CO₂ Data Share: A platform for sharing CO₂ storage reference datasets from demonstration projects

Odd Andersen¹ Grethe Tangen¹ Sallie Greenberg² Philip Ringrose³

¹SINTEF
²Illinois State Geological Survey
³Statoil/NTNU

Abstract

Extensive research is ongoing worldwide to build competence and to develop cost-efficient technologies for safe injection and subsurface storage of CO₂. Currently, the full potential of academic research is not realized due to limited access to reference datasets from field-scale and industry-scale CO₂ storage projects. While synthetic data and simplified geometries are useful for proof-of-concept studies and simple estimates, data from actual CO₂ storage operations remain invaluable to guide practical research, validate assumptions and provide new insights.

Major investments in pilot, demonstration and industry-scale storage projects over the years have resulted in a range of reference datasets (Ringrose et al. 2017), which should play an important role for building confidence in CO₂ storage as a greenhouse gas control strategy. Access to well-documented reference CO₂ storage datasets and learnings from them will advance research and help build capacity within carbon capture and storage (CCS) to the benefit of the research community, industry as well as public stakeholders. Quality assured data is also essential for developing and validating commercial models, technology and tools for safe and cost-efficient CO₂ storage. However, significant barriers exist for dissemination and use of such datasets among a larger scientific audience, including technical, licensing and quality issues, costs and documentation requirements. Furthermore, limited awareness of the existence of datasets and the lack of standards for referring to research based on the data limits the industry and researchers' opportunity to build on insights gained from first-mover projects. The CO₂ Data Share is a project dedicated to address these technical and practical shortcomings by establishing an international database and distribution system for curated, quality reference datasets collected from past and on-going CO₂-storage projects. Through the support from US Department of Energy and the Norwegian Climit programme a pilot for sharing reference datasets is planned to be available for the CCS community during 2019.

In the present paper, we describe the approach undertaken to establish a robust data dissemination solution based on available national infrastructure, the identified needs and requirements of data users and data providers, practical issues and lessons learned from the preparation of the initial datasets, as well as the chosen technical solution. The current base solution uses the CKAN data
portal software, but other solutions are also considered (including simple web-based downloads). A particularly critical issue is related to adequate documentation and metadata. Datasets come in many sizes, kinds and versions, and there is a need for a consistent yet simple system for describing the data and ensuring that the assumptions and inherent limitations are made clear to the researchers, while limiting the burden on the data providers. In this paper, we outline a system based on practical experience from industry and research, and show how it can be integrated in the technical solution. Dataset sizes vary from a few Mb to 100Gb and will thus require smart data management tools as well as user-competence screening. Finally, the paper also discusses approaches for managing ownership of datasets and regulating the terms of use in line with conditions set by the projects.

CO₂ Data Share has started as a collaboration between US and Norwegian stakeholders, but aims to be an open international network that includes private and public actors. By establishing the digital infrastructure for data sharing and facilitating network activities a key ambition of the project is to provide simple measures for sharing CO₂ storage datasets from full-scale projects and field tests, thus lowering the threshold for data owners to share their data with the CCS community. It will also make it easy to find, access and use well-documented datasets from pioneering CO₂ storage projects relevant to address technology gaps and reduce uncertainty. Finally, standards for curating and exchanging data will stimulate sharing of results from research using the datasets and promote research collaborations. It can also encourage data providers to include plans for data sharing already in the planning of the demonstration projects.

Acknowledgements:

This publication is made through the support of the Gassnova/Climit programme, US Department of Energy, Statoil and Illinois State Geological Survey.

References: