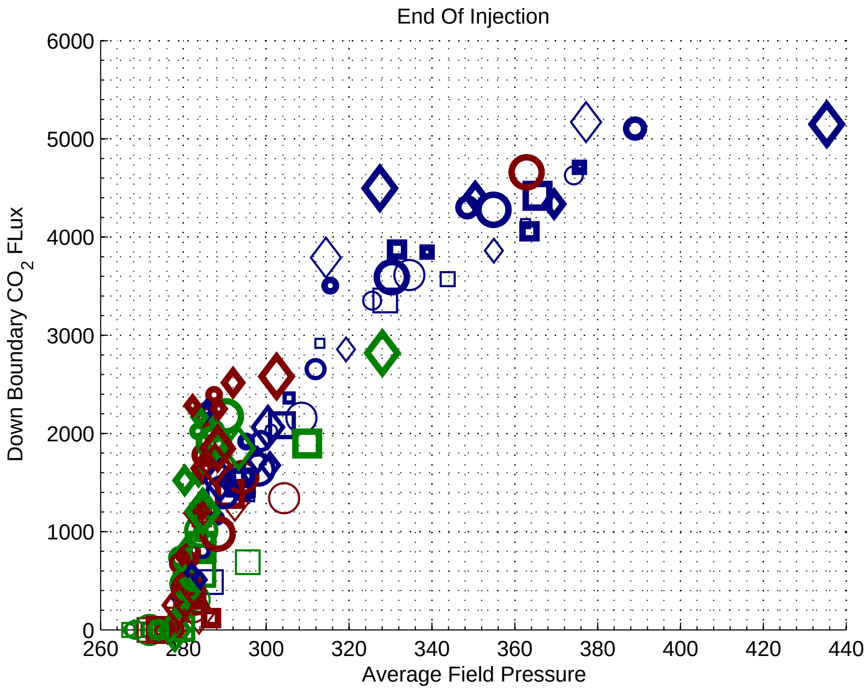

Figure 8 *Down boundary CO_2 flux versus average pressure, at end of injection.*

introduces lower number of plumes with lower volumes of residuals which make these cases to fall in between (Fig. 2).

Finally we look at total CO_2 residuals versus down boundary CO_2 fluxes at end of injection. We can recognize a negative correlation in an almost linear trend in Fig. 11. Higher out-flux through the down boundary leaves less CO_2 in the domain to migrate and this lowers the residual volumes in the domain.

Sensitivity of responses

In this section, we try to quantify the sensitivity of flow responses to each of the geological features. To achieve this, we define a gradient for each of the features. To make it clear, we use the example of barriers which are easier to explain.

We have three levels of barrier: low, medium and high. Suppose that we are interested in calculating the gradient of average field pressure with respect to barriers. We do this in two steps: first we average the average field pressure for cases of the same level of barriers. This results in three averaged pressure values corresponding to each level of barriers. In the next step, we fit a line through these three points and calculate the tangent of this line. This represents the average pressure increase due to one level increase in barriers.

For other features like fault and lobosity, we follow the same procedure. Though the feature variation is not apparent like barrier, that points to change in the type of the feature. For example, first level of fault criteria relates to unfaulted cases, the second relates to the open faulted and the third one is for the closed faulted cases. Or regarding progradation, we have two levels: up-dip and down-dip direction. The positive and negative gradient is defined based on the way we vary the defined levels.

Fig. 12 shows the average pressure sensitivity to different features at end of injection and end of sim-