Title: Zechstein halites as a potential hydrogen storage solution – Interim Results

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Abstract:

Energy Storage is a key component in the UK's strategy for decarbonising the economy by 2050; hydrogen and compressed-air energy storage (CAES) are both core elements required to integrate renewable energy technologies into electricity grids and domestic heating networks. Bulk energy storage technologies are required to accommodate the UK's fluctuating daily and seasonal energy supply requirements. To support the development of low carbon solutions for net zero the UK's underground storage capacity must therefore be increased. Subsurface salt caverns and depleted oil and gas fields have been identified as potential sites for CAES or hydrogen storage, with hydrogen storage in porous rocks at early stages of commercial consideration. This study seeks to understand the potential capacity for hydrogen salt cavern storage in the Southern North Sea (SNS) with particular focus on Permian halite deposits. We present interim results of a study investigating the distribution and thickness of halite units within the Zechstein Group of the SNS. 3D seismic interpretation and seismic attribute analysis (e.g. Pseudorelief) is used to identify key evaporite-carbonate cycles and to derive maps of halite distribution and thickness, which are then calibrated to available well data. In conjunction with log response data, this stratigraphic geometry is used to identify areas with halite deposits that are potentially suitable for salt cavern storage and provides a dataset with which to assess potential storage capacity. We will highlight some of the challenges associated with mapping halite deposits from seismic data, and discuss the workflows used to produce robust depth and thickness maps for individual halite intervals. This work is part of a multi-centre NERC-funded project in collaboration with the National Oceanography Centre (NOC) and Plymouth Marine Laboratory (PML).