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Communicating data quality through Web Map Services

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The sharing and visualization of environmental data through spatial data infrastructures is becoming increasingly common. However, information about the quality of data is frequently unavailable or presented in an inconsistent fashion. ("Data quality" is a phrase with many possible meanings but here we define it as "fitness for purpose" – therefore different users have different notions of what constitutes a "high quality" dataset.) The GeoViQua project (www.geoviqua.org) is developing means for eliciting, formatting, discovering and visualizing quality information using ISO and Open Geospatial Consortium (OGC) standards. Here we describe one aspect of the innovations of the GeoViQua project.

In this presentation, we shall demonstrate new developments in using Web Map Services to communicate data quality at the level of datasets, variables and individual samples. We shall outline a new draft set of conventions (known as "WMS-Q"), which describe a set of rules for using WMS to convey quality information (OGC draft Engineering Report 12-160). We shall demonstrate these conventions through new prototype software, based upon the widely-used ncWMS software, that applies these rules to enable the visualization of uncertainties in raster data such as satellite products and the results of numerical simulations.

Many conceptual and practical issues have arisen from these experiments. How can source data be formatted so that a WMS implementation can detect the semantic links between variables (e.g. the links between a mean field and its variance)? The visualization of uncertainty can be a complex task - how can we provide users with the power and flexibility to choose an optimal strategy? How can we maintain compatibility (as far as possible) with existing WMS clients?

We explore these questions with reference to existing standards and approaches, including UncertML, NetCDF-U and Styled Layer Descriptors.