

FAIR Digital Objects for 5D imagery of our and other planet(s)

Imaging the environment is an essential and crucial component in spatial science. This concerns nearly everything between the exploration of the ocean floor and investigating planetary surfaces. In and between both domains, this is applied at various scales –from microscopy through ambient imaging to remote sensing –and provides rich information for science. Due to recent the increasing number data acquisition technologies, advances in imaging capabilities, and number of platforms that provide imagery and related research data, data volume in nature science, and thus also for ocean and planetary research, is further increasing at an exponential rate. Although many datasets have already been collected and analyzed, the systematic, comparable, and transferable description of research data through metadata is still a big challenge in and for both fields. However, these descriptive elements are crucial, to enable efficient (re)use of valuable research data, prepare the scientific domains e.g. for data analytical tasks such as machine learning, big data analytics, but also to improve interdisciplinary science by other research groups not involved directly with the data collection. In order to achieve more effectiveness and efficiency in managing, interpreting, reusing and publishing imaging data, we here present a project to develop interoperable metadata recommendations in the form of FAIR [1] digital objects (FDOs) [2] for 5D (i.e. x, y, z, time, spatial reference) imagery of Earth and other planet(s). An FDO is a human and machine-readable file format for an entire image set, although it does not contain the actual image data, only references to it through persistent identifiers (FAIR marine images [3]). In addition to these core metadata, further descriptive elements are required to describe and quantify the semantic content of imaging research data. Such semantic components are similarly domain-specific but again synergies are expected between Earth and planetary research. We here present the current status of the project, with the specific tasks on joint metadata description of planetary and oceanic data.

[1] Wilkinson, M. I. et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* 3, 160018 (2016), doi:10.1038/sdata.2016.18.

[2] <https://fairdigitalobjectframework.org/>

[3] <https://marine-imaging.com/fair/ifdos/iFDO-overview/>

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Standards

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Metadata, Digital Objects, GIS

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Scientist/ Data Producer

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