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A proposed-standard format to represent and distribute tomographic models and other earth spatial data

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Formats used to represent (and distribute) tomographic earth models differ considerably and are rarely self-consistent. In fact, each earth scientist, or research group, uses specific conventions to encode the various parameterizations used to describe, e.g., seismic wave speed or density in three dimensions, and complete information is often found in related documents or publications (if available at all) only. As a consequence, use of various tomographic models from different authors requires considerable effort, is more cumbersome than it should be and prevents widespread exchange and circulation within the community. We propose a format, based on modern web standards, able to represent different (grid-based) model parameterizations within the same simple text-based environment, easy to write, to parse, and to visualise. The aim is the creation of self-describing data-structures, both human and machine readable, that are automatically recognised by general-purpose software agents, and easily imported in the scientific programming environment. We think that the adoption of such a representation as a standard for the exchange and distribution of earth models can greatly ease their usage and enhance their circulation, both among fellow seismologists and among a broader non-specialist community. The proposed solution uses semantic web technologies, fully fitting the current trends in data accessibility. It is based on Json (JavaScript Object Notation), a plain-text, human-readable lightweight computer data interchange format, which adopts a hierarchical name-value model for representing simple data structures and associative arrays (called objects). Our implementation allows integration of large datasets with metadata (authors, affiliations, bibliographic references, units of measure etc.) into a single resource. It is equally suited to represent other geo-referenced volumetric quantities — beyond tomographic models — as well as (structured and unstructured) computational meshes. This approach can exploit the capabilities of the web browser as a computing platform: a series of in-page quick tools for comparative analysis between models will be presented, as well as visualisation techniques for tomographic layers in Google Maps and Google Earth. We are working on tools for conversion into common scientific format like netCDF, to allow easy visualisation in GEON-IDV or gmt.