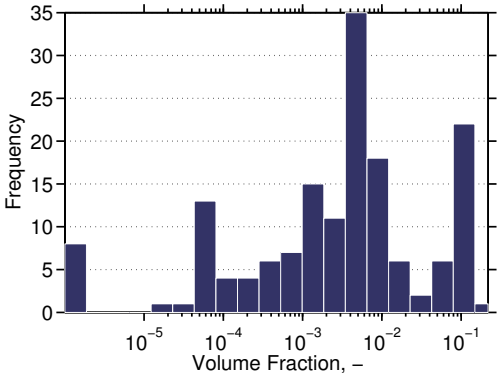
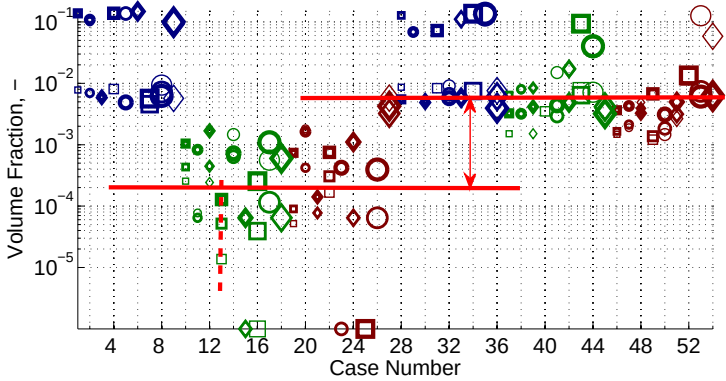


(a) Histogram of build-up volume fractions.



(b) Case plot of build-up volume fractions.

Figure 11: Build-up volume fraction for all cases in the rate-constrained scenario.

given in Figure 10. Here, we clearly see that low agrradation angle is very influential in the pressure buildup in the injection zone. A group of cases with low aggradation angle have a relatively large pressurized region in Figure 10b. However, also there are number of cases in Figure 10b that have a relatively low pressurized fraction. In these cases, the medium is conductive toward the open boundaries and the heterogeneity in the medium does not cause a major pressure buildup. Other observation in Figure 10b is the progradation effect; down-dip progradation, shows a rise in pressurized fraction for higher aggradation angles.

4.4 Build-up region

To study the pressure change, and how a pressure disturbance spreads through the medium, we use another metric. We calculate the pressure change by subtracting the initial pressure at each location from the current pressure. Different realizations are compared for the size of a region, which we call the buildup region, where the pressure increases from its initial value by 10 bar. The value 10 bar is chosen to make sure that the region has not reached the boundaries in any of the studied cases. The smaller the buildup region is, the less volume will be exposed to pressure change in the aquifer (Figure 11).

Higher pressure in the medium will obviously cause a larger buildup region. Impact of progradation on the pressure build-up is illustrated in Figure 11b. Up-dip progradation shows a relatively lower pressure buildup compared to down-dip progradation cases. We also see that aggradation dominates this effect, where cases with low aggradation angle show the same build-up pressure for both types of progradation directions (Note the blue colored markers that dont follow the lines in Figure 11b).

Several cases in Figure 11b show a trend for the fault parameter. The dashed line in the figure shows the trend of build-up pressure increase due to fault feature variations in three cases. Faulting changes the geometry of layers and puts different layers adjacent to each other. This enhances the connectivity in the medium. Local heterogeneities and closed