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# Marine Profiles for OGC Sensor Web Enablement Standards

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The use of OGC Sensor Web Enablement (SWE) standards in oceanology is increasing. Several projects are developing SWE-based infrastructures to ease the sharing of marine sensor data. This work ranges from developments on sensor level to efforts addressing interoperability of data flows between observatories and organisations.

The broad range of activities using SWE standards leads to a risk of diverging approaches how the SWE specifications are applied. Because the SWE standards are designed in a domain independent manner, they intentionally offer a high degree of flexibility enabling implementation across different domains and usage scenarios. At the same time this flexibility allows one to achieve similar goals in different ways. To avoid interoperability issues, an agreement is needed on how to apply SWE concepts and how to use vocabularies in a common way that will be shared by different projects, implementations, and users.

To address this need, partners from several projects and initiatives (AODN, BRIDGES, envri+, EUROFLEETS/EUROFLEETS2, FixO$_3$, FRAM, IOOS, Jerico/Jerico-Next, NeXOS, ODIP/ODIP II, RITMARE, SeaDataNet, SenseOcean, X-DOMES) have teamed up to develop marine profiles of OGC SWE standards that can serve as a common basis for developments in multiple projects and organisations. The following aspects will be especially considered:

1.) Provision of metadata: For discovering sensors/instruments as well as observation data, to facilitate the interpretation of observations, and to integrate instruments in sensor platforms, the provision of metadata is crucial. Thus, a marine profile of the OGC Sensor Model Language 2.0 (SensorML 2.0) will be developed allowing to provide metadata for different levels (e.g. observatory, instrument, and detector) and sensor types. The latter will enable metadata of a specific type to be automatically inherited by all devices/sensors of the same type. The application of further standards such as OGC PUCK will benefit from this encoding, too, by facilitating the communication with instruments.

2.) Encoding and modelling of observation data: For delivering observation data, the ISO/OGC Observations and Measurements 2.0 (O&M 2.0) standard serves as a good basis. Within an O&M profile, recommendations will be given on needed observation types that cover different aspects of marine sensing (trajectory, stationary, or profile measurements, etc.). Besides XML, further O&M encodings (e.g. JSON-based) will be considered.

3.) Data access: A profile of the OGC Sensor Observation Service 2.0 (SOS 2.0) standard will be specified to offer a common way on how this web service interface can be used for requesting marine observations and metadata. At the same time this will offer a common interface to cross-domain applications based upon tools such as the GEOSS DAB. Lightweight approaches such as REST will be considered as further bindings for the SOS interface.

4.) Backward compatibility: The profile will consider the existing observation systems so that migration paths towards the specified profiles can be offered.

We will present the current state of the profile development. In particular, a comparative analysis of SWE usage in different projects, an outline of the requirements, and fundamental aspects of profiles of SWE standards will be shown.