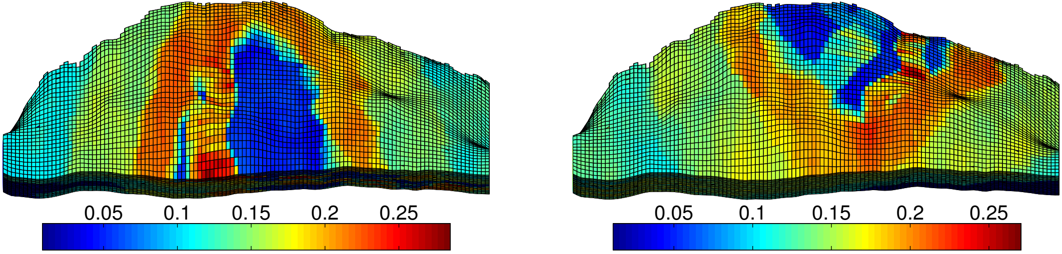

(a) Unfaulted grid. (b) Faulted grid.

Figure 3: Porosity values shown for cases with up-dip (left) and down-dip (right) progradations.

Shale draped surfaces may provide both horizontal and vertical barriers to fluid flow and are common in fluvial-dominated systems. They are the product of very shortterm fluctuations in the fluvial systems and periodic floods in the delta. Shore line shape is correlated to the shape of these flow barriers; straight shorelines typically have planar seaward-dipping clinoforms and curved shorelines have clinoforms that resemble top-truncated cones. Within the SAIGUP modeling process, these barrier surfaces were modeled as stepped transmissibility multipliers on the cell faces. Dipping barriers were not included in the flat shoreline models and in the realizations with lobosity, between one and three barriers were included. For the purpose of SAIGUP, three levels of barrier coverage were modeled for all of the SAIGUP models (10%, 50% and 90% coverage), with a smaller subset of 12 models having 100% coverage. All levels of coverage were subsequently slightly modified by removing the barriers where the fluvial channel deposits were present, since clinoforms are a feature of the delta front and not formed within a channel setting.

Aggradation angle models the variation of shoreline in a 2D, depositional dip-orientated cross-section. Within the SAIGUP study, the trajectory vary between horizontal progradation and pure vertical aggradation. Aggradation angle is a function of the balance between sediment supply and the rate of accommodation in the sea. When the fluvial flux increases in level, the deposition from the river toward the sea pile toward the sea and make the aggradation angle.

The final factor varied during the sedimentological modeling was the progradation or depositional-dip direction. The progradation direction is important in the CO_2 injection operations because the structural dip controls the injection well position and the direction of CO_2 plume movement during Injection. In Figure 3, injecting in high permeablity channels enhances the well injectivity and lowers the pressure build-up in the medium.

The faults are modeled as post-depositional with no related changes in facies thickness or shoreline orientations. Faulting process causes layers with different quality to become adjacent (Figure fig:fltZ). This can enhance the pressure connectivity by breaking the sealing layers, or it can produce sealed compartments that are not connected to the rest of the domain.

We have selected five geological parameters from the SAIGUP project to study the impact of heterogeneity on the pressure responses in a typical CO_2 injection problem. The considered