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Harmonising and semantically linking key variables from in-situ observing networks of an Integrated Atlantic Ocean Observing System, AtlantOS

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Atlantic Ocean observation is currently undertaken through loosely-coordinated, in-situ observing networks, satellite observations and data management arrangements at regional, national and international scales. The EU Horizon 2020 AtlantOS project aims to deliver an advanced framework for the development of an Integrated Atlantic Ocean Observing System that strengthens the Global Ocean Observing System (GOOS) and contributes to the aims of the Galway Statement on Atlantic Ocean Cooperation. One goal is to ensure that data from different and diverse in-situ observing networks are readily accessible and useable to a wider community, including the international ocean science community and other stakeholders in this field. To help achieve this goal, the British Oceanographic Data Centre (BODC) produced a parameter matrix to harmonise data exchange, data flow and data integration for the key variables acquired by multiple in-situ AtlantOS observing networks such as ARGO, Seafloor Mapping and OceanSITES.

Our solution used semantic linking of controlled vocabularies and metadata for parameters that were "mappable" to existing EU and international standard vocabularies. An AtlantOS Essential Variables list of terms (aggregated level) based on Global Climate Observing System (GCOS) Essential Climate Variables (ECV), GOOS Essential Ocean Variables (EOV) and other key network variables was defined and published on the Natural Environment Research Council (NERC) Vocabulary Server (version 2.0) as collection A05 (http://vocab.nerc.ac.uk/collection/A05/current/). This new vocabulary was semantically linked to standardised metadata for observed properties and units that had been validated by the AtlantOS community: SeaDataNet parameters (P01), Climate and Forecast (CF) Standard Names (P07) and SeaDataNet units (P06). Observed properties were mapped to biological entities from the internationally assured AphiaID from the WOrld Register of Marine Species (WoRMS), http://www.marinespecies.org/aphia.php?p=webservice.

The AtlantOS parameter matrix offers a way to harmonise the globally important variables (such as ECVs and EOVs) from in-situ observing networks that use different flavours of exchange formats based on SeaDataNet and CF parameter metadata. It also offers a way to standardise data in the wider Integrated Ocean Observing System. It uses sustainable and trusted standardised vocabularies that are governed by internationally renowned and long-standing organisations and is interoperable through the use of persistent resource identifiers, such as URNs and PURLs. It is the first step to integrating and serving data in a variety of international exchange formats using Application programming interfaces (API) improving both data discoverability and utility for users.