

Results data and supplementary material for: Slip-tendency analysis of a potential CO₂ storage site in the central German North Sea

Contents

1. Fault model

- **MATLAB figure file (.fig)**
Interactive visualization of the 3D fault model near Henni anticline.
- **Animation file (.avi)**
Animated visualization of the interpreted fault set to improve visibility of the fault geometry.

2. Simulation results

- **MATLAB data file (.mat)**
Contains the results of 3000 Monte-Carlo simulations with Latin hypercube sampling for each scenario of slip tendency and related quantities under normal-faulting (Scen1) and strike-slip (Scen2) regimes, both with (*Coh) and without cohesion of 2.5 MPa. The fault set is partitioned into 10 subdomains by stratigraphic units.

3. Supplementary material

- **Supplementary figure(s)**
Includes Figure S1, illustrating uncertainties in fault strike and depth.

File descriptions

MATLAB data file: This file contains processed simulation results in MATLAB structure format. It includes fault clusters produced in each simulation, along with the corresponding

- cumulative area (A_f) in km²,
- centre coordinates (area-weighted),
- mean strike (of its fault segments, area-weighted),
- mean dip (of its fault segments, area-weighted),
- mean rake (of its fault segments, area-weighted),
- mean slip tendency (T_s) (of its fault segments, area-weighted),
- mean tolerable pore pressure (Δp) (of its fault segments, area-weighted),
- potential moment magnitude estimates (M_w),
- number of fault segments.

Figure S1: This figure illustrates the zoning areas used to represent uncertainties in strike and depth. For strike, the area is divided into 18 zones according to data availability and resolution. For each zone, the range of possible strike values is shown (e.g., “340-20 deg”), and the variation is given (e.g., var. 15 deg). This means that the strike can vary by ± 15 deg

within the given range. To implement this, a strike modifier sampling factor between -1 and 1 is generated for all fault segments in each simulation and then multiplied by the variation value assigned to each zone. A skewed distribution is applied when the modified strike is expected to fall outside the specified range. For fault segments whose unmodified strike lies outside the given range, a variation of 15 deg is applied.

The subdivision for the variation of depth contains only two zones. The variations at the surface and at a depth of 2.5 km are specified. These values are applied linearly with depth to all nodes in the corresponding zone. As for strike, a sampling factor between -1 and 1 is generated and then multiplied by the variation values.

Data origin and authorship

The fault set was reconstructed by **Fabian Jähne-Klingberg (BGR)** using seismic data from multiple surveys. Analysis and post-processing were performed by **Hendrawan D.B. Aji (Kiel University)**.

Citation

Aji, H.D.B., Jähne-Klingberg, F. Results data and supplementary material for: Slip-tendency analysis of a potential CO₂ storage site in the central German North Sea Title of dataset (2026) Kiel University Research Data Repository. DOI: 10.57892/100-339.