




Jul 11th, 8:30 AM - 8:50 AM

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Peckham, Scott Dale, "Towards Standard Variable Names for Environmental Chemistry: Semantic Mediation and Extensions to the CSDMS Standard Names" (2016). *International Congress on Environmental Modelling and Software*. 1.
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Towards Standard Variable Names for Environmental Chemistry: Semantic Mediation and Extensions to the CSDMS Standard Names

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Abstract: When a model needs to obtain the values of its input variables from another model or from a data file, it is necessary to reliably match the internal vocabularies of the coupled resources (e.g. models or data sets). In addition, spatial regridding, time interpolation and unit conversion may be required. In order to automate this semantic matching and variable exchange process in a model coupling framework, the internal vocabularies of the resources to be coupled must be mapped to a controlled vocabulary in a hub-and-spoke manner. The CSDMS Standard Names provide a domain-independent set of conventions and rules for constructing standardized variable names for this purpose that are unambiguous and readable by both humans and machines. In previous work, this set of conventions have been used to construct over 2600 model variable names, mostly associated with environmental flow dynamics and physical quantities. In addition, the Earth System Bridge (ESB) project, funded by NSF's EarthCube initiative, is developing crosswalks or mappings between the CSDMS Standard Names and other large controlled vocabularies. These other vocabularies (e.g. CF Standard Names, EPA's SRS Names, USGS NWIS Names) are dominated by variable names associated with environmental chemistry, including atmospheric, aquatic, soil and solid earth chemistry. The ESB project is hosting a meeting in May to bring together experts from these domains with the goal of extending the CSDMS Standard Names with general rules for constructing environmental chemistry variable names. All products are being prepared using linked data technologies (e.g. RDF, OWL and SKOS). This talk will present the results of this effort.

Keywords: Standard variable names; controlled vocabularies; semantic mediation; environmental chemistry; CSDMS Standard Names