

## Conference Abstract

# Semantic Interoperability Solutions for the Essential Variables: Focus on biodiversity

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Received: 15 May 2019 | Published: 18 Jun 2019

Citation: Buttigieg P, Walls R, Thessen A (2019) Semantic Interoperability Solutions for the Essential Variables: Focus on biodiversity. Biodiversity Information Science and Standards 3: e36234.

<https://doi.org/10.3897/biss.3.36234>

## Abstract

The Earth system is enduring multiple, interacting stressors causing immense and irreversible change to its biosphere. The unprecedented magnitude of human influence on the planet is a cause for much concern, but also an opportunity to mitigate undesirable impact by instituting socio-ecological management strategies and monitoring their effectiveness. To do so, local and global policy developers and decision makers must have access to clear and globally consistent information streams that serve as planetary diagnostics. This need is being addressed by several international, multi-agency networks which have developed sets of "Essential Variables" (EVs) to improve consistency in the observation of key phenomena within their domains of operation. For example, the implementation of the [Essential Climate Variables \(ECVs\)](#) led by the [Global Climate Observing System \(GCOS\)](#) has set an example being followed in the marine and biodiversity domains by, respectively, the [Global Ocean Observing System's \(GOOS\) Essential Ocean Variables \(EOVs\)](#) and the [Group on Earth Observation Biodiversity Observation Network \(GEO BON\)'s Essential Biodiversity Variables \(EBVs\)](#). Each of these EV collections has a subset dedicated to biological and ecological phenomena. This is greatly encouraging for biodiversity science at large, but also runs the risk of parallel and conflicting developments occurring in the EV communities addressing the cross-cutting

theme of biodiversity. As a consequence, there is an urgent need for these systems, and the communities behind them, to pursue tight conceptual and technical interoperability in aid of a coherent treatment of biodiversity in planetary-scale monitoring.

In this contribution, we will describe our current research and implementation of a semantic interoperability layer for the EVs, with a focus on biology and ecology. Applying the best practices and core infrastructure of the [Open Biological and Biomedical Ontology \(OBO\) Foundry and Library](#), we have leveraged both mature and emerging reference ontologies targeting the domains of [ecosystems and environment](#), [population and communities](#), and [high-level ecological phenomena](#). This interoperable collection of ontologies constitutes a foundation for highly expressive EV knowledge representation and management through robust, [FAIR-compliant](#) technologies. Further, we are coordinating these efforts with [semantic technology adopted by UN agencies](#), representing global directives and indicators of the [UN Sustainable Development Agenda for 2030](#). With open editorial models behind each of these ontologies, we aim to offer a scalable and inclusive system to bridge data and information products across the EVs through machine-accessible knowledge representation.

## Keywords

ontology, essential variables, observatory, semantics, FAIR, interoperability, sustainable development

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## Presented at

Biodiversity\_Next 2019

## Funding program

PLB's contribution to this work is funded by the HGF Infrastructure Programme FRAM of the Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung

## Conflicts of interest

None