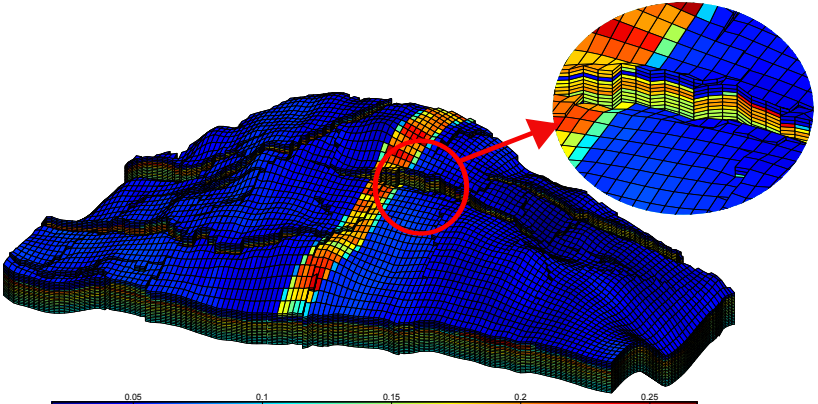
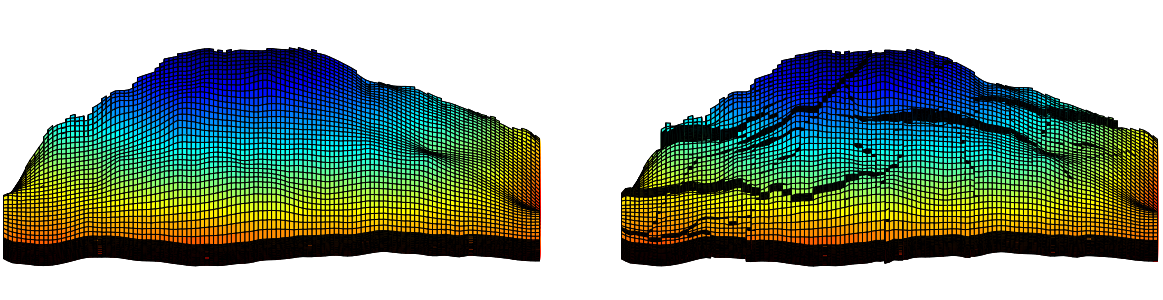


Figure 4: Faults connect layers with different rock types.



(a) Unfaulted grid.

(b) Faulted grid.

Figure 5: Models used in the study. Depth in meter is shown by color.

features with the grading levels in each one are shown in Figure 2. In addition to the features shown in Figure 2, we consider faulting levels: unfaulted, open, and close faults. Each of these features are represented with codes in the plots throughout the paper; such as shape, size, and color which are explained in Table 3.

In the last step, the produced geological realizations were upscaled via flow-based methods to a coarse grid that is suitable for detailed flow simulation. Detail of geological and simulation grid is given in Table 5.

3 Injection scenario

We assume open boundaries on the sides of the simulation model (Figure 6). The spatial dimensions of the model are relatively small (9km $\times$ 3km $\times$ 80m). Therefor, assuming closed or semi-closed boundaries results in an unrealistic pressure build-up in the domain due to