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Building a useful and usable data legacy from major interdisciplinary research programmes: the QUEST experience.

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"Quantifying and Understanding the Earth System" (QUEST) is a major UK research programme for Earth system science, with strong links to international global change programmes and to key Earth system modelling and observational data centres around the world. We report and reflect on the data challenges through the life of the programme and in its current synthesis phase, drawing on discussions from a data legacy workshop series.
We have encountered the substantial operational barriers to the knowledge integration that is needed for responses to contemporary societal challenges. Earth system science involves researchers from many disciplinary backgrounds, using global data sets pertaining to physical, chemical, biological, geological and socio-economic aspects of the Earth, relating to multiple timeframes, and including observational data, model output and future projections. Very often, these data are still collected and stored in a piecemeal fashion, and different research communities have different preferred formats.
QUEST has invested in the QUEST Earth System Data Initiative, as a way to assist Earth system researchers wanting to use and visualize global georeferenced data sets. The QESDI portal provides a means for accessing a broad range of Earth system-related data, downloadable in a common format, along with access to the underlying data from which the synthesis data sets have been constructed. Tools have been developed for displaying the data, with some interpretation and analysis tools. Given the breadth of users with diverse expertise across the global change community, there is a focus on metadata and rich text explanations of data collection, analysis, and other pertinent information, so that users can use data sets with more confidence (and with less risk of inappropriate use).
The lasting success of portals like this hinges on the committed engagement of the scientists involved, but it seems that concern for many data issues slips between the gaps of much contemporary global change science. In the spirit of interdisciplinary inquiry, we take a sociologist's perspective in exploring the cultural issues in big-programme science that shape that engagement (or its lack), and apply a political economist's analysis in proposing recommendations and incentives that could improve compliance and commitment with data stewardship and sharing initiatives in future programmes.