



A harmonized vocabulary for soil observed properties

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Interoperability of soil data depends on agreements concerning models, schemas and vocabularies. However, observed property terms are often defined during different activities and projects in isolation of one another, resulting in data that has the same scope being represented with different terms, using different formats and formalisms, and published in various access methods. Significantly, many soil property vocabularies conflate multiple concepts in a single term, e.g. quantity kind, units of measure, substance being observed, and procedure. Effectively, this bundles separate information elements into a single slot.

We have developed a vocabulary for observed soil properties by adopting and extending a previously defined water quality vocabulary. The observed property model separates the information elements, based on the Open Geospatial Consortium (OGC) Observations & Measurements model and extending the NASA/TopQuadrant 'Quantities, Units, Dimensions and Types' (QUDT) ontology. The imported water quality vocabulary is formalized using the Web Ontology Language (OWL). Key elements are defined as sub-classes or sub-properties of standard Simple Knowledge Organization System (SKOS) elements, allowing use of standard vocabulary interfaces.

For the soil observed property vocabulary, terms from QUDT and water quality are used where possible. These are supplemented with additional unit of measure (Unit), observed property (ScaledQuantityKind) and substance being observed (SubstanceOrTaxon) vocabulary entries required for the soil properties. The vocabulary terms have been extracted from the Australian Soil and Land Survey Field Handbook and Australian Soil Information Transfer and Evaluation System (SITES) vocabularies. The vocabulary links any chemical substances to items from the Chemical Entities of Biological Interest (ChEBI) ontology.

By formalizing the model for observable properties, and clearly labelling the separate elements, soil property observations may be more easily mapped to the OGC Observations & Measurements model for cross-domain applications.