Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Analytical Model for Post-Injection Spreading and Migration of CO_2 in Saline Aquifers, including Capillary Trapping, Solubility, and Leakage CHRISTOPHER MACMINN, RUBEN JUANES, MIT — In geological CO_2 storage, careful site selection and effective injection methods are the two primary means of maximizing reservoir "fill" and assessing and avoiding potential leakage paths. An accurate understanding of the subsurface spreading and migration of mobile CO_2 during and after injection is essential for these purposes. We present an analytical model for the post-injection spreading and migration of a plume of CO_2 in a saline aquifer, including the effects of gravity segregation, capillary trapping, natural groundwater flow, dissolution of CO_2 into groundwater, and leakage through the caprock. We account rigorously for the injection period, using the true end-of-injection plume shape as an initial condition. This comprehensive model allows us to estimate reservoir capacity for CO_2 storage at the basin scale, and to assess dynamically the relative importance of structural, capillary, and solution trapping mechanisms.

Christopher MacMinn
MIT

Date submitted: 04 Aug 2008 Electronic form version 1.4