This data article presents the first systematic assessment on the potential of onshore CO2-enhanced water recovery (CO2-EWR) using pure CO2 streams from industrial separation processes by this evaluation framework. The evaluation framework is developed for CO2 capture, geological utilization and storage (CCUS) project developments, including CO2 emission inventory, site suitability evaluation, and source-sink matching with techno-economic models. The data shows the matched source (CO2 source)-sink (onshore aquifer site) pairs with sites distribution and levelized cost under various scenarios. Data also shows the geographic distribution of source-sink pairs, cost curve, annual cumulative CO2 storage capacity and enhanced water production under various scenarios. Potential large-scale deployments of CO2-EWR projects with low cost in the modern coal chemical industry in China are shown and identified in the dataset. This data article is related to the research article “Cost curve of large-scale deployment of CO2-enhanced water recovery technology in modern coal chemical industries in China” (X. Li et al. 2019).

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1. Data

The data is on the first macro-scale study of potential CO₂ capture and CO₂-EWR projects by developed source-sink matching method with budget-type techno-economic models for coal chemical industry in China. The data show the details of matched source-sink pairs with potential costs. The data compiled in excel spreadsheets provides the inventory of several coal chemical processes, CO₂ emission from industrial and dilute processes of each CO₂ source, geographic distribution of potential integrated CCUS projects (source–sink pairs) with levelized costs and CO₂ storage capacity, cumulative storage capacity and water production for the whole set of modeled CO₂ sources and onshore aquifer sites in China under various scenarios of actual operating capacity in 2015, designed full capacity in 2015, and total capacity in 2016. The data can be used to identify various potential low-cost large-scale deployment of CO₂-EWR projects using pure CO₂ from the coal chemical industry in China. Data sheet and figures are compiled using Excel software (Spreadsheet tabs are shown in Fig. 1 and cost curve of one scenario is shown in Fig. 2).

2. Experimental design, materials and methods

The systematical evaluation framework is based on the synthetic framework including evaluation of CO₂ sources, site suitability, and source–sink matching with techno-economic models, and cost curve of potential integrated CCUS projects [2–5]. The details of this framework can refer to the paper by Li, Wei [1]. The data is generated through this framework considering lots of factors, such as, technology design of full-chain CCUS project, technical features of coal chemical factory, economic
parameters, factory location, project size, compression technology, location of storage sites, geological features, injection strategy, reservoir capacity, injectivity of wells, and potential for enhanced resource recovery for each prospective reservoir. The data generated by this framework include the inventory of several coal chemical processes, CO₂ emission from industrial and dilute processes, spatial distribution of potential integrated CCUS projects (source-sink pairs) with levelized costs, cumulative storage capacity and water production for the whole set of modeled CO₂ sources and onshore aquifer sites.

Fig. 1. Spreadsheet tabs with figures (excerpt).

Fig. 2. Cost curve of possible full-chain CCUS project versus annual cumulative capacity based on total capacity in 2016 (250-km searching range).
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Transparency document

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dib.2019.103810.

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