



Methods and architectures for automated space-time interpolation

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The INTAMAP FP6 project, which ran from 2006-2009, delivered as main output a web service for automated interpolation of environmental variables, and a number of clients for this. It used the OGC Web Processing Service as the main service protocol, and was set up to connected to OGC Sensor Observation Services, accepting input data in the form of Observations and Measurements documents, as well as coverage information through Web Coverage Services. The output was provided as GML (e.g. as RectifiedGrid), using UncertML to encode the interpolation error distribution characteristics. One of its main limitations is that it only allows for spatial interpolation, whereas many automated interpolation procedures require consideration of the spatio-temporal variability. This paper will give an overview of the INTAMAP methods, technical implementations and OGC standards-based interfaces. Next, it will show how these can be extended to the spatio-temporal domain when using simple deterministic and stochastic interpolation methods. Then, it will explore how simple interpolation procedures can be replaced by more sensible prediction and/or forecast procedures based on mechanistic, physical or chemical models that try to represent the processes underlying the phenomenon interpolated. Finally, it will discuss for both approaches how interpolation (or modelling) errors can be realistically communicated. Methodological, computational and architectural aspects will be discussed.