



European Geosciences Union
General Assembly 2014

PROD
TREES



National and
Kapodistrian
University of
Athens

Welcome and Introduction

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Overview

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- The event is conceived as a workshop for an open discussion on semantics services for discovery and access to EO products.
- ESA-ESRIN has funded the Prod-Trees project for answering to some of the issues about semantic discovery and access of EO products.
- The Prod-Trees Consortium has developed a solution based on:
 - ▣ The definition of a netCDF convention for EO products compliant with the CF convention and based on the OGC EOP profile for O&M
 - ▣ A cross-ontology browser for selecting concepts from different ontologies
 - ▣ A Reasoner for mapping high-level concepts to EO metadata
 - ▣ A catalog and access service for discovery and access EO-netCDF products
- The Prod-Trees Consortium has also implemented a prototype based on the enhancement of the ESA RARE system

Agenda

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- Project presentation
- Live demo
- Enabling technologies
 - ▣ General architecture
 - ▣ EO-netCDF
 - ▣ Semantic discovery broker
 - ▣ Cross-ontology browser and reasoner
- Open discussion



Objective

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- From Prod-Trees proposal:
 - ▣ **to extend the current CF-netCDF standard with descriptive metadata compliant with state-of-the-art ontologies, develop and extend supporting libraries and tools, and demonstrate the outcome in a semantically-enabled EO products search platform.**

netCDF and conventions



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- **NetCDF** (network Common Data Form) is a a general and flexible data model for **array-oriented scientific** data maintained by UCAR/UNIDATA.
 - ▣ Different versions/encodings: v3, v4, NcML (netCDF metadata in XML)
 - ▣ Specific semantics is encoded by defining and using conventions, enriching and extending the netCDF data model
- The **CF-netCDF** encoding format consists in netCDF conforming to the **CF** (Climate and Forecast) conventions.
- The OGC CF-netCDF SWG handles standardization of CF-netCDF (and netCDF related specifications)

Methodology

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- Collection of requirements
 - ▣ ESA requirements from the call
 - ▣ Community requirements (questionnaire to experts/relevant initiatives)
- Draft of EO enhancements
- Validation and assessment
 - ▣ Validation Group
 - co-chaired by B. Domenico and S. Nativi
 - Including respondents to the questionnaire
 - ▣ Use cases
 - three use-cases selected by ESA and Prod-Trees members



Main requirements

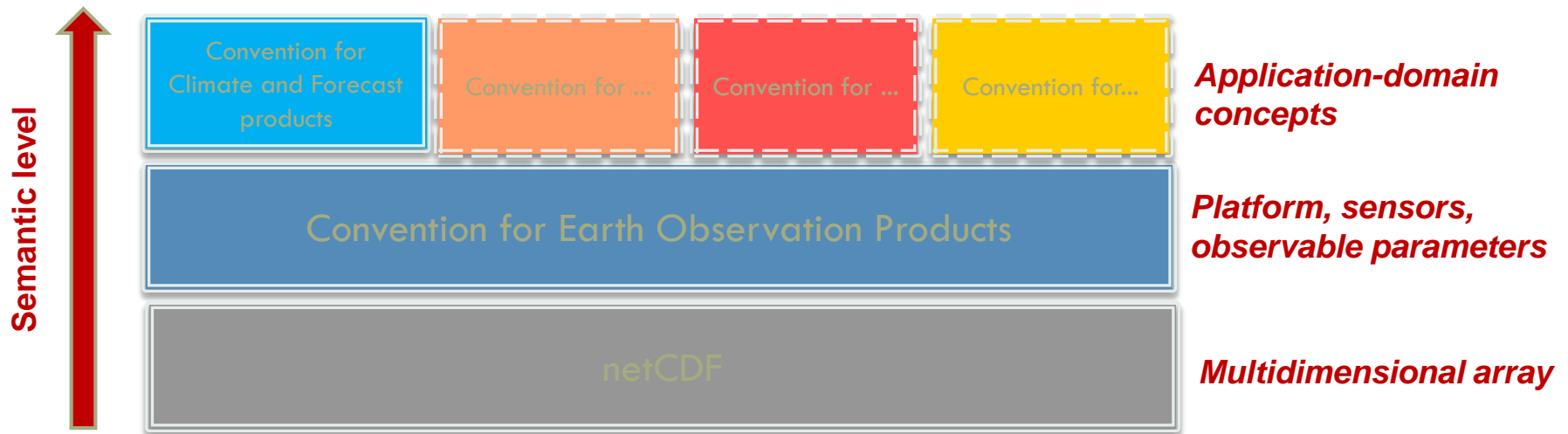
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- Objective changed from «*extend the current CF-netCDF standard*» to «*define a EO-netCDF convention*»
 - ☺ More flexible, easier adoption by users
 - ☹ Need for a clear identification of convention boundaries (what should be in EO and what should be in CF?)
- Scope limited to remote sensing data (not in-situ data)
- Metadata from EOP O&M profile and relevant ontologies
- Compliance with
 - ▣ CF-netCDF
 - ▣ netCDF-U (uncertainty convention)

EO-netCDF concept

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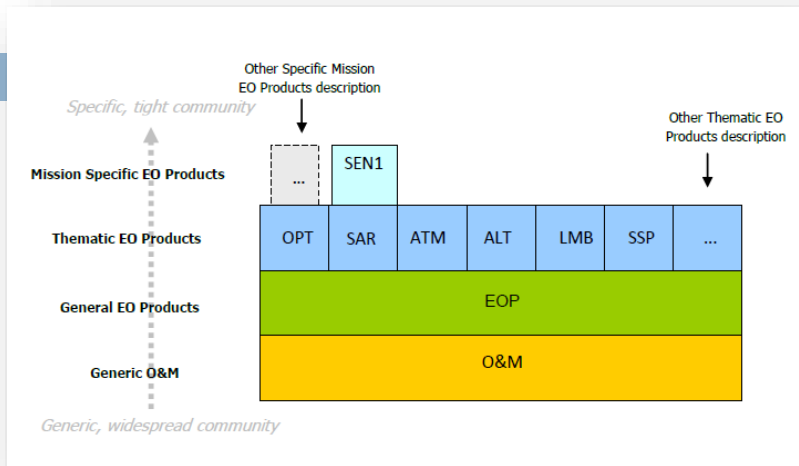
- EO Convention for lower semantic level
- Application domain conventions (like CF) for higher semantic levels





EO-netCDF current version

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- Full mapping of EOP O&M to netCDF



- Implementation in
 - ▣ netCDF v4
 - ▣ netCDF v3
 - Workarounds for Attribute Groups, String Arrays, etc.

Earth Observation equipment elements
Name of the group: "earth_observation_equipment"

| Attribute | Format | Description | Obligation |
|-------------------------|--------|------------------------------------|------------|
| platform_information | Group | Platform information. | O |
| instrument_information | Group | Instrument information. | O |
| sensor_information | Group | Sensor information. | O |
| acquisition_information | Group | Acquisition parameter information. | O |

Platform information attributes
Name of the group: "platform_information"

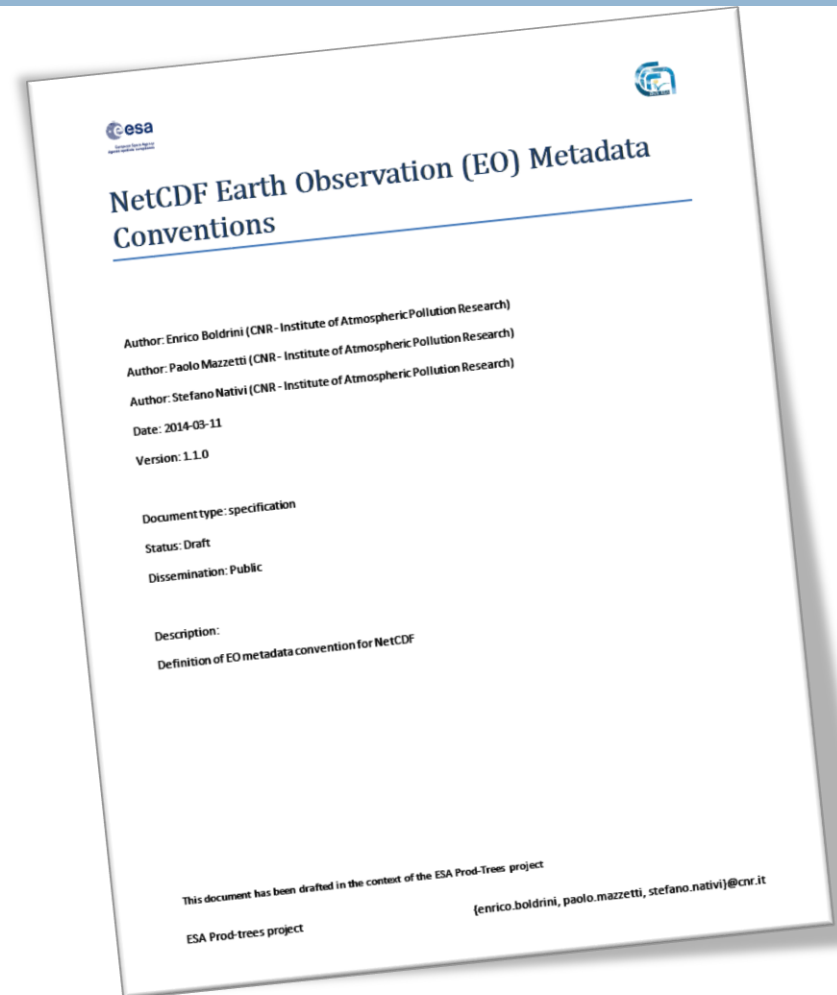
| Attribute | Format | Description | Obligation / Cardinality |
|-------------------|--------|--|--------------------------|
| short_name | String | Platform short name (e.g. PHR) | M |
| serial_identifier | String | Platform serial identifier (e.g. for PHR : 1A) | O |

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EO-netCDF status

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- First draft released on July 30, 2013
 - Based on EOP O&M
 - Discussed at the OGC CF-netCDF SWG meeting in Frascati
- Second draft released on February 28, 2014
 - Including Sentinel 1 metadata profile
 - Including draft of the EO vocabulary in RDF
- Final version planned on May 31, 2014
 - Textual version
 - Schematron schema for ncML validation
 - EO Vocabulary in RDF
- Plan for starting the standardization process in OGC. Relationships with:
 - CF-netCDF SWG
 - ESS DWG
 - EOP for OpenSearch SWG



EO-netCDF validation

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- Use-cases
 - ▣ Sentinel-1 test data converted in EO-netCDF
 - Example of SAFE to EO-netCDF conversion
 - Testing of EOP+SAR+SEN1 modules
 - Open Issue: test data are only raw data. We would need L1/L2 data
 - ▣ Looking for other valuable examples for testing other modules. Candidates:
 - MyOcean (for SSP module)
 - ENVISAT
 - AATSR TOA reflectance
 - MERIS Global Vegetation Index and Maximum Chlorophyll Index