SeaDataCloud

Interoperability with international data

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MARIS

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SDC – Final meeting, by web conference, 29-30 October 2020
The context for a broker

- Interoperability between heterogeneous data consumers and data providers
The context for a broker

- Interoperability between heterogeneous data consumers and data providers

Burden of interoperability on each **data consumer**
The context for a broker

- Interoperability between heterogeneous data consumers and data providers

Burden of interoperability on each data provider
Broker framework

- Interoperability between heterogeneous data consumers and data providers

Burden of interoperability on the broker
- complexity is more manageable \((c+p)\) instead of \((c*p)\)
Broker Main Functionalities

- **Discovery**
  - Metadata schemas Mediation and harmonization

- **Semantic discovery**
  - SKOS/Sparql to access external thesauri and vocabularies

- **Access: direct Download**
  - Online link to dataset

- **Access: simple transformations & download**
  - Format transformation
  - CRS transformation
  - (domain) Subsetting
  - (domain) Resolution change
Broker Main Artifacts

- COMMON DATA MODEL
- ACCESSORS (UPSTREAM MEDIATORS)
- PROFILERS (DOWNSTREAM FACADES)
- APIs
- COMMUNITY AND USER DEFINED VIEWS
## Accessors and Profilers

<table>
<thead>
<tr>
<th>OGC CSW 2.0.2 AP ISO 1.0</th>
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<tbody>
<tr>
<td>OGC CSW 2.0.2 ebRIM EO</td>
<td>CKAN</td>
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<td>OGC CSW 2.0.2 ebRIM CIM</td>
<td>DCAT</td>
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<td>ESRI GEOPORTAL 10</td>
<td>GI-cat</td>
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<td>OAI-PMH 2.0</td>
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<td>NCML-OD</td>
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<td>OpenSearch 1.1 ESIP</td>
<td>BCODMO</td>
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<td>NCML-CF</td>
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<td>CKAN</td>
<td>NetCDF-CF 1.4</td>
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<td>CUAHSI HIS-Central</td>
<td>FTP populated with supported metadata types</td>
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<tr>
<td>ESRI REST API 10.3</td>
<td>WAF Web Accessible Folders</td>
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<td>OGC WCS</td>
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<td>OGC WMS</td>
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<td>HDF</td>
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<td>OGC WPS 1.0.0</td>
<td>IADC DB (MySQL)</td>
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<td>OGC CSW 2.0.0 Core</td>
<td>GrADS-DS</td>
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<td>OGC CSW 2.0.2 AP ISO 1.0</td>
<td>FedEO</td>
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<tr>
<td>OGC CSW 2.0.2 ebRIM/EO AP</td>
<td>ARPA DB (based on Microsoft SQL)</td>
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<tr>
<td>OGC CSW 2.0.2 ebRIM/CIM AP</td>
<td>ESRI Map Server</td>
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<td>IRIS Station</td>
<td>SHAPE files (FTP)</td>
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<td>IRIS Event</td>
<td>KISTERS Web - Environment of Canada</td>
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<td>HYRAX THREDDS SERVER 1.9</td>
<td>Environment Canada Hydrometric data (FTP)</td>
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<td>OAI-PMH 2.0 - Harvesting</td>
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<td>Earth Engine</td>
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<td>DIF</td>
<td>RASAQM</td>
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<td>EGASKRO</td>
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<td>UNAVCO</td>
<td>SITAD (Sistema Informativo Territoriale Ambientale Diffuso)</td>
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</table>

[Support protocols](http://www.seadatanet.org)
Brokered source: NOAA NCEI

https://www.nodc.noaa.gov/archivesearch/cs

ESRI Geoportal catalogue

• 36000+ datasets & dataset collections
Brokered source: NOAA World Ocean Database (WOD)

Quality-controlled ocean profile and plankton data:
• 513 dataset collections

https://data.nodc.noaa.gov/ncei/wod/

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Brokered source: Australia Ocean Data Network

Geonetwork catalogue

- 1567 dataset collections

Brokered source: SeaDataNet

Aggregation service
- 993 dataset collections (aggregated records)
Included in the SeaDataCloud exploitation agreement

SDN Brokering service

- SeaDataNet CDI
- OpenSearch
- SDN broker portal

APIs

- SDN Broker
- SeaDataCloud
- SeaDataNet
- USA NCEI (NODC)
- USA WOD
- IMOS AODN

http://gs-service-production.geodab.eu/gs-service/seadatanet-broker/search

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Production grade deployment... with the cloud

Web service

Reliable
Fast
Optimized

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Production grade cloud infrastructure requirements

- Autoscaling
- Rolling updates
- Monitoring
- Load Balancing
- Routing

Production grade system
- High reliability
- High availability
- Resource optimization
Enabling technologies

Container orchestration system

- Autoscaling
- Rolling updates
- Routing
- Monitoring
- Load Balancing

Containerization

Virtualization

kubernetes

docker

openstack
Different cloud environments

- Cloud deployment
  - Amazon ECS + ECR
    - docker
  - EOSC Hub
    - kubernetes
    - docker
  - Copernicus DIAS
SDN Brokering service

Included in the SeaDataCloud exploitation agreement

http://gs-service-production.geodab.eu/gs-service/seadatanet-broker/search

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SeaDataNet broker portal
Query by constraints

- Search terms
- Spatial extent
- Temporal extent
- Sources
### Filtering of results

#### Instrument

<table>
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<tr>
<th>Attribute</th>
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<tr>
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<tr>
<td>SALINITY</td>
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<td>BAROMETRIC PRESSURE</td>
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<td>WIND SPEED</td>
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<td>WIND DIRECTION</td>
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<td>WAVE HEIGHT</td>
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<td>AIR TEMPERATURE - WET BULB</td>
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#### Source

<table>
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<tr>
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<th>Organization</th>
<th>Platform</th>
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</thead>
</table>

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Evaluation of results

Overview

**Water temperature, salinity, and potential temperature oceanographic profile data from F/V Alaskan Enterprise in the Chukchi Sea, 2010-08-24 to 2010-09-20 (NCEI Accession 0155761)**

This CTD data set, consisting of 47 casts, was collected in the Chukchi Sea during the FV Alaskan Enterprise (AE10-01) cruise. August 24 - September 20, 2010 (cruise ID: CHAOX 2010). The cruise was funded by DCO Bureau of Ocean Energy Management (BORM) through the NOAA National Marine Mammal Laboratory. Involved groups included NMML, AFSC, BERM, PMEL, and ECOFOCI. CTD operations

Title

Abstract

Measurement info: instrument, platform, organization, parameter

**CTD**

Conductivity-Temperature-Depth probe

**Alaskan Enterprise**


More metadata: keywords, formats, links

**Keywords**

Oceanographic geographical features
- Vertical spatial coordinates
- Chlorophyll pigment concentrations in water bodies
- Nitrate concentration parameters in the water column
- Phosphate concentration parameters in the water column
- Temperature of the water column
- Salinity of the water column
- Silicate concentration parameters in the water column
- Dissolved total and organic nitrogen concentrations in the water column
- Dissolved total or organic phosphorus concentration in the water column
- Temperate total and organic nitrogen concentrations in the water column
- Particulate total and organic phosphorus concentrations in the water column
- River flow and discharge
- Discrete water samples
- Water level markers
- Vessel of opportunity
- River station

**Formats**

Ocean Data View ASCII input
- Climate and Forecast Point Data NetCDF

**Links**

"https://cdi.seadatanet.org/search?step=0081104-0371104-0481104-0114-020ds03" Description: "Seadatanet CDI v5 portal website"

"https://geo-service.maris.nl/seadatanet/wms" Protocol: "urn:ogc:serviceType:WebMapService:1.1.1:HTTP" Description: "WMS example uri"
Thank you

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paolo.mazzetti@cnr.it
dick@maris.nl

Further reading & documentation:
http://www.geodab.net/