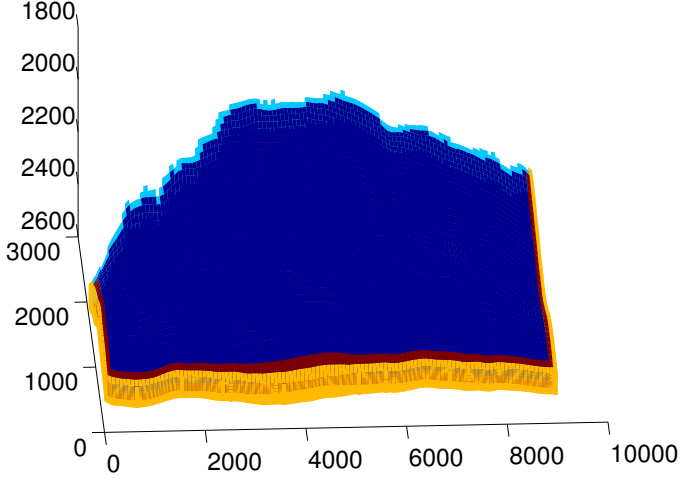

Figure 6: Boundaries in the flow simulation model; the crest boundary (light blue) is considered closed to flow. Cells' pore volume at other sides of the model are multiplied by 10^3 (red) and 10^6 (yellow) to model the open boundaries on the sides.

in the medium for both strategies.

In the pressure-constrained strategy, the injector operates with the priority of injecting a volumetric rate of 3650 m^3/day. A pressure constraint of 400 bar is set on the injector. If the well bottom-hole pressure goes higher than that, the well priority changes to continue operating at 400 bar by reducing the injection rate until the target CO_2 volume is injected into the medium. As soon as the total injected volume reaches this number, the injector will be shut from the bore-hole and no injection happens for the rest of simulation time.

4 Pressure analysis

We start by discussing the pressure responses we will use in our study for one particular realization. Then we do the full analysis by considering all of the 160 specified realizations, which are made by combining the geological variable levels discussed earlier[1]. Response plots are shown and discussed accordingly. Most of the reported results are chosen at 2.4 hours (0.1 day), i.e., at the beginning of injection. At that time, the system pressure response is higher compared to the later times when the pressure in the system drops to lower values (Figure 7b). In additon, at this time the same amount of CO_2 is injected in all cases, which allows for a fair comparison between cases.

Four types of responses are considered to be basis for the comparison between cases. One important question is how fast we can inject into a realization. To compare different cases, injection time is calculated considering a fixed total volume of injection in all models. Pressure behavior in the system is studied, by looking at aquifer average pressure and pressure elevation across the well. An overpressure region is defined in which the volumetric spread of over-pressurized locations in the model is measured. Finally, the farthest place from the

[1]Combining all the features and levels makes 162 cases. However, two cases were missing in the original data set.