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Multiple DOF for X-ray CT Hydrocarbon Exploration

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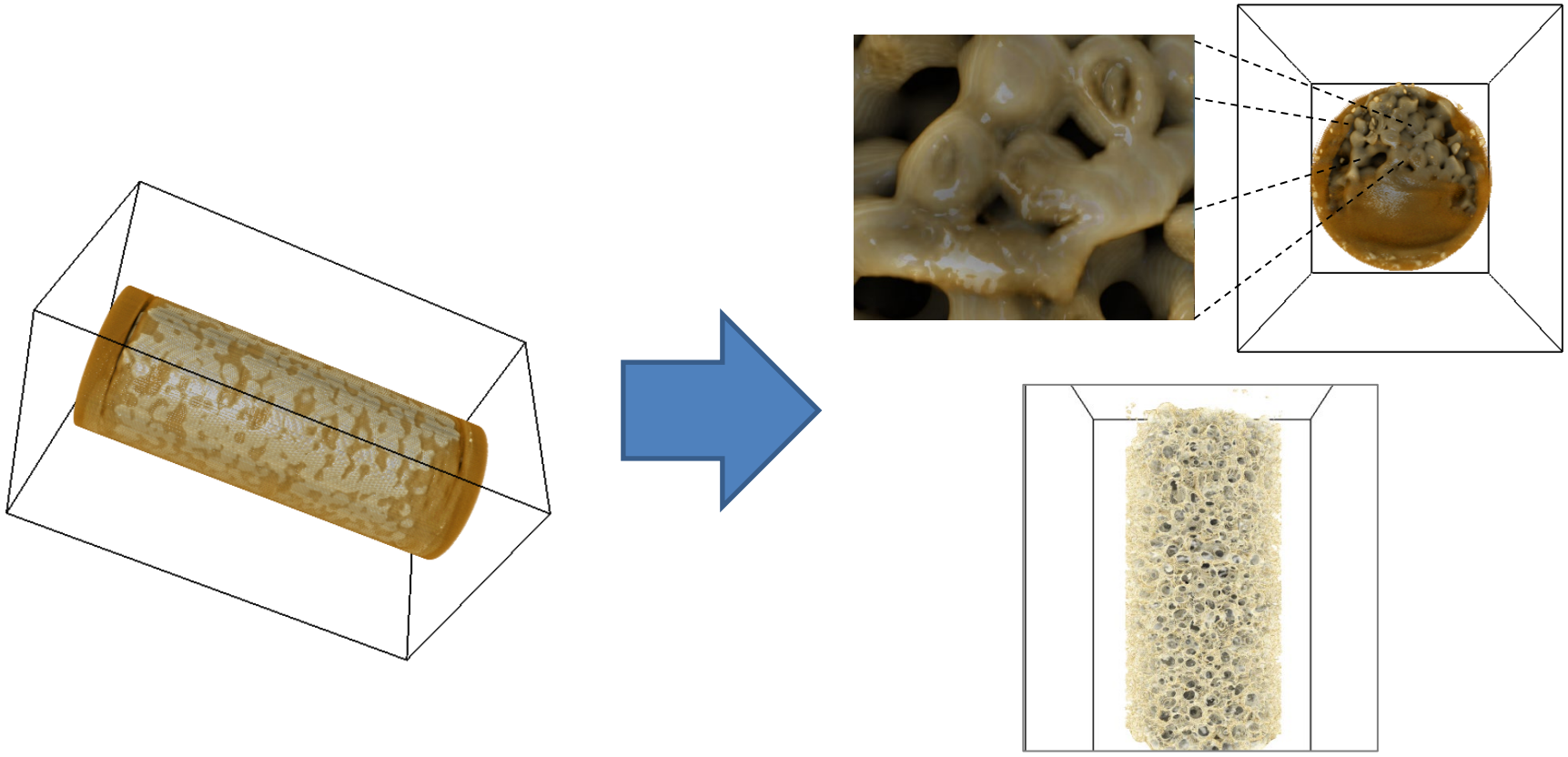
In geoscience, **CT volumes** are used to support petroleum exploration activity



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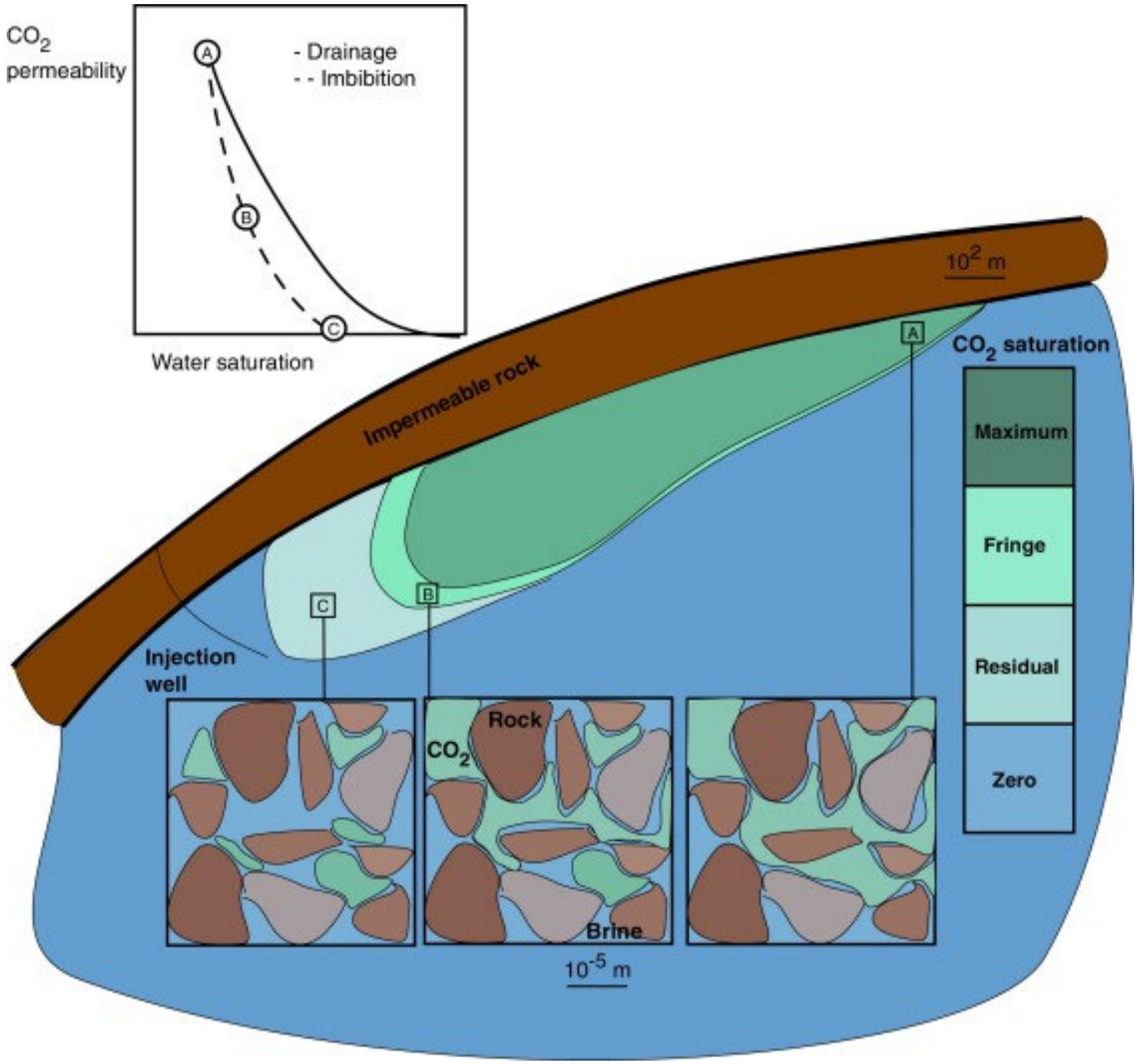
Capture and storage (CCS) of CO_2



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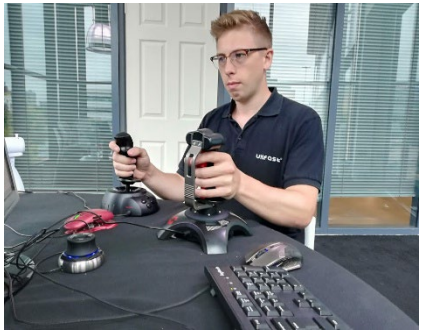
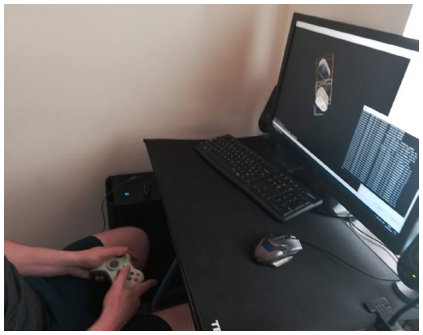
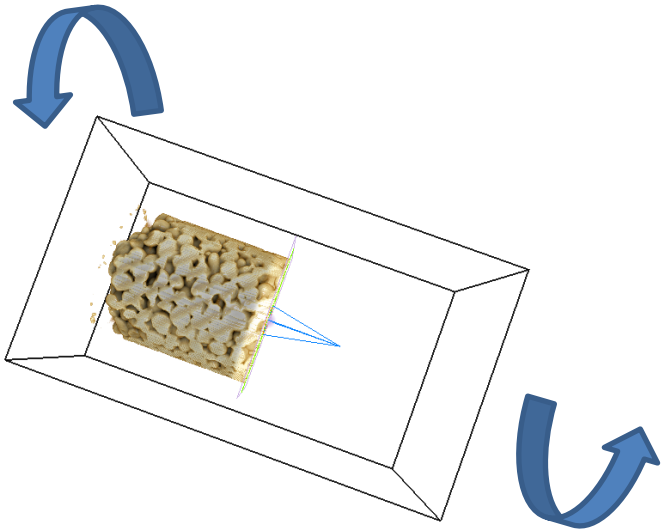
Problem to solve







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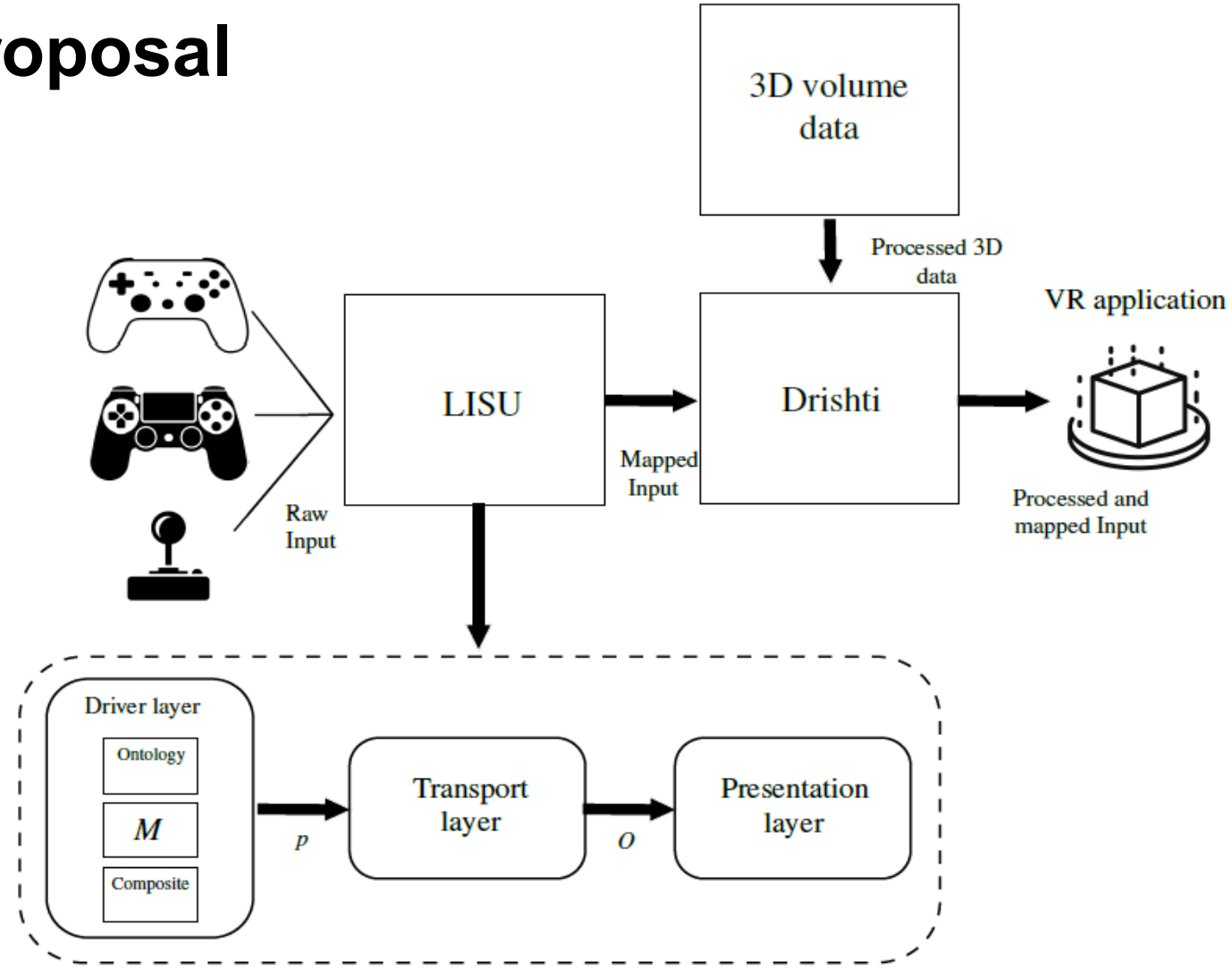
Our proposal



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Objectives

- Reconstructing a 3D model representing the residual gas trapping at the pore scale.
- Obtaining a volume data dimension of 521 x 503 x 1292 voxels, using different input devices each with multiple DOFs.

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Experimental setup and procedure

- Datasets from the British Geological Survey (BGS) database*
- LISU framework
- Python (v.3.7)
- ANU Drishti version 2.6.4

* https://metadata.bgs.ac.uk/geonetwork/srv/api/records/7315b790-333e-4e5b-e054-002128a47908

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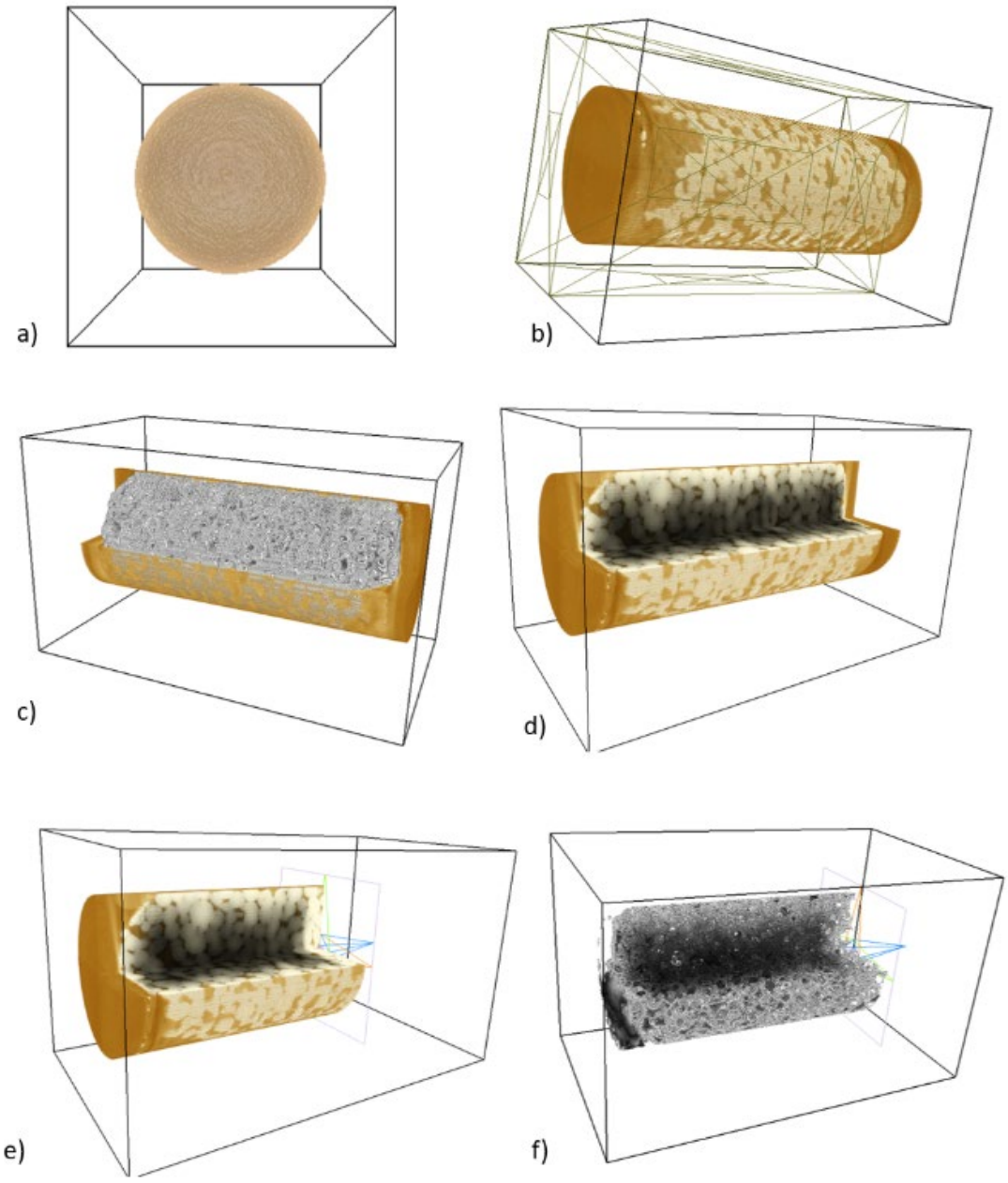

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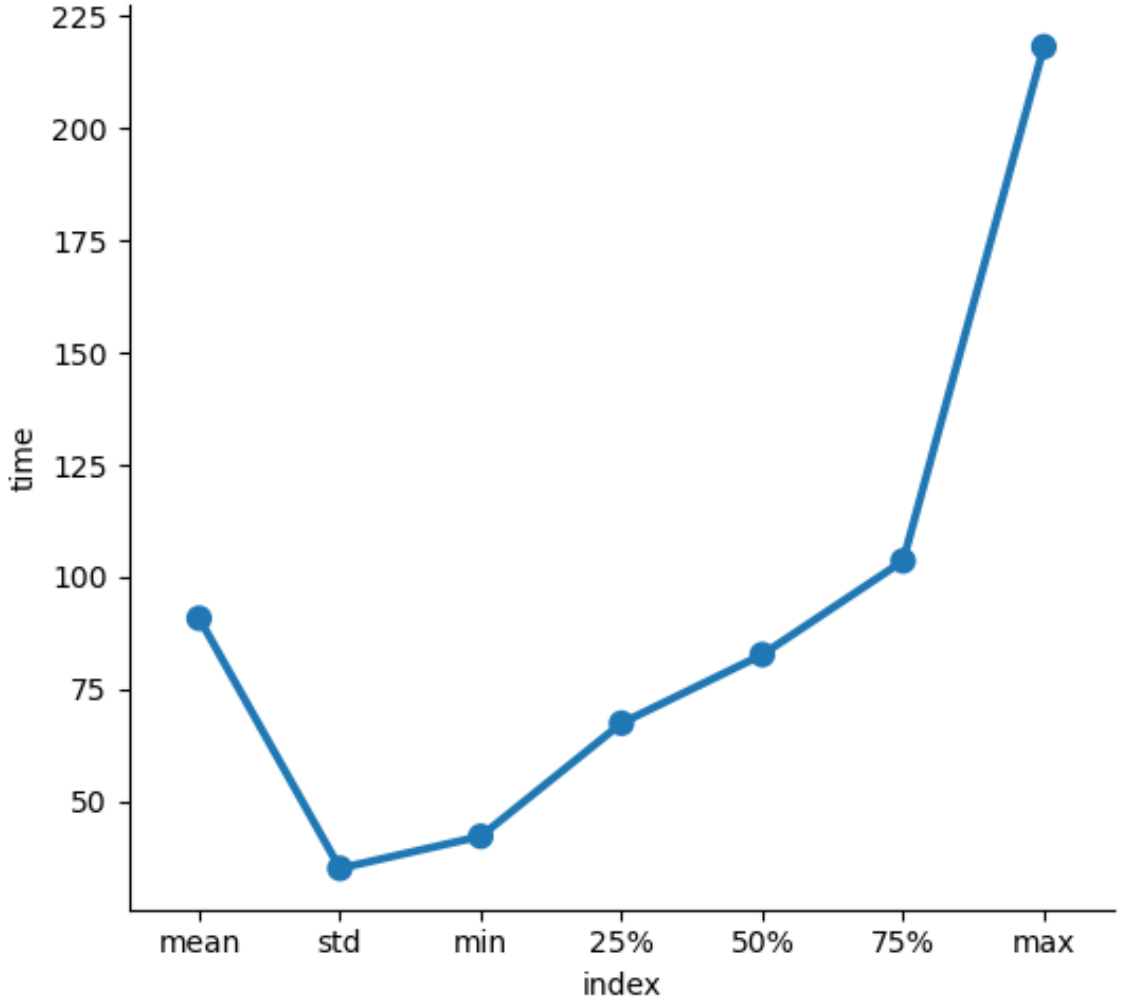
Average completion times in seconds



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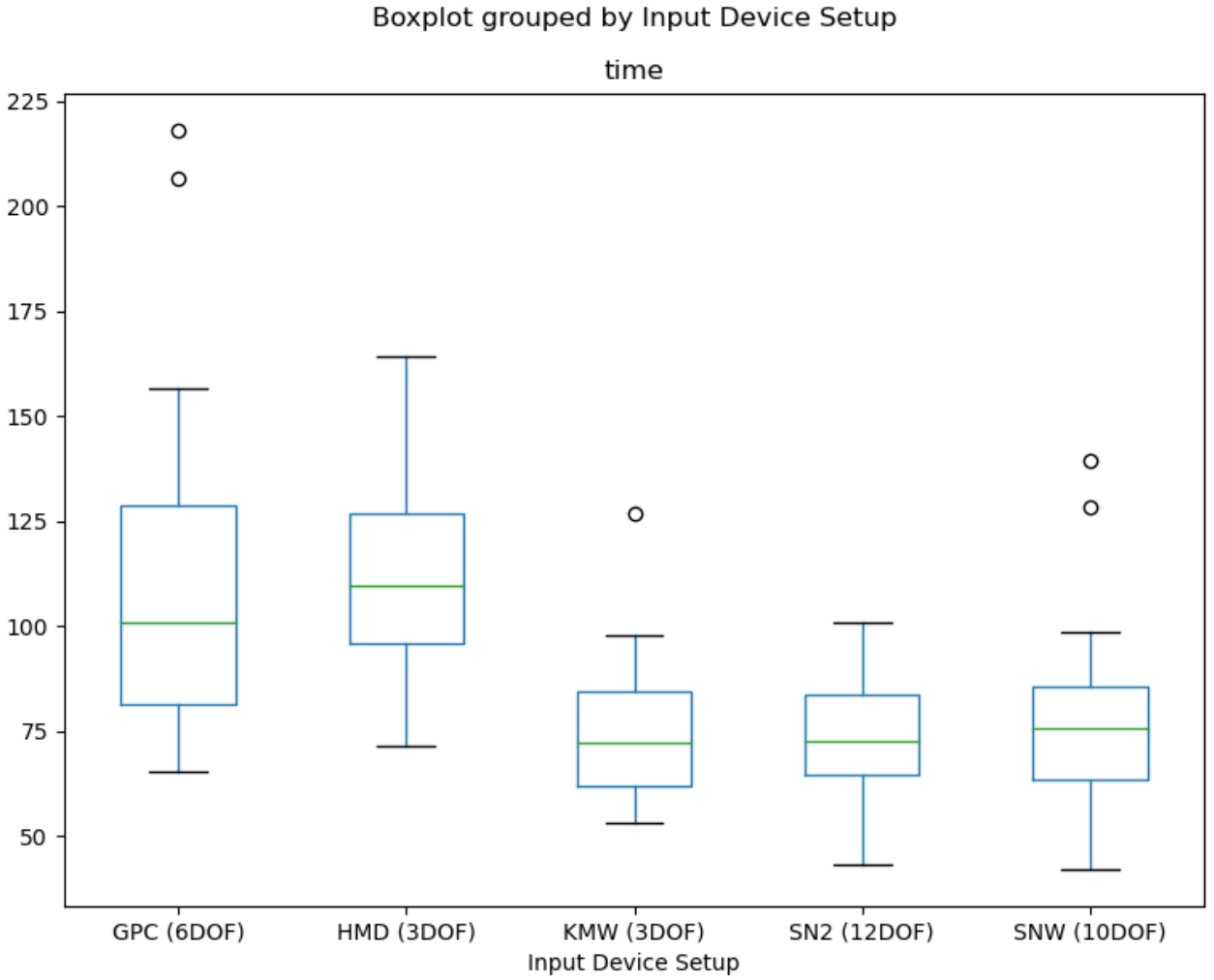
Performance time and the lapse of days of the experiment



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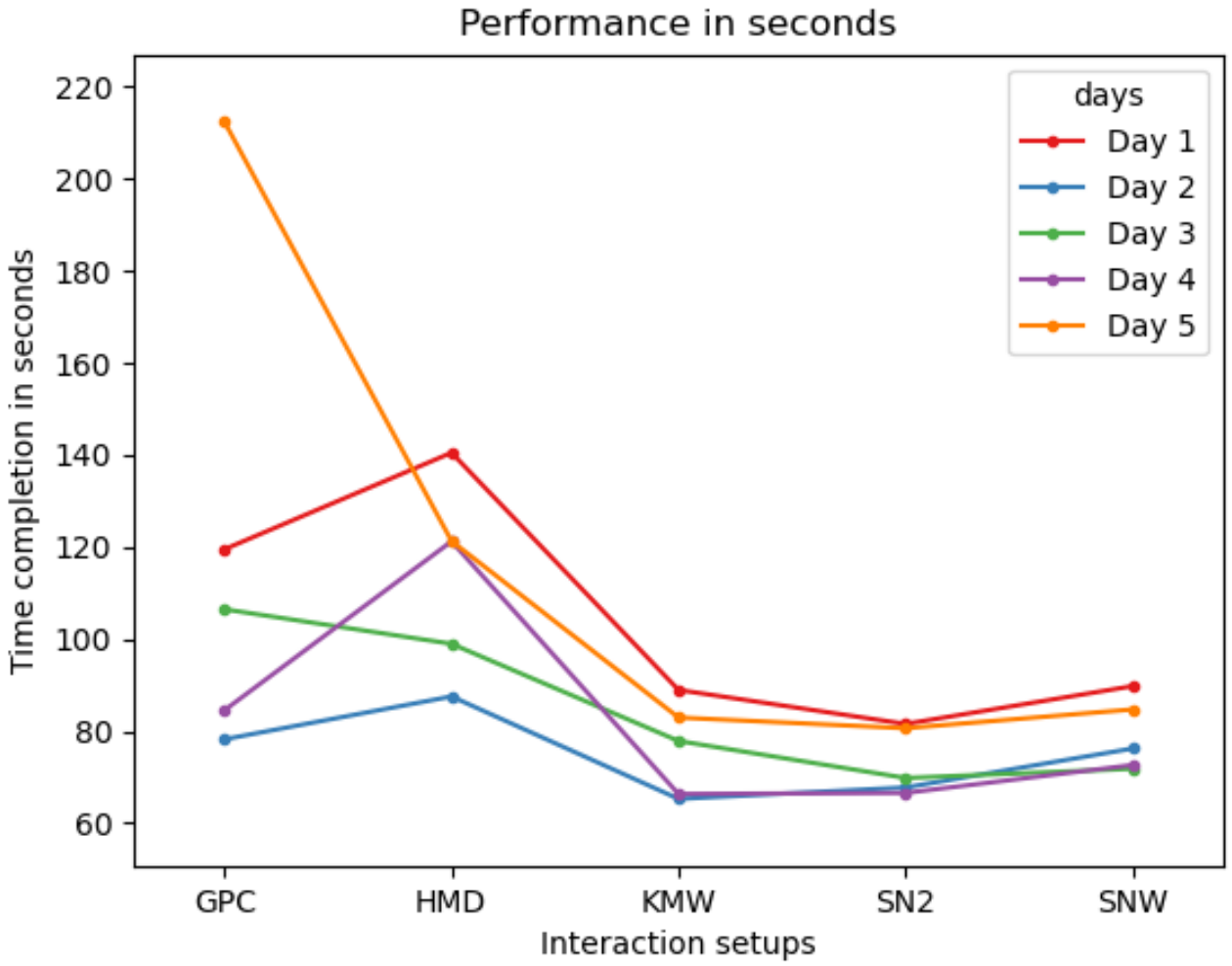
Learning curve and the lapse of days of the experiment



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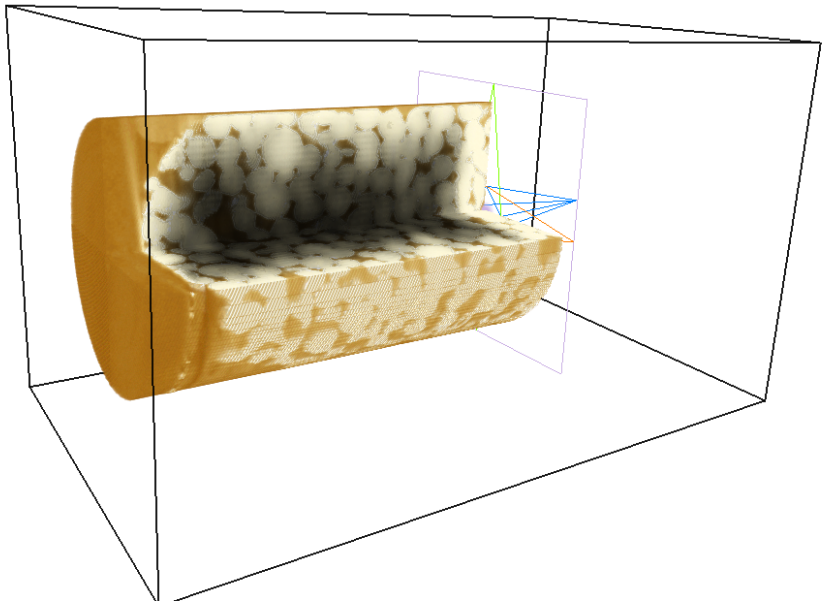
Resulting geometry of the Ketton carbonate core and flow-field within it computed using the lattice Boltzmann method*



* Sergi Molins et al., 2012; DOI: https://doi.org/10.1029/2011WR011404

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Conclusion and future work

- Evaluated a new framework for exploring and segmenting volumetric data
- Beneficial for the oil and gas community
- More accurate and precise digital reconstruction and 3D modelling in VR applications
- Further work is needed for out of the scope findings

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Questions?
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Thank you!

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