

Management of Environmental Metadata in Germany Tools and Experiences

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Introduction: One of the first steps towards the establishment of the European Spatial Data Infrastructure (ESDI) envisioned by the EU-INSPIRE Directive will be the implementation of (meta)data catalogs. These catalogs will reference the geospatial data available in the EU member states for the themes specified in INSPIRE Annexes I to III. A first draft of the implementing rules for metadata (IR Metadata) was released in February 2007 for review through SDICs and LMOs. The IR Metadata are expected to be finalized by the end of 2007. This means that, according to the time-table specified in the INSPIRE directive, the member states have until 2010 to build data catalogs for Annex I and II themes, and until the year 2013 for Annex III themes.

The environmental administration in the EU member states will be responsible to provide the required metadata for most of the environmental themes. They will also be responsible to operate the respective data catalogs. In federal states like Germany this will not be easy because geospatial data, like the associated metadata, are managed by many different public authorities, on different levels of the administrative hierarchy, and within different administrative units.

The German Umweltdatenkatalog: Nonwithstanding the complexity of the German administrative system, the German environmental administration is well prepared to meet the INSPIRE challenge: As early as the mid-1980's, the federal and state administration realized the need for a harmonized management of environmental metadata. The Environmental Data Catalog (Umweltdatenkatalog UDK) was born as a cooperation between federal- and state environment agencies (Swoboda, 1999). Since then, the UDK has been steadily improved. It was synchronized with the relevant international standards, i.e. ISO 19115 and ISO 19119 (Karschnick, 2003). Today, the UDK is firmly rooted in the organizational structures of several federal environment

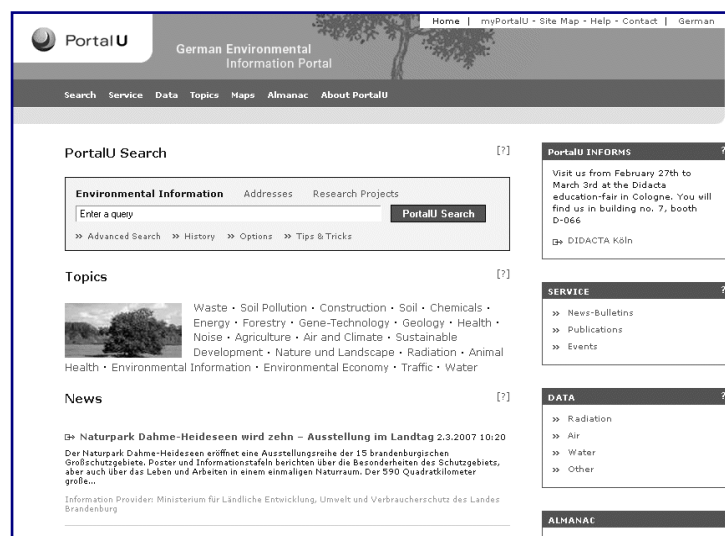


Figure 1: The PortalU home page

agencies and in 14 federal states. Even some state mapping agencies use it for geospatial reference data.

The UDK currently holds about 16.000 records, among which more than one-third point to geospatial data and to services. Since June 2006, the UDK is integrated in the German Environmental Information Portal (PortalU[®] - www.portalu.de), which is the central Internet portal to publicly-held environmental information in Germany (Vögele, 2006). PortalU[®] features not only a user-friendly interface (Figure 1), a powerful search engine, and tools to visualize and query digital maps. It also implements a catalog interface that follows OGC's CSW 2.0 specification (OGC, 2004, Klenke, 2006). By mid 2008, an Internet-based tool for online data-entry will be added. This will make it possible to handle the whole "metadata-workflow", from metadata-creation and quality control to discovery and evaluation, online and de-centralized.

Experiences and problems: But although the UDK is a successful and well-established tool, there are still many obstacles that have to be overcome on the path to full interoperability of metadata and data catalogs. These obstacles shed a light on the kind of problems that will have to be faced when the INSPIRE ESDI is established.

- **Inadequate specifications for catalog interfaces:** On the technical level, the CSW catalog interface proved to be more problematic than expected. The available specifications and application profiles proved to be not mature enough to support a seamless integration with other data catalogs and information portals, like the geoportal operated by the national German Geodata Infrastructure (GDI-DE). More detailed specifications and a common catalog reference implementation are necessary.
- **Heterogeneous metadata content:** Because the UDK is used by different thematic user communities in different agencies and federal states, the content of the UDK is not as harmonized as it should be. This refers mainly to a heterogeneity in granularity (data are described on different abstraction-levels), insufficient content (only core-fields are filled), semantic heterogeneity (different terms and code lists are used for the same concepts), and a lack in actuality (metadata are not updated frequently enough). On the level of the European SDI, it will be necessary to provide concise and standardized guidelines to minimize metadata heterogeneity.
- **Unharmonized service metadata:** A more specific problem relates to the description of services. Although more and more agencies provide viewing services based on the OGC WMS specification, only a few of these services are referenced correctly in the UDK so far. This has to do with the complexity of service metadata and general lack of relevant experience and working examples. However, it is also related to a conceptual uncertainty about how to describe services in general. Questions like "Should a service be referenced to provide a whole data collection (i.e. a thematic digital map), or should each thematic layer be treated as a separate service?" have to be solved before meaningful and harmonized metadata for services can be created.

Summary and conclusions: For the environmental administration in Germany, the UDK and PortalU[®] provide a sound basis to comply with the INSPIRE Directive in terms of setting up metadata catalogs for the INSPIRE environmental data themes.

However, they still struggle to solve a number of technical and conceptual problems described above and other EU member states are likely to encounter very similar problems. Thus to be able to overcome these obstacles on the way to a harmonized ESDI, INSPIRE will have to provide a high level of guidance and conceptual support.

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