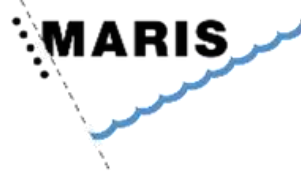


27-29 May 2024 



imdis

International conference on Marine Data and Information Systems





Interoperable Management and Provision of Metrological Data in Ocean Sciences

Simon Jirka, Christian Autermann (52°North GmbH)

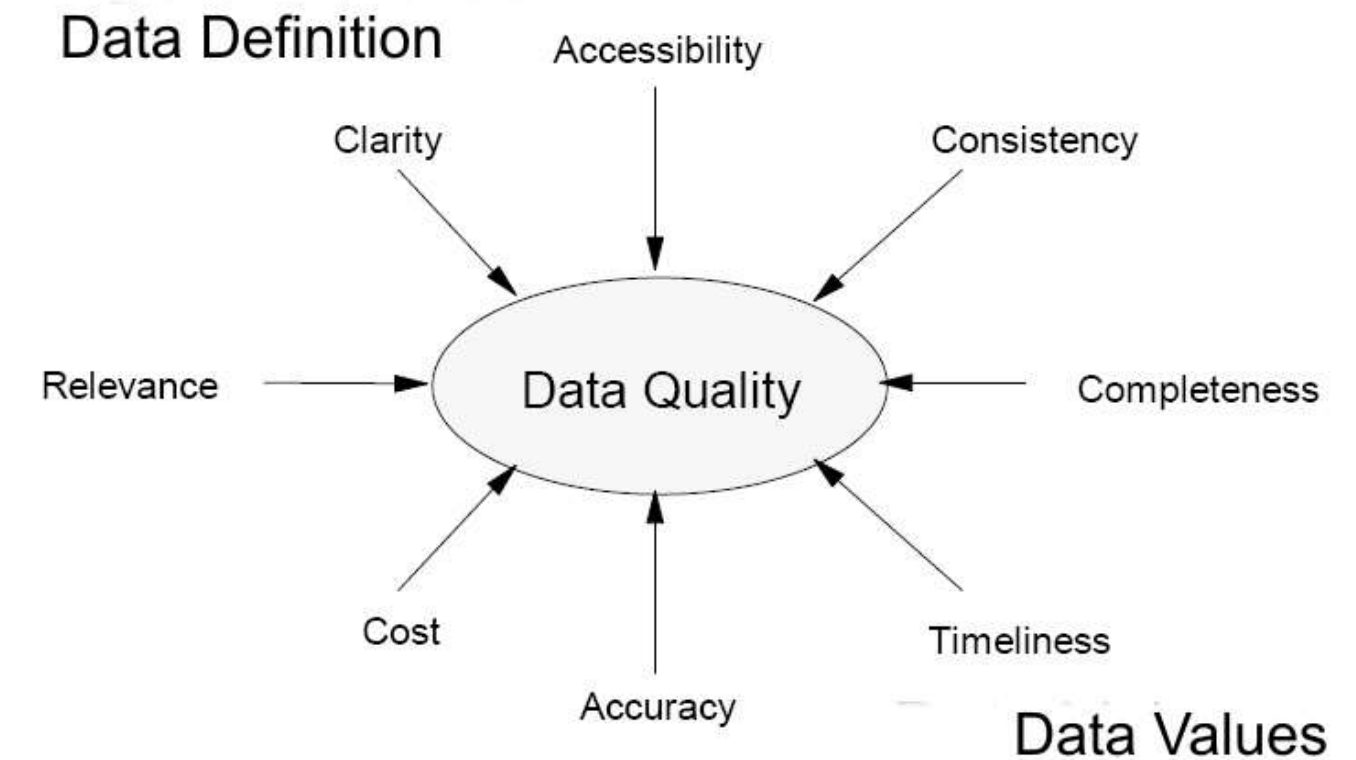
**Joaquin Del Rio Fernandez, Enoc Martínez (Universitat
Politécnica de Catalunya)**



Project funded by the European Commission within the Horizon 2020
Programme (2014-2020)
Grant Agreement No. 101008724

Introduction

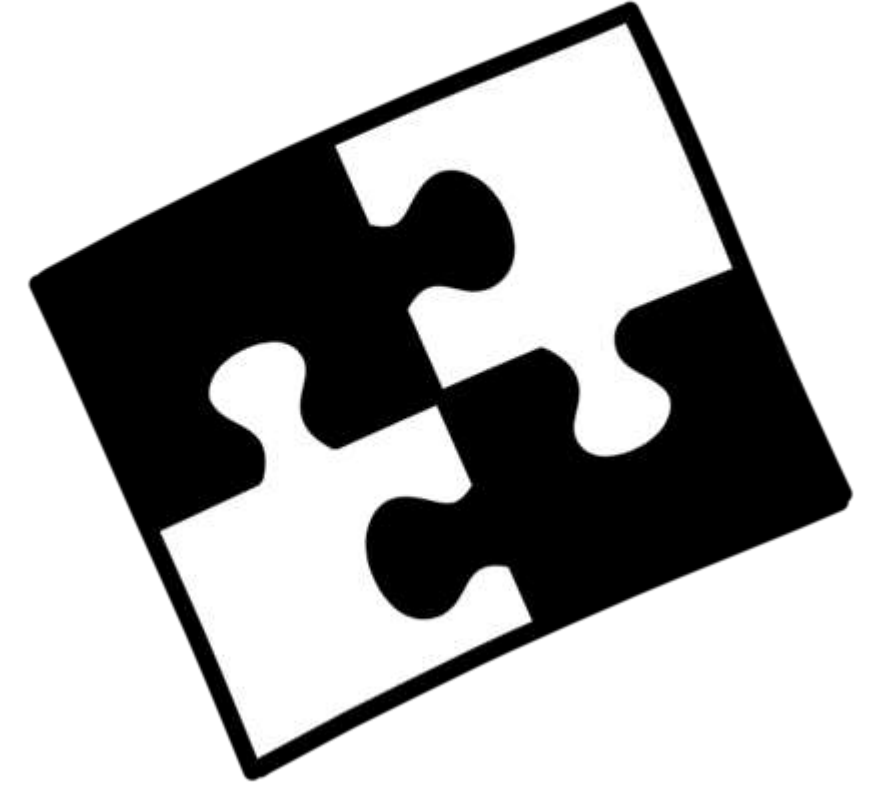
- Describing the quality of sensors and measured data
 - Understanding the reliability of the data
 - Understanding how the data may be used for further analysis
 - Enabling the combined use of data with different quality characteristics (e.g. high-precision networks densified by low-cost sensors)
- Examples of relevant (meta)data
 - Information about calibration processes
 - Quality and precision of sensing devices
 - Applied measurement processes
 - Any kind of data processing that was conducted



Matthew West and Julian Fowler, CC BY-SA 3.0
<<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons

Challenge: Interoperability

- How to provide such quality-related (meta)data in an interoperable manner?
 - Facilitate the processing of quality information
 - Ensure that a minimum set of quality information is provided
 - Enable dynamic processing chains that consider the quality information provided for sensor data sets
- Investigation of standards for providing quality information about sensors and sensor data



Source: https://commons.wikimedia.org/wiki/File:Interoperability_2.png
Creative Commons CC0 1.0 Universal Public Domain Dedication.

Recommendations on Interoperability Standards

- Metadata about observation data sets
 - ISO 19115/OGC Sensor Model Language (SensorML)
 - Consider the use of a JSON encoding (see OGC API Connected Systems)
- Metadata about sensors and data acquisition processes
 - ISO 19115/OGC Sensor Model Language (SensorML)
- Observation data
 - ISO 19156:2023/OGC Observations, Measurements and Samples
 - Consider the use of a JSON encoding (see OGC API Connected Systems)

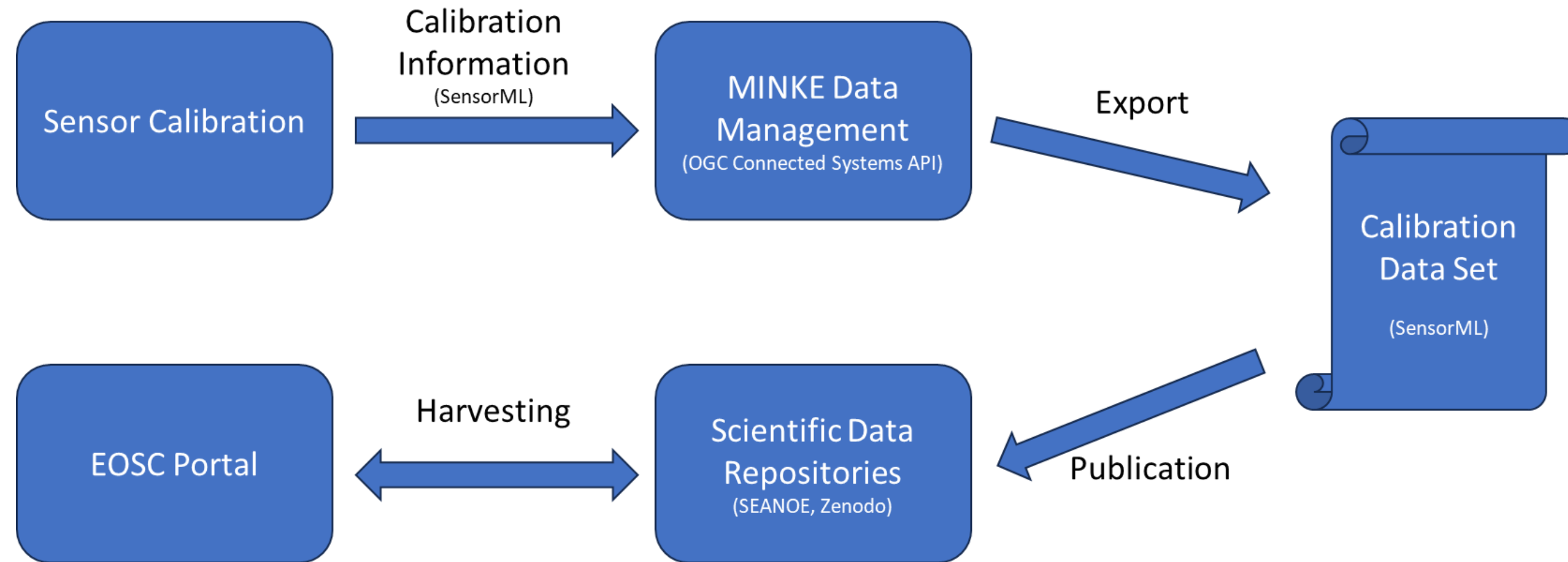
Recommendations on Interoperability Standards

- Interfaces for data access and delivery
 - OGC SensorThings API → commonly used; but no dedicated support for interoperable provision of sensor metadata
 - OGC API Connected Systems → in development; dedicated focus on metadata provision
- Ensure semantic interoperability through a common terminology within data sets and corresponding metadata → focus on the NERC Vocabulary Server

Sharing of Quality Information via the EOSC

- Investigating an approach for enabling the interoperable sharing of observation data via the European Open Science Cloud (EOSC)
 - Data publication workflows
 - Provision of metadata
 - Discovery of data sets
 - Data access/download
- Build upon the identified interoperability standards
- Result: EOSC Publication workflow for sensor quality information

Sharing of Quality Information via the EOSC



Architecture/Strategy

- MINKE Data Management
 - Built upon database for storing data received from MINKE partners
 - Manages
 - Information about sensors (e.g. general metadata, quality information, calibration information, etc.)
 - Related data sets
 - Based on SensorML and OGC API Connected Systems
 - Modern, lightweight REST interface
 - Ambition: Propose an interoperable way how to provide sensor metadata, quality information and sensor data via the OGC API family of standard → contribution to the OGC Connected Systems Standards Working Group
 - Enable publication of metadata to EOSC Marketplace

Current Status

- Development of a first version of MINKE data management component
- Serves as validation of the ongoing work of the OGC API Connected Systems Standards Working Group
- Published as open source software
- Development ongoing, first validation will be conducted via a dedicated project activities (TNA)

Summary

- Aim: Interoperable provision of quality related sensor (meta)data
- Relevant standards have been identified:
 - OGC Sensor Model Language (SensorML)
 - OGC API family of standards → OGC API Connected Systems
- MINKE Data Repository as central building block for managing all kinds of sensor quality information based on the identified standards
- Publication workflow for sharing sensor quality information via the EOSC

Contact

Passeig Marítim de la Barceloneta, 37-49

08003 Barcelona (Spain)

T. +34 93 230 95 00

project_coordination@minke.eu

 www.minke.eu

 [@MinkeProject](https://twitter.com/MinkeProject)

 [MINKE Project](https://www.linkedin.com/company/minke-project)

 project_coordination@minke.eu



27-29 May 2024 



imdis

International conference on Marine Data and Information Systems

