Geophysical Research Abstracts,
Vol. 11, EGU2009-13623, 2009
EGU General Assembly 2009

Geo-Ontologies Are Scale Dependent

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Philosophers aim at a single ontology that describes “how the world is”; for information systems we aim only at ontologies that describe a conceptualization of reality (Guarino 1995; Gruber 2005). A conceptualization of the world implies a spatial and temporal scale: what are the phenomena, the objects and the speed of their change? Few articles (Reitsma et al. 2003) seem to address that an ontology is scale specific (but many articles indicate that ontologies are scale-free in another sense namely that they are scale free in the link densities between concepts).

The scale in the conceptualization can be linked to the observation process. The extent of the support of the physical observation instrument and the sampling theorem indicate what level of detail we find in a dataset. These rules apply for remote sensing or sensor networks alike. An ontology of observations must include scale or level of detail, and concepts derived from observations should carry this relation forward.

A simple example: in high resolution remote sensing image agricultural plots and roads between them are shown, at lower resolution, only the plots and not the roads are visible. This gives two ontologies, one with plots and roads, the other with plots only. Note that a
neighborhood relation in the two different ontologies also yield different results.

References

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