in shallow-marine depositional systems are examined by using a large number of parametrized realizations representing a spectrum of sedimentological and structural scenarios.

The studied responses are most sensitive to aggradation, progradation direction, and faulting. Low aggradation angles inhibit the upward movement of the CO_2 plume and keep the flow restricted to the geological layers in which the CO_2 is injected. In cases with low rock quality in the injection layers, pressure will build up in the well-bore and large volumes may be forced down-dip and out through the lower boundary, as observed in [2]. In the down-dip progradation, the majority of the region around injection point is made of low quality rock and injecting in down-dip progradation normally ends up in a higher pressure buildup and a lower injectivity. Faults change the geometrical structure of the medium and they put different layers in contact. Pressure disturbances can leak through faults to larger distances from the injection point. Closed faults can significantly reduce the injectivity quality.

The workflow of the pressure study demonstrated here can be used in specific studies in the context of geological uncertainty. In particular, the insight of how different geological parameters impact the pressure buildup (and the migration of the CO_2 plume) can be used to predict optimal injection locations for this type of shallow-marine systems. The workflow can also be used for other depositional systems. However, since the study only involved two specific injection strategies, it is possible that one may obtain different outcomes than reported herein if significantly different values are used for the operational limits.

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