data formats	WMS, OPeNDAP,netcdf
Catalogue Service URL	-
WMS URL	http://netmar.met.no/geoserver/ows?service=wms&version=1.3.0&request=GetCapabilities
OpeNDAPURL	http://thredds.met.no/thredds/dodsC/osisaf_test/met.no/ice/type_nh_agg.html

FTP URL	ftp://saf.met.no/prod/

Parameter 1	**type_nh**
Description	The sea ice type product from the EUMETSAT OSI SAF. Ice classes are assigned from atmospherically corrected SSM/I brightness temperatures and ASCAT backscatter values, using a Bayesian approach. It is operational since 2005. Covers the northern hemisphere.
Units (URN)	SDN:P061::UUUU
Units (Text)	None
SeaDataNet Name (URN)	SDN:P01::ICETYPEX
SeaDataNet Name (Text)	Type (EUMETSAT OSI-SAF) of ice on the water body by classification of brightness temperature and ASCAT backscatter
WMS Layer Name	netmar:ice_type_nh

Parameter 2	**type_sh**
Description	The sea ice type product from the EUMETSAT OSI SAF. Ice classes are assigned from atmospherically corrected SSM/I brightness temperatures and ASCAT backscatter values, using a Bayesian approach. It is operational since 2005. Covers the southern hemisphere.
Units (URN)	SDN:P061::UUUU
Units (Text)	None
SeaDataNet Name (URN)	SDN:P01::ICETYPEX
SeaDataNet Name (Text)	Type (EUMETSAT OSI-SAF) of ice on the water body by classification of brightness temperature and ASCAT backscatter
WMS Layer Name	netmar:ice_type_sh

2.3.9 *Weather forecast service*

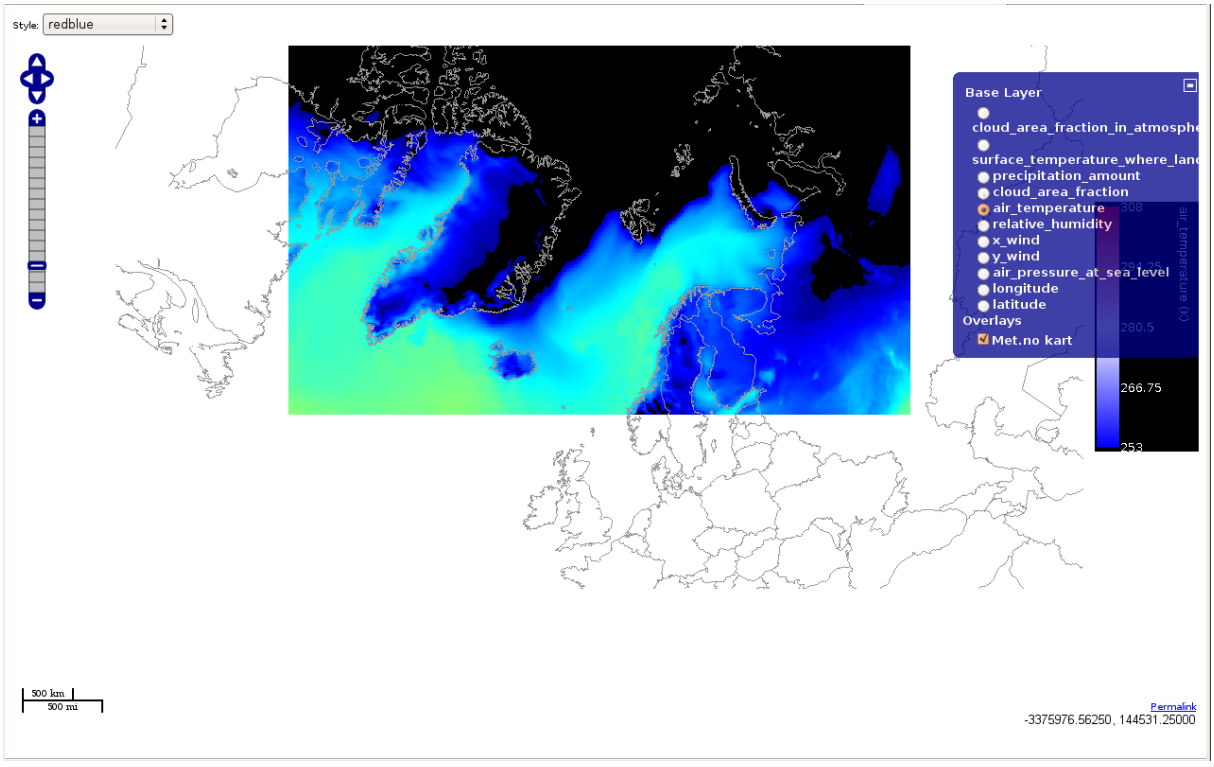

Figure 2-9 HIRLAM air temperature forecast

Dataset	HIRLAM
Service Type	WMS (also, data downloadable from OPeNDAP)
Description	Products from the METNO numerical weather production. METNO is running the HIRLAM model.
Provider	METNO
Access Restrictions	Freely available
Status	Operational, the current information is on a 12km resolution model of northern region to be updated with a higher (8km) resolution in the near future
Parameters	air_temperature, x_wind, y_wind
Type of data	Forecast, Model run. Gridded data.
Area covered	> 60deg north, to be increased to
Spatial resolution	12km
Native projection	Rotated latitude longitude
Output projections	polar-stereographic
Temporal resolution	1h, 3h
Forecast length	~ 60h
Time span	On disk usually 1 month
Update frequency	6h
Native data formats	Felt
Output data formats	Netcdf
Catalogue Service URL	-
WMS URL	http://netmar.met.no/geoserver/ows?service=wms&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://thredds.met.no/thredds/catalog/metno/proff4km/default/catalog.html?dataset=metno/proff4km/default/Proff_Default_4km_best.ncd

Parameter 1	air_temperature
Description	Air temperature at 2 meters
Units (URN)	SDN:P061::UPKA
Units (Text)	K
SeaDataNet Name (URN)	SDN:P01::ATEMP2MM
SeaDataNet Name (Text)	Temperature (at 2m) of the atmosphere by model prediction
WMS Layer Name	netmar:air_temperature

Parameter 2	x_wind
Description	Wind in coordinate x-axis at 10 meters.
Units (URN)	SDN:P061::UVAA
Units (Text)	ms
SeaDataNet Name (URN)	SDN:P01::WINDXMOD
SeaDataNet Name (Text)	Windspeed along coordinate x-axis at 10 meters.
WMS Layer Name	netmar:x_wind

Parameter 3	y_wind
Description	Wind in coordinate y-axis at 10 meters.
Units (URN)	SDN:P061::UVAA
Units (Text)	ms
SeaDataNet Name (URN)	SDN:P01::WINDYMOD
SeaDataNet Name (Text)	Windspeed along coordinate y-axis at 10 meters.
WMS Layer Name	netmar:y_wind

3 Services for Pilot-2: Oil spill drift forecast and Shoreline Cleanup assessment services in France (CEDRE)

3.1 Description of the user group

The oil spill drift forecast service will be used by the members of the French Slick Drift Monitoring and Prediction Committee, which include Cedre, Ifremer, MRCC, French Navy and possibly several Met offices. These organisations are in charge of obtaining and analysing all relevant data in order to make an assessment of how the pollution will spread. Using this assessment the authorities in charge of aircraft and vessels deployment may optimise survey and cleanup operations. In this context, the Committee members will rely on different software models, as well as their extensive expertise to make a best possible assessment of the fate of the slicks.

Data management concerning shoreline cleanup assessment consists in collecting and organizing all the information about the pollution itself as well as all the ensuing operations. Daily data analysis has proven to be essential to inform and help decision makers and Department Prefect on land, because it allows them to assess the evolution of events.

3.2 Work context

The two NETMAR oil spill use cases primarily concern tasks that need to deal with huge amounts of data day after day. These data are needed to support emergency response services during long lasting oil spill crisis situations to provide accurate information about the oil pollution allowing more efficient usage of human resources and equipment.

The first use case is intended for an oil spill drift forecast service in France that will be based on new tools and enhanced functionality to support the experts in making estimates of where a slick or a group of slicks will drift. The second use case concerns the collection of all operational information about onshore pollution landings and mitigation actions during the response phase.

Considering the first use case, oil slick drift models rely on adequate forecasts of both currents and weather to accurately predict the oil's future drift and fate. To enable forecasters to take full advantage of the wealth of metocean and drift models available in the world, either from national agencies or other sources, there is a need for a Marine Information System for searching, downloading and integrating or displaying data in an efficient way. The overall objective of the first use case is to allow maritime responders and scientists to undertake consensus forecasting for oil spills and possibly chemical spills. This requires access to different drift forecasts and the corresponding metocean fields that were used as input to each oil slick drift model. By comparing the different forecasts, the oil spill expert will be able to determine if different models predict different fates of the same oil slick (same initial location and characteristics), or if different forecasts show similar drift patterns. Based on this assessment, a consensus forecast is prepared, marking the areas with the highest probability for oil slick drift.

During an oil spill crisis, it is also necessary to systematically survey and document the affected area to provide a rapid and accurate geographic picture of shoreline oiling conditions. The information is used to develop real-time decisions regarding shoreline treatment and cleanup operations. The daily information regarding the shoreline treatment and cleanup operations are also collected. This information needs to be stored in an Internet database for easy access from all the stakeholders, being either in central administration or being local responders or decision makers.

This second use case is defined to collect all of these pieces of information and make them readily available during the crisis. The main objective is to provide a detailed view of the evolution of the pollution response on shore in near real time, exploiting all the cleanup data at different levels (commune, district, department, region) of organization (count of stranded oil slick, on going cleanup operations, actual manpower resources, special equipments being used, collected and disposed waste, etc.). This use case aims at supporting both detailed and global view of all response actions, while providing a user-friendly communication system for all parties involved in the pollution mitigation activities. Moreover, the archived data can be used as a possible support for cleanup cost claims later on.

3.3 Data Service Descriptions

At present there exists no online semantic resource for pilot 2 metadata. However, relevant terms have been identified and these will be included in an updated deliverable D3.8, (Prototype interlinked ontology resource fully populated to NETMAR requirements). An updated list of pilot 2 data services is given below with the semantic metadata definitions. Semantic metadata references will be added when D3.8 is available.

3.3.1 *MOTHY Service*

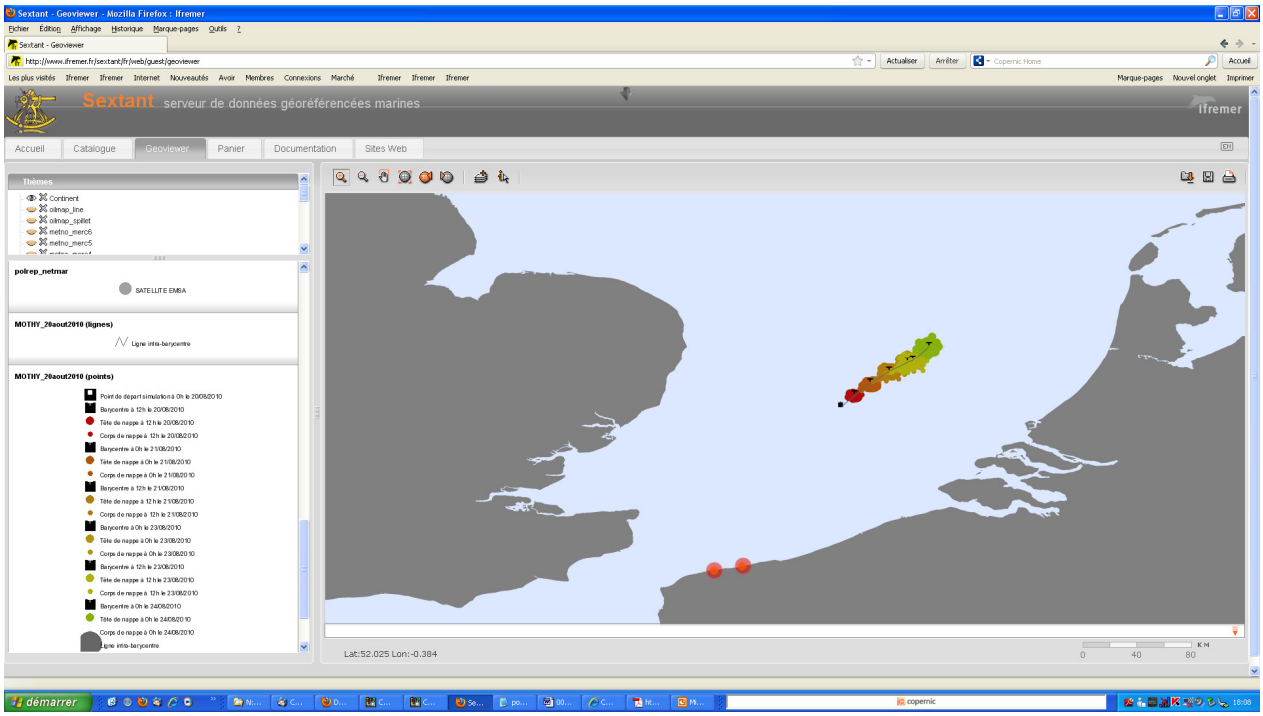

Figure 3-1 Screenshot of MOTHY service

Dataset	MOTHY
Service Type	WMS / WFS
Description	MOTHY (Oil slick Drift model)
Provider	METEO FRANCE
Access Restrictions	Restricted
Status	Test
Parameters	Diameter, depth of each spillet every 12 hours.
Type of data	Model results, Lagrangian model with 500 spillets
Area covered	French area surveillance (but also : World coverage)
Spatial resolution	From 9 km to 150 meters. Around the french shoreline (metropole), the resolution is about 1800 meters.
Native projection	Mercator
Output projections	Mercator
Temporal resolution	every 12 hours
Forecast length	3 days
Time span	
Update frequency	During the crisis : Every day or every new pollution observation
Native data formats	GPX
Output data formats	GIF picture (or animation) and GFX (spillet location), XML (metadata)
Catalogue Service URL	http://www.ifremer.fr/geonetwork/srv/fr/csw?request=GetRecordById&elementSetName=full&service=CSW&version=2.0.2&id=5160f44c-e1f2-4a3f-8462-ca51d65b8db5&OutputSchema=http://www.isotc211.org/2005/gmd
Service URL	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=MOTHY_20aout2010 (points) http://mp.cedre-

	carto.com/cartes/module_netmar/carteWS.php?/LAYERS=MOTHY_20aout2010 (lignes)

Parameter	ETAT
Description	Location of the spillet in the water column
Units (URN)	
Units (Text)	on the surface / under the surface
SeaDataNet Name (URN)	
SeaDataNet Name (Text)	
WMS Layer Name	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=MOTHY_20aout2010 (points)

Parameter	DIAMETRE
Description	Location of the spillet in slick drift pattern
Units (URN)	
Units (Text)	on the head of the slick drift / on the queue of the slick drift
SeaDataNet Name (URN)	
SeaDataNet Name (Text)	
WMS Layer Name	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=MOTHY_20aout2010 (points)

3.3.2 *OILMAP service*

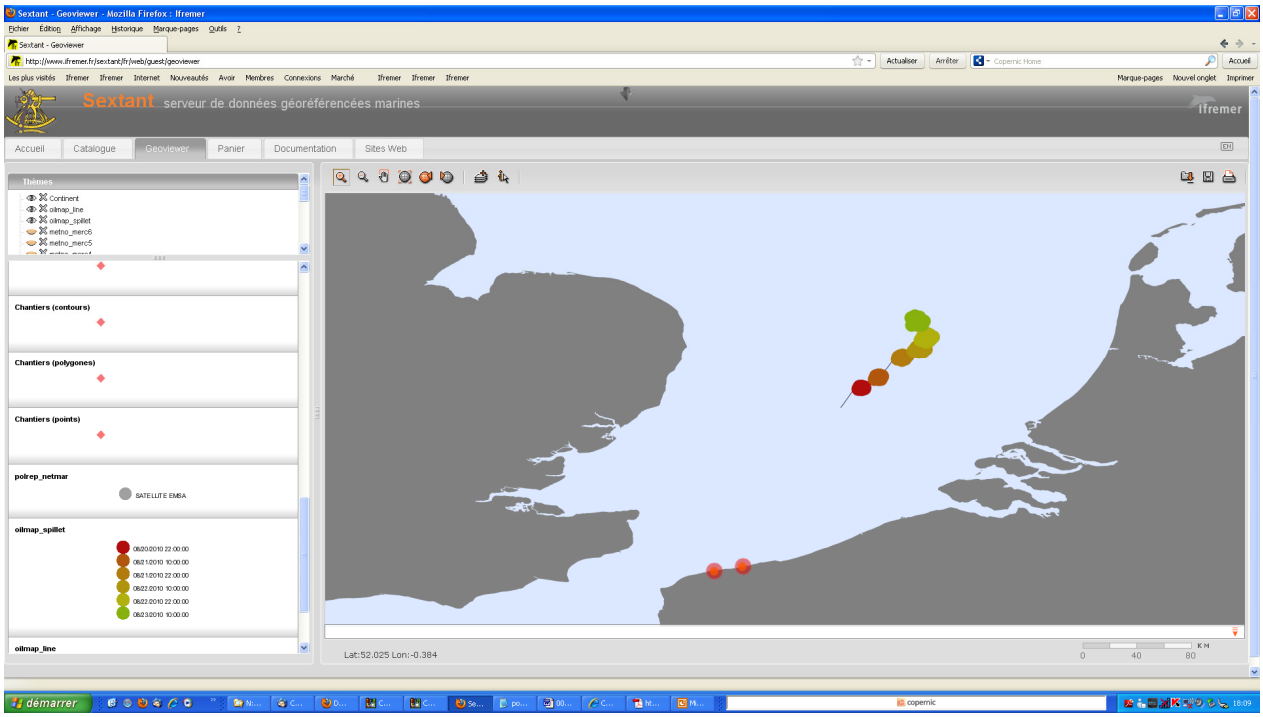

Figure 3-3-2: Screenshot of OILMAP service

Dataset	OILMAP
Service Type	WMS / WFS
Description	OILMAP (oil slick drift model)
Provider	CEDRE (from ASA, american model)
Access Restrictions	Restricted
Status	Test
Parameters	spillet behaviour and location every timestep (6 to 12 hours)
Type of data	Model results, Lagrangian model spillets
Area covered	French area surveillance (but also : World coverage)
Spatial resolution	From 10 km (US-Navy current to 100 meters (PREVIMER current)
Native projection	Mercator
Output projections	Mercator
Temporal resolution	From 1 hour to 12 hours
Forecast length	3 days
Time span	
Update frequency	Each new pollution observation
Native data formats	SHAPE
Output data formats	GIF picture (or animation) and DBF data (rough data), shape
Catalogue Service URL	http://www.ifremer.fr/geonetwork/srv/fr/csw?request=GetRecordById&elementSetName=full&service=CSW&version=2.0.2&id=59f69310-dffc-46a1-b071-3275e34ee18e&OutputSchema=http://www.isotc211.org/2005/gmd
Service URL	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=oilmap_line http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=oilmap_spillet

3.3.3 *POLREP service*

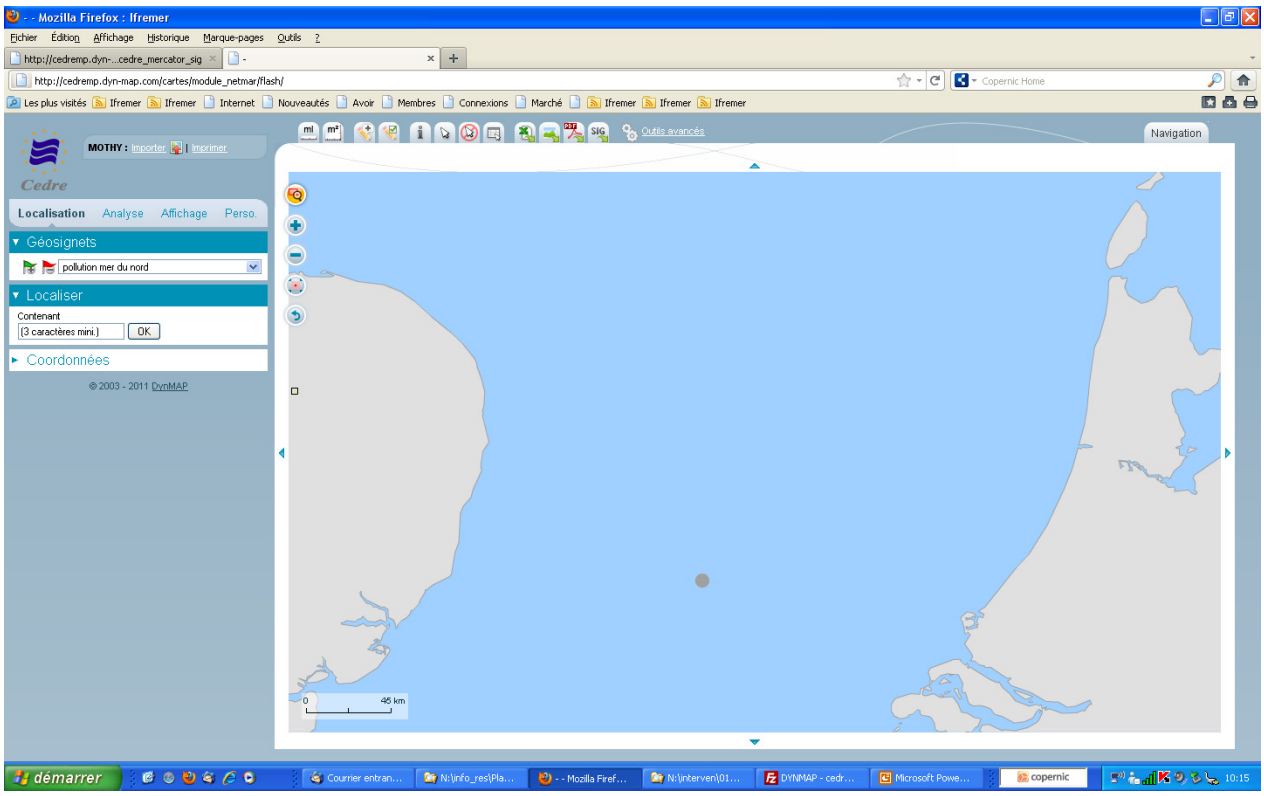

Figure 3-3-3: Screenshot of POLREP service

Dataset	POLREP
Service Type	WMS / WFS
Description	*Pollution reports at sea*
Provider	CROSS (or Navy or Customs)
Access Restrictions	Restricted
Status	Test
Parameters	Bonn agreement code appearance (identification number for each POLREP)
Type of data	Database / MySQL
Area covered	French area surveillance
Spatial resolution	N/A
Native projection	Mercator
Output projections	Mercator
Temporal resolution	Each pollution observation
Forecast length	N/A
Time span	N/A
Update frequency	Each pollution observation
Native data formats	XML
Output data formats	Shape / XML
Catalogue Service URL	http://www.ifremer.fr/geonetwork/srv/fr/csw?request=GetRecordById&elementSetName=full&service=CSW&version=2.0.2&id=DynMAP_metadata_141&OutputSchema=http://www.isotc211.org/2005/gmd
Service URL	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=polrep_netmar
Parameter	**classif_pollution**
Description	Reliability of the pollution's observation
Units (URN)	
Units (Text)	Doubtful, Probable, Checked
SeaDataNet Name (URN)	
SeaDataNet Name (Text)	
WMS Layer Name	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=polrep_netmar

Parameter	Nature_poll
Description	Description of the pollution source
Units (URN)	
Units (Text)	Land spillage, Tank clearing, Further to peril of the sea, Unknown origin
SeaDataNet Name (URN)	
SeaDataNet Name (Text)	
WMS Layer Name	http://mp.cedre-carto.com/cartes/module_netmar/carteWS.php?/LAYERS=polrep_netmar

3.3.4 *Shoreline survey service*

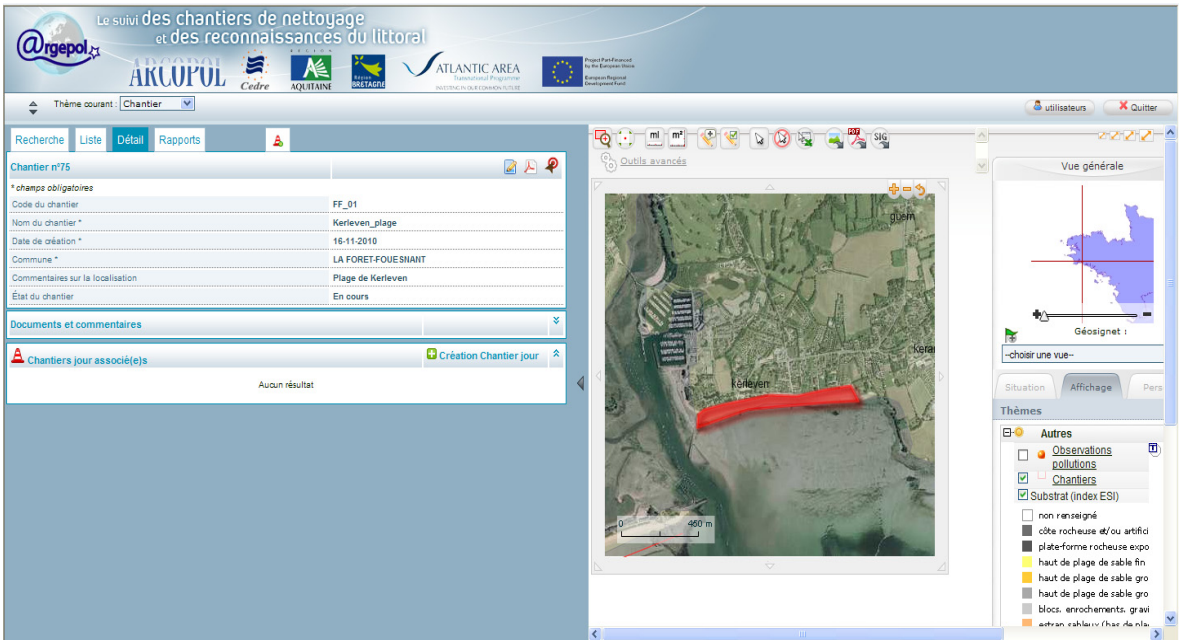

Figure 3-3-4: Screenshot of "shoreline survey" service

Dataset	Shoreline survey
Service Type	WMS/WFS
Description	*Observation of shoreline pollution*
Provider	Cedre
Access Restrictions	Restricted
Status	Test
Parameters	Description of pollution (nature of pollution, location, length of survey, shoreline type …)
Type of data	Database / Mapserver
Native projection	Lambert 93
Output projections	Lambert 93
Area covered	French Area
Temporal resolution	N/A
Time span	
Update frequency	After each shoreline survey
Native data formats	Database / Mapserver
Output data formats	Shape
Catalogue Service URL	http://www.ifremer.fr/geonetwork/srv/fr/csw?request=GetRecordById&elementSetName=full&service=CSW&version=2.0.2&id=67591d3a-3684-48e2-bd1e-31886cf9ea30&OutputSchema=http://www.isotc211.org/2005/gmd
Service URL	http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Observations pollutions

Parameter	pourcentage_couverture (Percentage cover)
Description	Percentage cover of the pollution on the shoreline
Units (URN)	
Units (Text)	Percent (%)
SeaDataNet Name (URN)	

SeaDataNet Name (Text)	
WMS Layer Name	http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Observations pollutions

Parameter	**vol_estime (Estimated volume)**
Description	Estimated volume of the observed pollution
Units (URN)	
Units (Text)	Cubic meters (m3)
SeaDataNet Name (URN)	
SeaDataNet Name (Text)	
WMS Layer Name	http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Observations pollutions

3.3.5 *Cleanup site service*

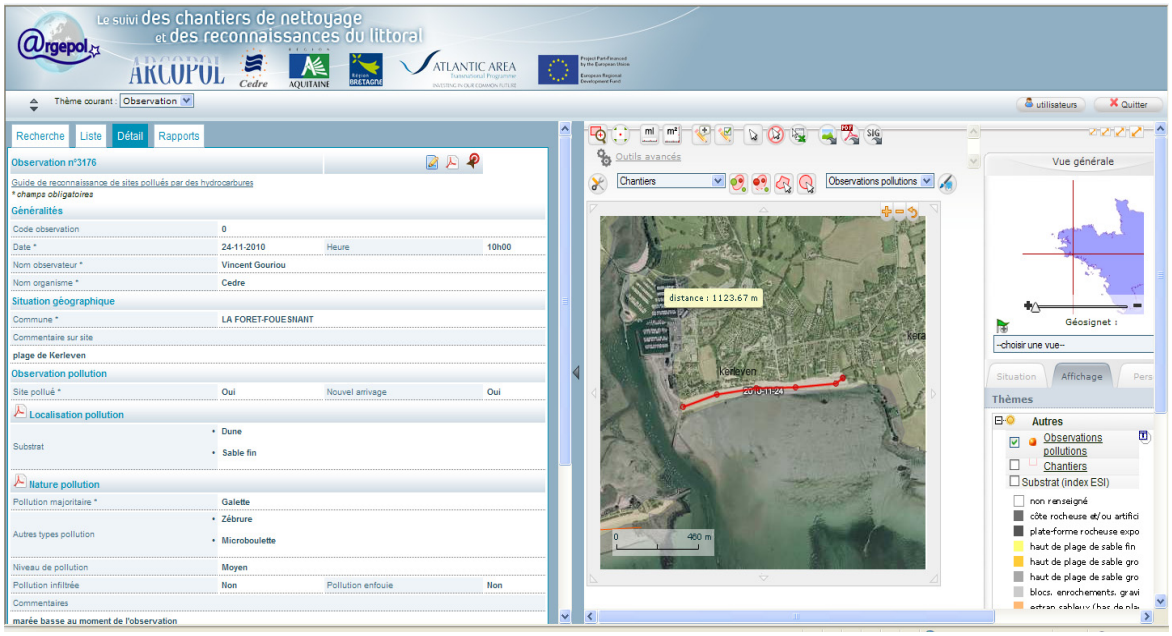

Figure 3-5: Screenshot of "Cleanup site" service

Dataset	**Cleanup site**
Service Type	WMS/WFS
Description	Cleanup site evolution
Provider	Cedre
Access Restrictions	restricted
Status	Test
Parameters	Description of daily cleanup site (on going cleanup operations, actual manpower resources, special equipments being used, collected and disposed waste, etc.).
Type of data	Database / Mapserver
Native projection	Lambert 93
Output projections	Lambert 93
Area covered	French Area
Temporal resolution	N/A
Time span	
Update frequency	Daily

Native data formats	Database / Mapserver
Output data formats	Shape
Catalogue Service URL	http://www.ifremer.fr/geonetwork/srv/fr/csw?request=GetRecordById&elementSetName=full&service=CSW&version=2.0.2&id=166785cb-c17d-4c2c-b862-cf512e8706cc&OutputSchema=http://www.isotc211.org/2005/gmd
Service URL	http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (points) http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (polygons) http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (contours) http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (lignes)

Parameter	**etat_chantier (Worksite status)**
Description	Status of the cleanup worksite
Units (URN)	
Units (Text)	Open, closed
SeaDataNet Name (URN)	
SeaDataNet Name (Text)	
WMS Layer Name	http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (points) http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (polygons) http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (contours) http://argepol.cedre-carto.com/a_argepol/carteWS.php?/LAYERS=Chantiers (lignes)

4 Services for Pilot 3: Ocean Colour - Marine Ecosystem, Research and Monitoring

4.1 Description of the user group

User group 3 consists of a number of different communities with a common interest in marine ecosystems.

National observatories and networks:
The Western English Channel Observatory (WECO) comprises sampling sites south of Plymouth where a range of biological, chemical physical and optical measurements are taken. Its objective is to draw together long-term in situ measurements; ecosystem modelling studies; and Earth Observation (EO) and integrate these using web-based Geographic Information System (GIS) technology.

The Chlorophyll Global Integrated Network (ChloroGIN) project aims to promote in situ measurement of chlorophyll in combination with satellite-derived estimates.

Modelling community:
Marine Ecosystem Evolution in a Changing Environment (MEECE) is a 4-year EC FP7 project that started in 2008 and includes 21 partners around Europe. MEECE aims to use a combination of data synthesis, numerical simulation and targeted experiments to boost knowledge and develop the predictive capabilities needed to learn about the response of marine ecosystems.

Operational community:
The French authorities (Prefectures) have a responsibility for operational monitoring of algal blooms.

4.2 Work context

Researchers in ecosystems need to be able to identify and use long-term time series to quantify ecosystem responses to natural variability, climate change or the impact of anthropogenic activities. Examples may include comparing long term change in zooplankton concentration to water temperature or relating optical properties to chlorophyll concentration.

There is also a need to compare the coupled physical and biological models which are being run in hindcast mode with historical EO data for validation, enabling future forecasts to observe the impacts of climate change such as changes in primary production or ocean acidification. This can be achieved using in situ data sets such as the Continuous Plankton Recorder (CPR); long term sampling stations, such as in the western English Channel, in operation for over 100 years, and satellite remote sensing for which SST data have been continuously available for approximately 30 years and ocean colour for approximately 12 years.

Operational users may find it useful to compare, in near real time, contemporary satellite and in situ data in order to provide input to water quality monitoring systems, for example, on phytoplankton chlorophyll-a concentration. Phytoplankton blooms occur each year in the Gulf of Biscay and English Channel from early spring to

autumn; because some species in these blooms can cause disturbance in human activities such as aquaculture (oysters, mussels) or human health problems, regular monitoring of these areas is coordinated by Ifremer.

Permanent monitoring of micro-algae blooms is performed by the Phytoplankton and Phytotoxins networks (REPHY) operated under the control of Ifremer. Other sources of information are also taken in account such as satellite sea-colour imagery and hydrodynamical models outputs.

EO data are available both as images (served via WMS) for visualisation purposes and as netCDF (OPeNDAP) which may be used within other processing chains.

4.3 Data Service Descriptions

4.3.1 *MODIS Ocean Colour Service*

Dataset	**MODIS Aqua**
Service Type	WMS
Description	EO data from the MODIS instrument on the NASA Aqua satellite.
Provider	NASA/MYOCEAN
Access Restrictions	Freely available
Status	Production
Parameters	nLw_xxx, chlor_a
Type of data	Satellite imagery
Area covered	European waters: Westernmost longitude = -15 Easternmost longitude = 9 Southernmost latitude = 47 Northernmost latitude = 63
Spatial resolution	1km
Native projection	Geographic
Output projections	Geographic
Temporal resolution	Daily (subject to visibility)
Forecast length	N/A
Time span	2008 onward
Update frequency	Daily
Native data formats	netCDF
Output data formats	png, netCDF
Catalogue Service URL	http://rsg.pml.ac.uk/csw
Service URL	http://rsg.pml.ac.uk/wms?SERVICE=WMS&REQUEST=GetCapabilities&VERSION=1.3.0
OPeNDAP URL	http://rsg.pml.ac.uk/thredds/catalog/RSG_MODIS_UK_OC/catalog.html

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX412N
SeaDataNet Name (Text)	Normalised water-leaving radiance (412nm wavelength) from the water body

WMS Layer Name	MYOCEAN_MYO_DT/ nLw_412

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX443N
SeaDataNet Name (Text)	Normalised water-leaving radiance (443nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MYO_DT/ nLw_443

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX488N
SeaDataNet Name (Text)	Normalised water-leaving radiance (488nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MYO_DT/ nLw_488

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX531N
SeaDataNet Name (Text)	Normalised water-leaving radiance (531nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MYO_DT/ nLw_531

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX551N
SeaDataNet Name (Text)	Normalised water-leaving radiance (551nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MYO_DT/ nLw_551

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX667N
SeaDataNet Name (Text)	Normalised water-leaving radiance (667nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MYO_DT/ nLw_667

Parameter	**Chlorophyll (chlor_a)**
Description	Chlorophyll concentration estimates
Units (URN)	SDN:P061::UMMC
Units (Text)	mg m-3
SeaDataNet Name (URN)	SDN:P01::CHLMOOC5

SeaDataNet Name (Text)	Concentration of chlorophyll-a {chl-a} per unit volume of the water body by Moderate Resolution Imaging Spectroradiometer (MODIS) and OC5 algorithm
WMS Layer Name	MYOCEAN_MYO_DT/chlor_a

4.3.2 *MERIS Ocean Colour Service*

Dataset	**MERIS**
Service Type	WMS
Description	EO data from the MERIS instrument on the ESA Envisat satellite.
Provider	ESA/MYOCEAN
Access Restrictions	Freely available
Status	Production
Parameters	nLw_xxx, chlor_a
Type of data	Satellite imagery
Area covered	European waters: Westernmost longitude = -15 Easternmost longitude = 9 Southernmost latitude = 47 Northernmost latitude = 63
Spatial resolution	1km
Native projection	Geographic
Output projections	Geographic
Temporal resolution	Daily (subject to visibility)
Forecast length	N/A
Time span	2008 onward
Update frequency	Daily
Native data formats	netCDF
Output data formats	png, netCDF
Catalogue Service URL	http://rsg.pml.ac.uk/csw
Service URL	http://rsg.pml.ac.uk/wms?SERVICE=WMS&REQUEST=GetCapabilities&VERSION=1.3.0
OPeNDAP URL	http://rsg.pml.ac.uk/thredds/catalog/meris_UK_singlescenes/catalog.html

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX413N
SeaDataNet Name (Text)	Normalised water-leaving radiance (413nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MER/ nLw_413

Parameter	**Water Leaving Radiance (nLw)**
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX443N
SeaDataNet Name (Text)	Normalised water-leaving radiance (443nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MER/ nLw_443

Parameter	Water Leaving Radiance (nLw)
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX490N
SeaDataNet Name (Text)	Normalised water-leaving radiance (490nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MER/ nLw_490

Parameter	Water Leaving Radiance (nLw)
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX510N
SeaDataNet Name (Text)	Normalised water-leaving radiance (510nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MER/ nLw_510

Parameter	Water Leaving Radiance (nLw)
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX560N
SeaDataNet Name (Text)	Normalised water-leaving radiance (560nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MER/ nLw_560

Parameter	Water Leaving Radiance (nLw)
Description	surface_upwelling_spectral_radiance_in_air_emerging_from_sea_water
Units (URN)	SDN:P061::MWSR
Units (Text)	mWcm-2µm-1sr-1
SeaDataNet Name (URN)	SDN:P01::RXXX619N
SeaDataNet Name (Text)	Normalised water-leaving radiance (619nm wavelength) from the water body
WMS Layer Name	MYOCEAN_MER/ nLw_619

Parameter	Chlorophyll (chlor_a)
Description	Chlorophyll concentration estimates
Units (URN)	SDN:P061::UMMC
Units (Text)	mg m-3
SeaDataNet Name (URN)	SDN:P01::CHLMEAL1
SeaDataNet Name (Text)	Concentration of chlorophyll-a {chl-a} per unit volume of the water body by programmable medium-spectral resolution imaging spectrometer (MERIS
WMS Layer Name	MYOCEAN_MER/chlor_a

4.3.3 *L4 in situ Service*

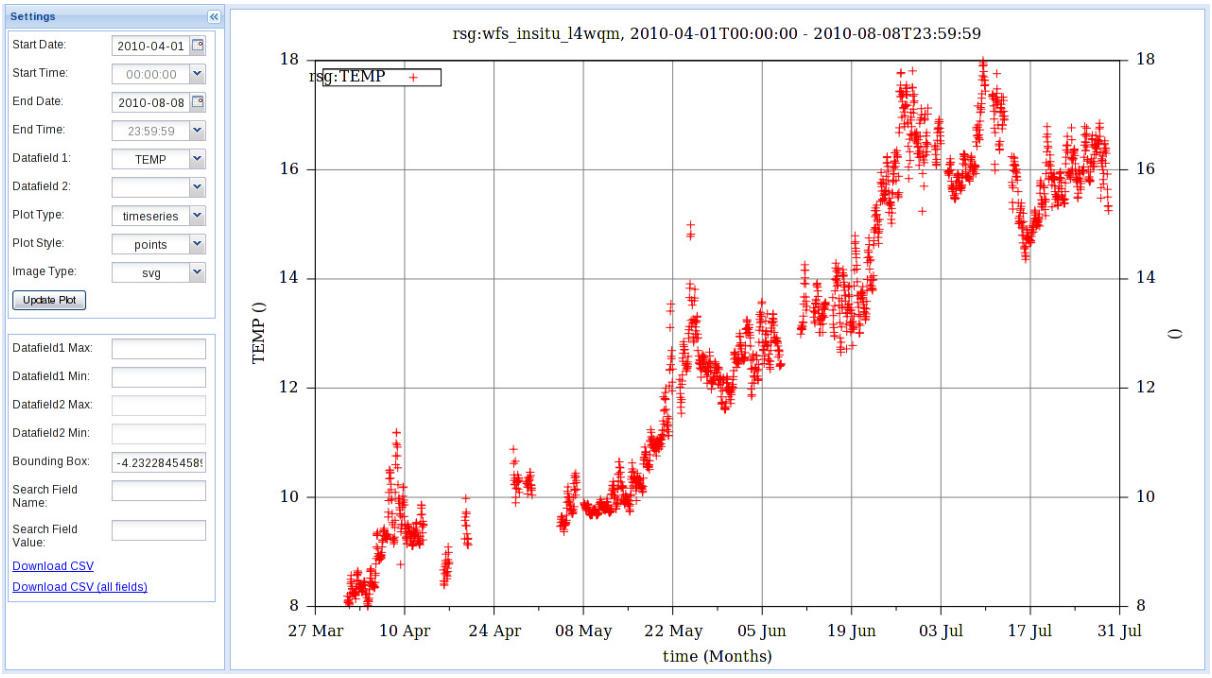

Figure 4-4-1: Surface temperature time series from L4 station

Dataset	**L4 in situ data**
Service Type	WFS
Description	*In situ* observations from station “L4” in the western English Channel.
Provider	PML
Access Restrictions	Freely available subject to restrictions
Status	Test
Parameters	chlor_a, SST, salinity, oxygen, turbidity, fluorescence
Type of data	In-situ data
Area covered	Western English Channel, 50.22°N 4.22°W
Temporal resolution	Weekly depending on weather.
Time span	2001 onwards
Update frequency	When processed.
Native data formats	PostgreSQL database
Output data formats	GML
Catalogue Service URL	http://rsg.pml.ac.uk/csw
Service URL	http://rsg.pml.ac.uk/wfs?service=WFS&request=describefeaturetype&typename=rsg:wfs_insitu_l4wqm

Parameter	**CHL**
Description	Chlorophyll concentration
Units (URN)	SDN:P061::UMMC
Units (Text)	mg m-3
SeaDataNet Name (URN)	SDN:P01::CPHLPR01
SeaDataNet Name (Text)	Concentration of chlorophyll-a {chl-a} per unit volume of the water body [particulate phase] by in-situ chlorophyll fluorometer
WFS Parameter Name	CHL

Parameter	**SST**

Description	Sea Surface Temperature
Units (URN)	SDN:P061::UPAA
Units (Text)	C
SeaDataNet Name (URN)	SDN:P01::TEMPPR01
SeaDataNet Name (Text)	Temperature of the water body
WFS Parameter Name	TEMP

Parameter	**Salinity**
Description	Salinity
Units (URN)	SDN:P061::UUUU
Units (Text)	None
SeaDataNet Name (URN)	SDN:P01::PSLTZZ01
SeaDataNet Name (Text)	Practical salinity of the water body
WFS Parameter Name	PSAL

Parameter	**Oxygen**
Description	Oxygen
Units (URN)	SDN:P061:: UPOX
Units (Text)	uM
SeaDataNet Name (URN)	SDN:P01::DOXYZZXX
SeaDataNet Name (Text)	Concentration of oxygen {O2} per unit volume of the water body [dissolved phase]
WFS Parameter Name	OXYC

Parameter	**Turbidity**
Description	Turbidity.
Units (URN)	SDN:P061:: USTU
Units (Text)	NTU
SeaDataNet Name (URN)	SDN:P01::NEPHIF01
SeaDataNet Name (Text)	Turbidity of the water body by in-situ nephelometer
WFS Parameter Name	TSED

Parameter	**Fluorescence**
Description	Fluorescence
Units (URN)	SDN:P061::UUUU
Units (Text)	None
SeaDataNet Name (URN)	SDN:P01::FLUOZZZZ
SeaDataNet Name (Text)	Fluorescence of the water body
WFS Parameter Name	FVLT

4.3.4 *MODIS EO service*

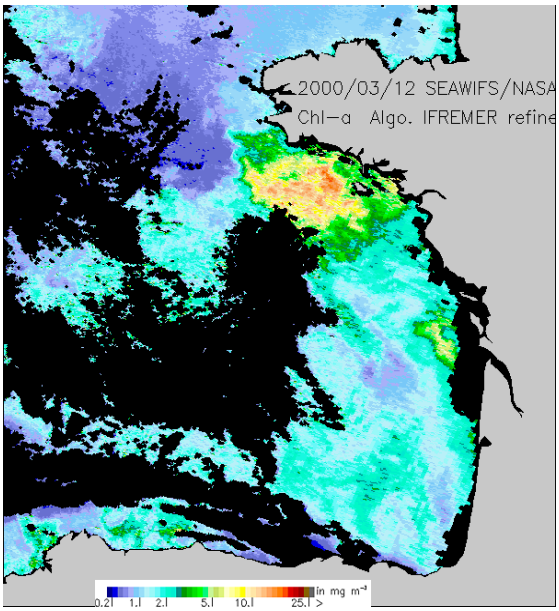

Figure 4-2 MODIS Chl-a, computed with Ifremer regional algorithm

Dataset	MODIS
Service Type	WMS
Description	EO data from the MODIS instrument
Provider	NASA
Access Restrictions	Freely available
Status	Planned
Parameters	nLw, chlor_a
Type of data	Satellite imagery
Area covered	European waters: Westernmost longitude = -12 Easternmost longitude = 13 Southernmost latitude = 36 Northernmost latitude = 60
Spatial resolution	1km
Native projection	Geographic
Output projections	Geographic
Temporal resolution	Daily (subject to visibility)
Forecast length	N/A
Update frequency	Daily
Native data formats	netCDF
Output data formats	png, netCDF
Catalogue Service URL	
Service URL	http://www.ifremer.fr/thredds/wms/IFREMER-WESTERN_EUROPE-CHL_ISPM_MODIS_L3-NRT-OBS_FULL_TIME_SERIE?service=WMS&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://www.ifremer.fr/thredds/dodsC/IFREMER-WESTERN_EUROPE-CHL_ISPM_MODIS_L3-NRT-OBS_FULL_TIME_SERIE.html

Parameter	chl_a
Description	OC5 chlorophyll-a concentration

Units (URN)	SDN:P061::UKMC
Units (Text)	kg m-3
SeaDataNet Name (URN)	SDN:P01::CHLMOOC5
SeaDataNet Name (Text)	Concentration of chlorophyll-a {chl-a} per unit volume of the water body by Moderate Resolution Imaging Spectroradiometer (MODIS) and OC5 algorithm
WMS Layer Name	chl_a

Parameter	inorganic_suspended_matter
Description	Inorganic suspended matter
Units (URN)	SDN:P061::UKMC
Units (Text)	kg m-3
SeaDataNet Name (URN)	SDN:P01::SPMIMOXX
SeaDataNet Name (Text)	Concentration of suspended particulate material (inorganic) per unit volume of the water body by Moderate Resolution Imaging Spectroradiometer (MODIS)
WMS Layer Name	inorganic_suspended_matter

Parameter	**turbidity**
Description	Turbidity
Units (URN)	SDN:P061::USTU
Units (Text)	NTU
SeaDataNet Name (URN)	SDN:P01::TURBMOXX
SeaDataNet Name (Text)	Turbidity of the water column by Moderate Resolution Imaging Spectroradiometer (MODIS)
WMS Layer Name	turbidity

4.3.5 *MERIS EO service*

Dataset	**MERIS**
Description	EO data from the MERIS instrument
Provider	ESA
Access Restrictions	Freely available?
Status	Planned
Parameters	nLw, chlor_a
Type of data	Satellite imagery
Area covered	European waters: Westernmost longitude = -12 Easternmost longitude = 13 Southernmost latitude = 36 Northernmost latitude = 60
Spatial resolution	1km
Native projection	Geographic
Output projections	Geographic
Temporal resolution	Daily (subject to visibility)
Forecast length	N/A
Update frequency	Daily
Native data formats	netCDF
Output data formats	png, netCDF
Catalogue Service URL	
Service URL	http://www.ifremer.fr/thredds/wms/IFREMER-WESTERN_EUROPE-CHL_ISPM_MERIS_L3-NRT-OBS_FULL_TIME_SERIE?service=WMS&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://www.ifremer.fr/thredds/dodsC/IFREMER-WESTERN_EUROPE-CHL_ISPM_MERIS_L3-NRT-

	OBS_FULL_TIME_SERIE.html

Parameter	chl_a
Description	OC5 chlorophyll-a concentration
Units (URN)	SDN:P061::UKMC
Units (Text)	kg m-3
SeaDataNet Name (URN)	SDN:P01::CHLMEOC5
SeaDataNet Name (Text)	Concentration of chlorophyll-a {chl-a} per unit volume of the water body by programmable medium-spectral resolution imaging spectrometer (MERIS) and OC5 algorithm
WMS Layer Name	chl_a

Parameter	inorganic_suspended_matter
Description	Inorganic suspended matter
Units (URN)	SDN:P061::UKMC
Units (Text)	kg m-3
SeaDataNet Name (URN)	SDN:P01::SPMIMEXX
SeaDataNet Name (Text)	Concentration of suspended particulate material (inorganic) per unit volume of the water body by programmable medium-spectral resolution imaging spectrometer (MERIS)
WMS Layer Name	inorganic_suspended_matter

Parameter	turbidity
Description	Turbidity
Units (URN)	SDN:P061::USTU
Units (Text)	NTU
SeaDataNet Name (URN)	SDN:P01::TURBMEXX
SeaDataNet Name (Text)	Turbidity of the water column by programmable medium-spectral resolution imaging spectrometer (MERIS)
WMS Layer Name	turbidity

4.3.6 *Combined MODIS/MERIS EO service*

Dataset	MODIS/MERIS
Description	EO data generated from MODIS/MERIS
Provider	Ifremer
Access Restrictions	Freely available
Status	Planned
Parameters	nLw, chlor_a
Type of data	Satellite imagery
Area covered	European waters: Westernmost longitude = -12 Easternmost longitude = 13 Southernmost latitude = 36 Northernmost latitude = 60
Spatial resolution	1km
Native projection	Geographic
Output projections	Geographic
Temporal resolution	Daily (subject to visibility)
Forecast length	N/A
Update frequency	Daily
Native data formats	netCDF
Output data formats	png, netCDF

Catalogue Service URL	
Service URL	http://www.ifremer.fr/thredds/wms/IFREMER-WESTERN_EUROPE-CHL_ISPM_MODIS_MERIS_L4-RAN-OBS_FULL_TIME_SERIE?service=WMS&version=1.3.0&request=GetCapabilities
OPeNDAP URL	http://www.ifremer.fr/thredds/dodsC/IFREMER-WESTERN_EUROPE-CHL_ISPM_MODIS_MERIS_L4-RAN-OBS_FULL_TIME_SERIE.html

Parameter	chl_a
Description	analysed chlorophyll-a
Units (URN)	SDN:P061::UKMC
Units (Text)	kg m-3
SeaDataNet Name (URN)	SDN:P01::CHLAMSAT
SeaDataNet Name (Text)	Concentration of suspended particulate material (inorganic) by synthesis of calibrated data from multiple sensors on one or more satellite platforms
WMS Layer Name	chl_a

Parameter	inorganic_suspended_matter
Description	Analysed inorganic suspended matter
Units (URN)	SDN:P061::UKMC
Units (Text)	kg m-3
SeaDataNet Name (URN)	SDN:P01::SPMIMSAT
SeaDataNet Name (Text)	Chlorophyll concentration determined by analysis and synthesis of calibrated data from multiple sensors on one or more satellite platforms
WMS Layer Name	inorganic_suspended_matter

4.3.7 *REPHY in situ service*

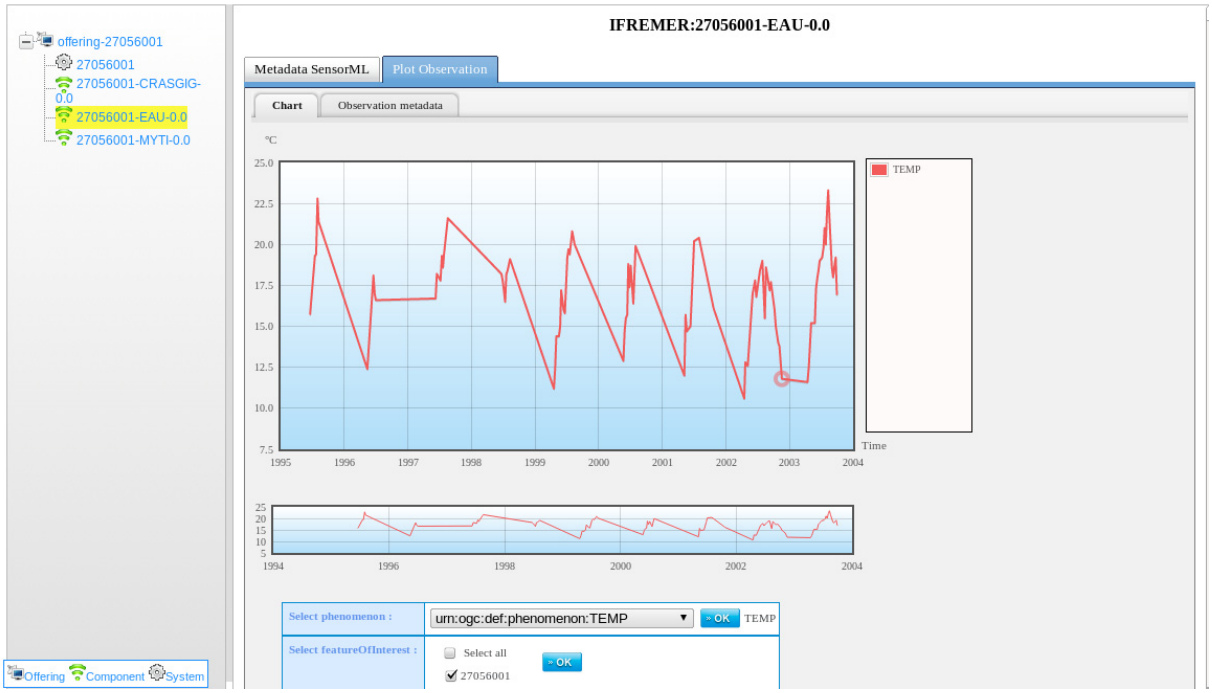

Figure 4-3 Surface temperature time series from Penerf station

Dataset	In Situ
Service	SWE (SOS)
Description	In situ observations from the REPHY network
Provider	Ifremer
Access Restrictions	Freely available
Status	Planned
Parameters	Chlorophyll-a, Turbidity, Temperature, Salinity
Type of data	In-situ data
Area covered	French coasts
Temporal resolution	
Time span	1984 onwards
Update frequency	When processed
Native data formats	Oracle database
Output data formats	CSV
Service	SWE (SOS)
Catalogue Service URL	
Service URL	http://www.ifremer.fr/swe_q2_TS_WS/WS/sos?request=getCapabilities&service=SOS&version=1.0.0

Parameter	Chlorophyll (chlor_a)
Description	Surface chlorophyll
Units (URN)	SDN:P061::UMMC
Units (Text)	mg m^{-3}
SeaDataNet Name (URN)	SDN:P01::CPHLPR01
SeaDataNet Name (Text)	Concentration of chlorophyll-a {chl-a} per unit volume of the water body [particulate phase] by in-situ chlorophyll fluorometer
Phenomenon Name	CHLOROA

Parameter	Turbidity
Description	Turbidity
Units (URN)	SDN:P061::USTU
Units (Text)	NTU
SeaDataNet Name (URN)	SDN:P01::NEPHIF01
SeaDataNet Name (Text)	Turbidity of the water body by in-situ nephelometer
Phenomenon Name	TURB

Parameter	Temperature
Description	Temperature
Units (URN)	SDN:P061::UPAA
Units (Text)	C
SeaDataNet Name (URN)	SDN:P01::TEMPPR01
SeaDataNet Name (Text)	Temperature of the water body
Phenomenon Name	TEMP

Parameter	Salinity
Description	Salinity
Units (URN)	SDN:P061::UUUU
Units (Text)	PSU
SeaDataNet Name (URN)	SDN:P01::PSLTZZ01
SeaDataNet Name (Text)	Practical salinity of the water body
Phenomenon Name	SALI

5 Services for Pilot-4: The International Coastal Atlas Network (ICAN)

5.1 Description of the user group

In recent years significant momentum has occurred in the development of Internet resources for decision makers, scientists and the general public who are interested in the coast. A key aspect of this trend has been the development of coastal web atlases (CWA), based on web enabled geographic information systems (GIS).

A CWA has been defined by the ICAN (International Coastal Atlas Network) community as: a collection of digital maps and datasets with supplementary tables, illustrations and information that systematically illustrate the coast, oftentimes with cartographic and decision support tools, all of which are accessible via the Internet.

The application scope of CWAs is broad. Driving factors for CWA development include the need for:

- Better planning to cater for increased population pressures in the coastal zone (e.g. the UN estimate that by 2020 75% of the world's population will be living within 60 km of the coastal zone (United Nations, 1992; Shi and Singh, 2003).
- Decision support systems in relation to climate change scenarios in vulnerable coastal regions.
- Information to facilitate assessments of risk to natural hazards (including tsunamis and floods).
- Access to data and maps to support marine spatial planning (MSP) as a tool for better coastal and marine area management.
- Maps of jurisdictional boundaries for maritime territories in support of claims related to the United Nations Convention on the Law of the Sea (UNCLOS), which has a deadline for submissions of 2013.
- More efficient and effective coastal and marine area governance including access to relevant data and information.
- Information on resource availability and exploitation including habitat and species information, as well as ecological and community resilience.

The mission/strategic aim of ICAN is to share experiences and to find common solutions to CWA development (e.g., user and developer guides, handbooks and articles on best practices, information on standards and web services, expertise and technical support directories, education, outreach, and funding opportunities, etc.), while ensuring maximum relevance and added value for the end-users.

In 2007, the ICAN community selected the topic of **coastal erosion** as the main focus of a project to demonstrate semantic interoperability among selected coastal web atlas. However, it is recognised that there are many more topics that coastal web atlas can address. For the coastal erosion use case example, the following user roles were targeted (however other roles do exist):

- **Coastal Manager/Planner** (uses an inventory to take regulatory action; helps form policy guidelines as potential statutes or regulatory rules)

- **Private Property Owner** (seeks insight about adverse impacts to a property)
- **Emergency Responders** (need information about past, present, or future hazardous events)
- **Scientist** (investigates research questions for knowledge building, relevant for policy implications and decision support action)
- **Local CWA administrator** (supports other users with getting access to data, perhaps from own system or other systems)

5.2 Work context

The ICAN community wish to make their ongoing digital atlas developments more interoperable to better support data discovery, data visualisation, and data sharing across administrative, natural and thematic borders. Data discovery is a key first step to improved interoperability for the ICAN community, as it enables subsequent data visualisation and data sharing. Data discovery includes smart search functionality. Semantically enabled (or "smart") discovery is where terms supplied by the search client are used to locate metadata that has been marked up using different but semantically related terms. For instance, a user search keyword of "elevation" should discover appropriate datasets flagged with "bathymetry", "depth contours", etc., as these are narrower terms than "elevation." Or a user search keyword of "seafloor" should discover datasets tagged as "seabed", as these terms are synonyms. Smart search can also be applied to support multi-lingual search, e.g. the English term "water" will map to the French term "eau", to the Spanish term "agua", to the German term "wasser", etc. Current data discovery, access and visualisation of atlas datasets is limited and fragmented. Users must individually search standalone atlases. Atlas developers require guidelines to support improved interoperability and connectivity between atlases, both legacy and new.

CWAs contain a diverse range of dataset products. For example, the 2007 ICAN coastal erosion use case listed several key datasets, which include:

- Coastal access and recreation
- Coastal armouring
- Cadastral datasets with assessor attribution
- Geology
- Land use and zoning
- Current shoreline position
- Historic shoreline positions
- Permit tracking systems and a dynamic link to cadastral data
- Aerial imagery
- Streams
- Beaches
- Bluff and dune fields
- Regulatory jurisdictions
- Community development
- Geomorphology profiles
- Erosion Risk study results – Risk Zones or Lines
- Topography

- Wave climate data
- Shallow water bathymetry
- Transportation networks
- Public utilities
- Public lands

This pilot will evolve after the NETMAR project to include several CWA nodes. Access to these nodes for data and service discovery will be made through the CSW mediator. Once data or service metadata are obtained, EUMIS may then access these data or services directly via the local CWA node. Within the pilot, MIDA is initially implementing and testing the network services and semantic framework developed by NETMAR. Results of this NETMAR work will feed into the ICAN community via NETMAR deliverables, workshops, WIKI, etc. Therefore, the following data service descriptions focus on MIDA datasets and services.

5.3 Data Service Descriptions

5.3.1 *MIDA WMS maps*

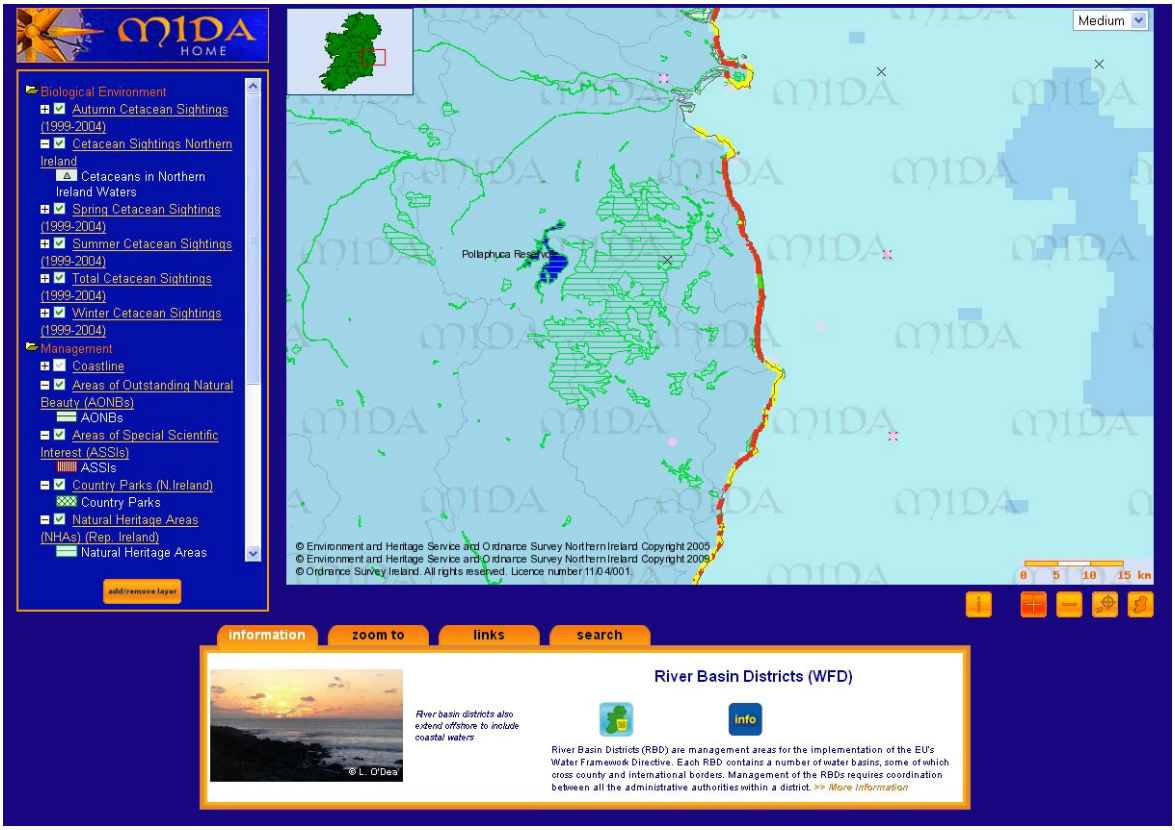

Figure 5-1: Marine Irish Digital Atlas with numerous datasets displayed

Datasets	MIDA WMS maps for NETMAR ICAN pilot
Service Type	WMS
Description	Numerous maps ranging from physical environment to biology to socio-economic, etc.
Provider	Data sourced from multiple third party data providers. Data is currently centrally stored in MIDA database.

Access Restrictions	MIDA has license agreements with multiple third party data providers. Metadata will be freely available, but WMS services will be limited to unrestricted and sample datasets.
Status	For the NETMAR ICAN pilot sample datasets complete. This supports the theme of coastal erosion.
Parameters	Ranges from physical environment to biology to socio-economic, etc. parameters.
Type of data	Vector and Raster maps
Area covered	Datasets coverage includes the Republic of Ireland, Northern Ireland, Island of Ireland, North East Atlantic, Irish territorial seas.
Spatial resolution	Various
Native projection	Irish National Grid (EPSG:29900). Will be upgraded to Irish Grid (EPSG:29902) at a future date.
Output projections	EPSG:29900 (update to EPSG:29902 in future) EPSG:4326 EPSG:900913 EPSG:4258 EPSG:3034 EPSG:3035 EPSG:3041 EPSG:3042
Temporal resolution	Various
Forecast length	Various
Time span	Various
Update frequency	For the NETMAR ICAN pilot sample datasets complete. This supports the theme of coastal erosion.
Native data formats	Shapefile and GeoTIFF
Output data formats	image/png image/png; mode=8bit image/jpeg image/gif image/tiff
Catalogue Service URL	http://netmar.ucc.ie/geonetwork
Service URL	http://netmar.ucc.ie/server/mapserver/wms.php?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetCapabilities

5.3.1.1 Themes

This WMS contains a broad variety of thematic datasets supporting the ICAN application area of coastal erosion. The semantic resources for MIDA datasets consist of theme keywords. These are defined in the NERC Vocabulary Server[1]. Sample MIDA datasets for the NETMAR ICAN pilot include:

MIDA dataset name	**Bathing Water Quality**
Description	The EU Bathing Water Directive sets standards for bathing waters. These waters are monitored to check the quality in order to protect public health and the environment. There are 131 sites of which 122 are sea water and 9 are freshwater.
Theme (URN / Text)	SDN:A04::BathingWaterQuality
	Quality of designated bathing waters in terms of compliance with standards for microbiological parameters, physicochemical parameters (mineral oils, surface-active substances and phenols, etc.), etc.

[1] http://vocab.nerc.ac.uk/scheme/MIDA/current

MIDA dataset name	Biosphere Reserves
Description	Biosphere Reserves for the island of Ireland, which are areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use, and are part of a global network. They are not covered by an international convention but must meet specific criteria. Often they are areas protected under other national or international systems.
Theme (URN / Text)	SDN:A04::BiosphereReserves
	Biosphere Reserves are areas designated under UNESCO's Man and the Biosphere (MAB) Programme. The purpose of these areas is to study the balance of environmental conservation, economic development, and maintenance of cultural values.

MIDA dataset name	Blue Flag Beaches
Description	The blue flag is an exclusive eco-label awarded annually to beaches and marinas by the FEE (Foundation for Environmental Education). They are selected through strict criteria dealing with water quality, environmental education and information, environmental management, and safety and other services. Dataset list beaches awarded for the Republic of Ireland and Northern Ireland.
Theme (URN / Text)	SDN:A04::BlueFlagBeaches
	The blue flag is a global voluntary eco-label, awarded annually to beaches which have excellent water quality, environmental management, safety and a specific range of facilities for users.

MIDA dataset name	Coastal Defence Works
Description	This dataset has been created by the Eurosion project at a scale 1:100,000 and in vector format for the European coast. The dataset shows morpho-sedimentological patterns, geological patterns, erosion trends and the existence of coastal defence works along the Irish coast.
Theme (URN / Text)	SDN:A04::CoastalDefenceStructures
	Man-made structures designed to reduce the effects of erosion and coastal flooding on coastal areas.

MIDA dataset name	Coastal Defence Works
Description	This dataset has been created by the Eurosion project at a scale 1:100,000 and in vector format for the European coast. The dataset shows morpho-sedimentological patterns, geological patterns, erosion trends and the existence of coastal defence works along the Irish coast.
Theme (URN / Text)	SDN:A04::CoastalDefenceStructures
	Man-made structures designed to reduce the effects of erosion and coastal flooding on coastal areas.

MIDA dataset name	Coastal Geology
Description	This dataset has been created by the Eurosion project at a scale 1:100,000 and in vector format for the European coast. The dataset shows morpho-sedimentological patterns, geological patterns, erosion trends and the existence of coastal defence works along the Irish coast.
Theme (URN / Text)	SDN:A04::CoastalGeology
	The nature of physical land-forms, structures, rocks, and sediments with particular emphasis on the coastal zone. The term can also be used to describe the scientific study of such features in the coastal zone.

MIDA dataset name	Coastal Geomorphology
Description	This dataset has been created by the Eurosion project at a scale 1:100,000 and in vector format for the European coast. The dataset shows morpho-sedimentological patterns, geological patterns, erosion trends and the existence of coastal defence works along the Irish coast.
Theme (URN / Text)	SDN:A04::CoastalGeomorphology
	A description and/or classification of the coast's topographic features. Coastal Geomorphology also refers to the scientific discipline which describes and classifies coastal topography.

MIDA dataset name	Sea Level Rise
Description	This dataset has been created by the EUROSION project for the European coast. This layer provides information on the relative sea level rise at 23 locations along the Irish and Northern Irish coastline. These locations are situated 50 to 100 km away from the shoreline. Distance from one location to another location is approximately 100 km.
Theme (URN / Text)	SDN:A04::SeaLevelChange
	The rise/fall in average tidal-gauge measured sea surface height over.

MIDA dataset name	Tide Gauge Network
Description	The dataset contains the location and other relevant information about all known temporary and permanent tide gauges. It includes the five gauges which are part of the Irish Tide Gauge Network.
Theme (URN / Text)	SDN:A04::TideGauges
	A measuring instrument used to measure the level (and extremes) of tidal movement of sea levels at a point on the Earths surface.

MIDA dataset name	Weather Stations
Description	Weather stations in the Republic of Ireland managed by Met Éireann. It includes stations currently collecting data and stations which are already closed but have collected data in the past.
Theme 1 (URN / Text)	SDN:A04::ClimatologicalStations
	A climatological station is a weather recording facility, either on land or sea, equipped with instruments and devices for observing atmospheric conditions. These provide data and information for weather forecasts and to study the weather and climate. The measurements taken include temperature, barometric pressure, humidity, wind speed, wind direction, and precipitation amounts.
Theme 2 (URN / Text)	SDN:A04::RainfallStations
	Climatic monitoring locations where regular measurements and recordings of precipitation are made.
Theme 3 (URN / Text)	SDN:A04::SynopticStations
	Stations carrying out regular surface-weather observations on a 6-hourly or more frequent basis. Synoptic stations are usually located at airports and differ from climate stations in the greater number of variables observed and in the greater frequency of observations (climate stations usually make observations once or twice per day).

6 References

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