G Model
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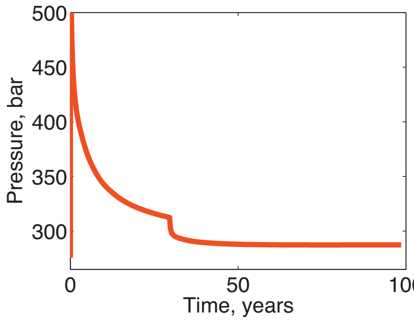
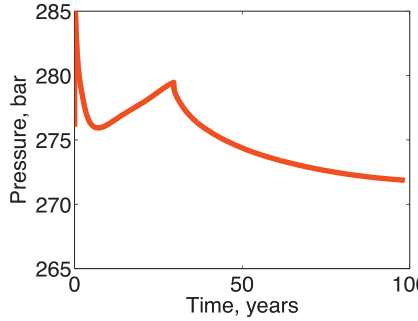
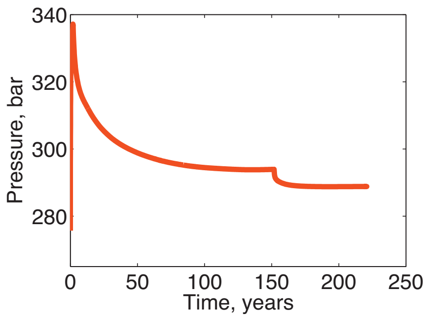


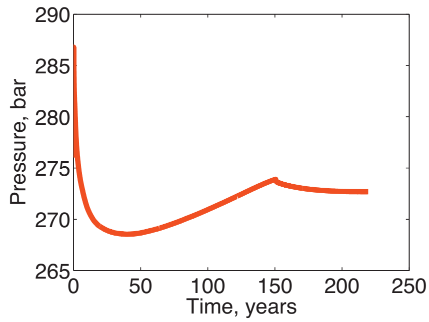
(a) Average CO_2 pressure for an extreme aggradation case in the original (high) injection rate scenario.



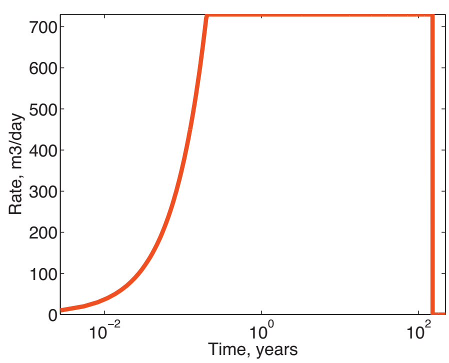
(b) Average CO_2 pressure for an average case in the original (high) injection rate scenario.



(c) Average CO_2 pressure for the extreme aggradation case in an adapted (lower) injection rate scenario.



(d) Average CO_2 pressure for an average case in the adapted (lower) injection rate scenario.



(e) Adapted injection rate scenario for safer conditions.

Fig. 14. Average CO_2 pressure values versus time for two selected cases. The initial pressure peak values in the first time step have been truncated in the plots (a), (b) and (c). They go up to 1680, 334 and 338 bar respectively.

flow pathways into regions with better rock properties, providing the possibility to relax the pressure build-up, and also to let the CO_2 escape towards the boundaries.

The expected leakage risk is plotted in Fig. 11d, and increases in value as the injected CO_2 travels upward and accumulates beneath the sealing cap-rock.

5.2. Results of CO_2 storage risk assessment

In this section, the probability distributions (rather than expected values) of system responses during and after injection are studied. Results from the MC analysis of the response surface are given as histograms of output values and also as cumulative distribution functions (CDF) for probabilities (Figs. 12 and 13).

Fig. 12a–c shows the histograms of responses obtained from the Monte-Carlo process at the end of injection. A long tail is observed for lower mobile and residual CO_2 values in Fig. 12b and c. The long tail means a large range of possible low values. Pressure shows a long tail for higher values. This means that even high critical values still have substantial probabilities to be exceeded, indicating that the possibility of geomechanical damage to sealing layers will have to receive a large attention. We observe an issue of mass conservation in Fig. 12b, where a few realizations show more mobile CO_2 in the domain than the total injected volume (which is about 40×10^6 m^3). This is a typical issue for a large class of statistical

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