Geophysical Research Abstracts
Vol. 12, EGU2010-3351, 2010
EGU General Assembly 2010

Issues related to handling Exploration Seismic data within the EU FP7 GeoSeas project

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GeoSeas is a sibling of the SeaDataNet initiative, aiming at creating an e-infrastructure where users will be able to identify, locate and access pan-European, harmonized and federated marine Geological and Geophysical data. GeoSeas adopts many of the technologies developed within SeaDataNet. While for most of the designated data types, only minor tuning is required, the case of Exploration Seismics poses several issues needing specific solutions.

The main issue is the sampling strategy, where the technologies, practices and the legacies of exploration geophysics differ considerably from those found in Oceanography (the original research field considered by SeaDataNet). Specific extensions to the SeaDataNet framework were required at many levels. The most significant interventions concerned the Common Data Index (CDI) metadatabase and data access mechanisms.

The primary feature of interest in marine exploration geophysics is the seismic line (in the 2D case) or the seismic volume (3D). For various reasons seismic lines are often segmented, which poses serious problems to the one-to-one correspondence between the CDI and data files. Furthermore, common practice is for positioning and the observation data to be managed separately.

Another issue is that the catalogue of metadata items needed for Seismic data discovery and browsing needs parameters that are not available in the standard CDI. However, in the context of data discovery a common framework for all data types is preferable, so we should avoid unnecessary customization for this data type.

Both of these issues have been addressed using the framework provided by the OGC Observations and Measurements standard (O&M - see Cox, this conference). O&M provides a structure for observation metadata, allowing the description of the feature of interest, observation procedure, sampling features and the relationships between them, while still allowing the original encoding of the actual observation result. Thus, the additional indexing information is encoded in what is effectively an extension to CDI, but using cross-domain standards, which will allow geophysics data to be discovered and assessed in a common framework with other marine and oceanography data.

Data access in this field poses further problems. There are significant economic interests in seismic data. The publication of relatively raw data through web service interfaces must follow a schedule that respect legitimate intellectual property concerns. Nevertheless, more open data publication can be used to position the data owner within the scientific community and to attract new projects and therefore funding.

From the data owner point of view the difficulty in balancing opening and protection can be overcome only offering to external users a controlled, server-side, web-based data access. This is also preferred considering that data volumes are large (Seismic data (post-stack) is often 50-100 MB, while field data can easily reach GB).