

Archiving and Sharing Legacy Exploration Seismic Data: Opportunities and Challenges

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November 22, 2022

Abstract

Over the past 60+ years, an enormous amount of exploration geophysics survey data has been collected around the globe, the majority of which is high-quality 2D and 3D seismic data acquired by the petroleum energy industry. Much of this ‘legacy’ data still has significant commercial value today and in the future, for hydrocarbon exploration, gas storage (methane, helium, hydrogen...), groundwater, minerals, CO₂ sequestration, geothermal, and other purposes. However, there is likely a subset of this exploration data that is of little further commercial value, but may be of immense value to academic, government and industry researchers, for example. This may include very long 2D seismic lines recorded in frontier exploration areas which turned out to be non-prospective; for example along convergent margin subduction zones or major continental tectonic fault zones, which are absent of major sedimentary basins. Shared access to this subset of legacy data would provide an extremely useful opportunity and resource for academic researchers and others, much as shared earthquake data via the IRIS network has revolutionized our understanding of earthquakes, faults and tectonics. There are several challenges that would need to be overcome before such legacy data can be shared widely among the broader geophysical community. Much of this legacy data is archived on old magnetic tape media that is now physically degrading, making it difficult to recover the data. The data would need to be collected, recovered, QC’ed, archived with associated metadata, and stored on modern digital data storage systems like the IRIS DMC, newer cloud-based systems like OSDU, or other options. The data archival, maintenance and support for a shared data distribution system would require a sustainable business model and funding from all of the data stakeholders, including government agencies like NSF, academic universities, and industry users. Data use agreements would need to be structured to ensure that data is used for non-commercial purposes as appropriate, data users respect various legal terms and conditions, and data is not shared freely among individual recipients without the approval of the host data center.

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