TriStore – FAQ's

Q: TriStore draws on the accumulated knowledge of a number of successful JIP's. How much data for TriStore will have originated from these JIP's and how much of the data is new?

(QF) The techniques/work flows that will be used for the characterization of the flow properties of the Triassic have been developed and tested during previous JIPs. However, the data that will be collected during the current JIP is mostly new. In addition, we expect to adapt the workflow to take into account that there will be different controls on reservoir quality within the Triassic reservoirs compared to the tight gas sandstones, which was the focus of the PETGAS JIP and resulted in the innovations feeding into the TriStore project.

(NPM) In relation to WP3, for which delivery will be led by Luca (LC) and Nigel (NPM), ~80% of the data will be new and acquired explicitly as part of the TriStore project; the other ~20% will be data on Triassic sedimentary systems that we have already collected during past research.

Q: Are you able to provide access to any relevant knowledge/data accumulated from the previous JIP's e.g. access to relevant portions of the Fluvial Architecture Knowledge Base? Relevant fault rock or cap rock data?

(QF) We have some data on the likely flow properties of fault rocks from the Triassic, which will be made available. We also have our own database on the dynamic elastic properties and mineralogy of top seals, which will be provided to sponsors as a comparison to the caprocks to Triassic reservoirs around the UK.

(NPM) In relation to WP3, we will use existing knowledge, data, technologies and knowhow that have already been collected and developed at the University of Leeds. This will include access to all Triassic related sedimentary data and information held in the FAKTS and DASA databases. This includes results from a large volume of in-house research undertaken previously by NPM and LC (plus colleagues). This accumulated information will be provided alongside much additional new data from field studies to be undertaken as part of the TriStore project.

Q: How much / what proportion of the database will comprise outcrop data rather than subsurface well data?

(QF) We will attempt to use as much subsurface data as possible as that will provide the best way of linking core analysis and wire-line log data. We will, however, have to supplement this will samples from the outcrop particularly for the caprocks and fault rocks, which are likely to be less well represented in cores than the Triassic reservoirs.

(NPM) In relation to WP3, available data relating to Triassic sedimentary successions will comprise ~70% field acquired data and ~30% subsurface data. Direct field observation is the only way to constrain the dimensions and 3D anatomy of sedimentary geobodies at the scale of facies units, architectural elements and larger. Such data are essential for subsurface characterization of flow units through sedimentary porous media.

Q: Approximately how many field locations will be sampled? how many of these are 'new' and not already well documented in the literature?

We have identified ~30 UK outcrop successions that expose Triassic strata at a scale suitable for detailed facies analysis and architectural element analysis. These are located in the following basins and their surrounding regions: Cheshire, Stafford, Worchester Graben, Needwood, Knowle, Wessex, East Irish Sea, Lancashire, Cumbria, East Midland Shelf, Nottingham (Sherwood).

(ADPS, QF) We have identified 12 locations of Mercia Mudstone (and equivalent caprocks to the Bunter and the Sherwood Sandstone Group) based on a preliminary review. This number is very likely to increase after WP1 is completed. We will aim to sample a variety of facies across this stratigraphic group. We will also use wire-line log data from offshore wells to assess whether we are missing mudstone lithofacies with particular properties from the dataset and if this proves to be the case we will attempt to sample these from outcrop.

Q: How much of the data collected for the project will be of the caprock? How much fault data will there be?

(QF) This will depend on sample availability and gaps in our dataset, as well as the key interests of final sponsors. We will not know the former until after WP1 is complete and the latter will become clearer after receiving feedback from potential sponsors. It is envisioned that we would analyse the following:

- Microstructure and unconfined MICP on up to 50 caprock samples
- Stressed MICP on up to 25 caprock samples
- Microstructure, stressed permeability and MICP on up to 50 fault rock samples
- CO_2-brine relative permeability on up to 10 fault rock samples
- Microstructure and stressed permeability on up to 100 host sandstone samples
- Microstructural analysis of up to 500 cuttings samples (caprock and host)
- Grain size analysis on up to 200 samples

(NPM) In relation to WP3, we have identified ~10 UK outcrop successions that expose Triassic Murcia Mudstone Group at a scale that will enable regional insight to be gained.

Q: To what extent will 3D modelling be a part of this Joint Industry project?

(QF) Creation of full-field geological models and flow simulations are outside the scope of this project although the data we will collect is ideally suited to populate such models. We will, however, construct simplified 2D and 3D models to explore the implications of the results on injectivity and caprock leakage. The impact of sedimentary heterogeneity their interaction with faults will be explored using industry standard flow simulation software. Top seal leakage and capillary-dominated flow across faults will probably be assessed using finite element software such as Parageo.

(NPM) In relation to WP3, we will use a range of 3D modelling tools to quantitatively describe aspects of 3D reservoir heterogeneity. Tools will include in-house developed software, such as PB-SAND and DuneModeller, plus specialist workflows that utilise MPS modelling methods. We specialise in modelling lithological heterogeneity at multiple scales from facies units, to architectural elements, to entire basin fills. Part of this modelling work will incorporate tectonostratigraphic modelling applied specifically to the fills of rift basins. Results of this modelling work will be available to sponsors of TriStore.

Q: Aside from fieldwork and conventional oil & gas wells, is there any other data that could be incorporated into this project?

(QF/NPM) Some well test data are available from onshore Sherwood Sandstone (e.g. Medici et al., 2019), which we will integrate into the study. Additionally, we already have access to a series of water company (and related) well-log and borehole records that penetrate Triassic successions.

For any further technical clarifications or questions, please do not hesitate to contact us using the details below.

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