Evolving the UNESCO/IOC Ocean Best Practices System: preparing methods for the oceans' digital ecosystem

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Introduction

Best practices are one of the most valuable outcomes of collective human behaviour, encapsulating the culmination of years - perhaps centuries - of methodological development. Despite this, many best practices, along with the methods that precede them, are lost when projects end, generations turn over, or simply when URLs fail to resolve. Addressing this, the Intergovernmental Oceanographic Commission of UNESCO has deployed an Ocean Best Practices System (OBPS; Buttigieg et al., 2018; Pearlman et al., 2019). Here, we briefly describe subsequent developments in the system's technology (Buttigieg et al., 2019), outlining an ongoing co-development process to support the UN Decade of Ocean Science for Sustainable Development (Ryabinin, 2019).

Advancing metadata, structured documentation, and version control

Actionable metadata is at the heart of the OBPS. A revised set of mandatory fields and optional fields allows the OBPS' technologies to interlink content across its entire corpus, seeding new potentials in technical and human interoperability. Free-text entry fields (for e.g. SDG codes, EOV names, and spatial descriptors) are being substituted by those referencing external community vocabularies and ontologies to increase interoperability, in line with the vision of the Ocean Data and Information System. Key examples (see Buttigieg et al 2019) include 1) UN Environment's SDG Interface Ontology, 2) NERC Vocabulary server resources, and 3) the Environment Ontology which includes semantic references for the Essential Ocean Variables (EOVs). We constantly seek additional terminology resources, and invite the community to suggest new high-quality, marine-focused terminologies.

While metadata is essential, document text (with multi-lingual range) is the OBPS' primary resource. Parsing this corpus with natural language processing (NLP) is hindered by inconsistent document structure. In response, Hörstmann et al. (2020) have published guidance for future submissions to allow improved processing. More machine-friendly templates have been created (e.g. for sensors), with elements illustrated in Figure 1. Tabulated information will be used to auto-populate OBPS metadata, while prose will be augmented through semantic tagging.

Preserving the version history of a method, as it evolves into a best practice, is essential. With the recent upgrade of the OBPS' archiving software, we are implementing automated and user-controlled item-level versioning (Hörstmann et al., 2020). This will upgrade the current, manual approach and allow users to trace method evolution and maturity through multiple rounds of review.

Seeding a new federation of interoperable document stores

The OBPS' open codebase is intended to support reuse by all to create interoperable document stores. As an example, the EU Horizon 2020 project CAPARDUS is creating an "Arctic Common Practices

System" (ACPS) based on an Arctic Collection within the OBPS. An open co-development process will help meet the needs of Arctic stakeholders in their rapidly changing context.

Conclusion & outlook

The OBPS will continue to evolve through community input and partnerships in projects such as JERICO S3, EuroSea, OceanObs RCN and CAPARDUS. We invite ocean technologists, informaticians, and software developers to join our implementation team in advancing this system into a gold standard for handling methods and best practices in ocean sciences and applications. We also welcome the technical expertise of this community in identifying and endorsing methods as best practices to help guide the ocean community in the use of high-quality digital resources.

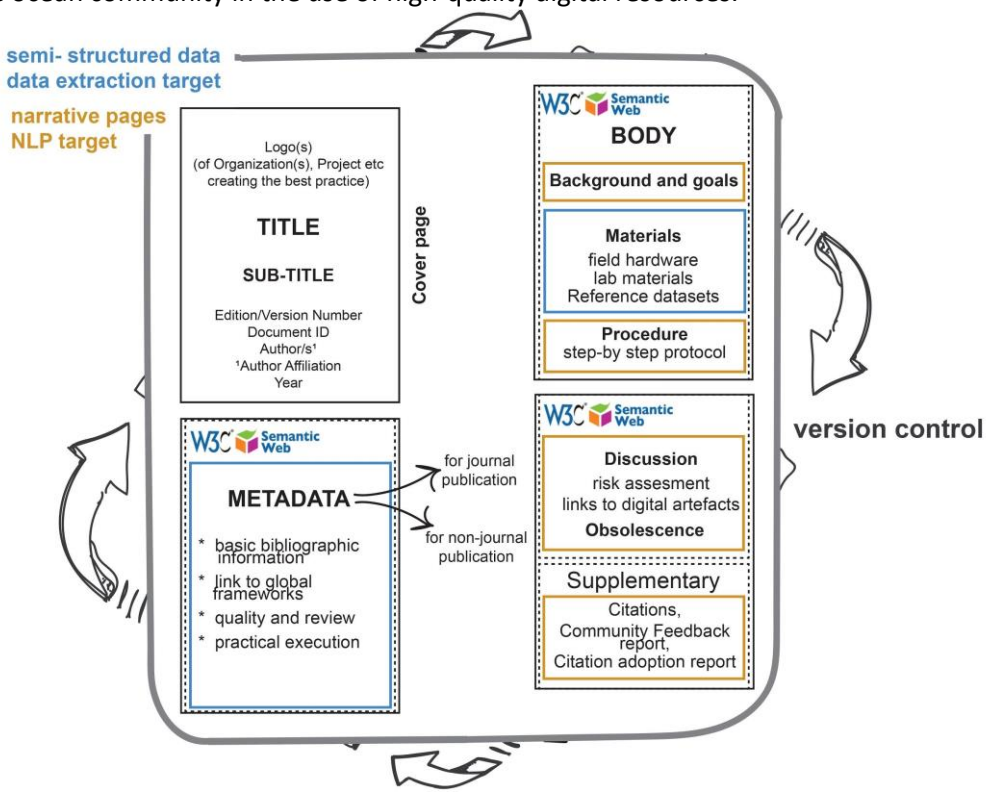

Figure 1: Illustration of the OBPS template (modified after Hörstmann et al. 2020). Blue boxes: document parts where semi-structured metadata are expected and mined. Yellow boxes: narrative content subject to text mining. Semantic web technologies using reference terminologies are used throughout to enhance interoperability. Version control systems preserve corpus history.

References

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