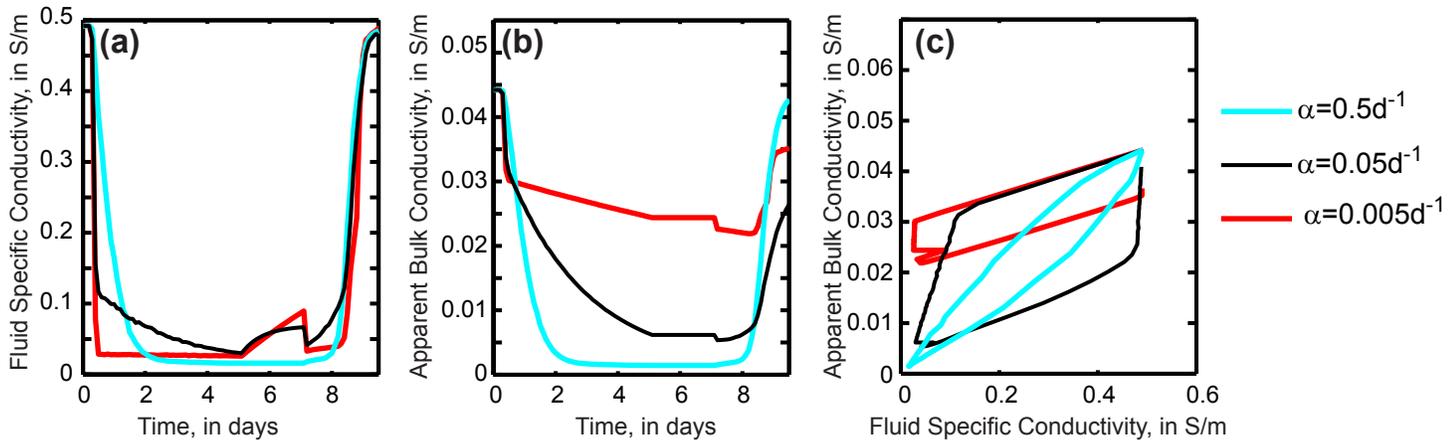
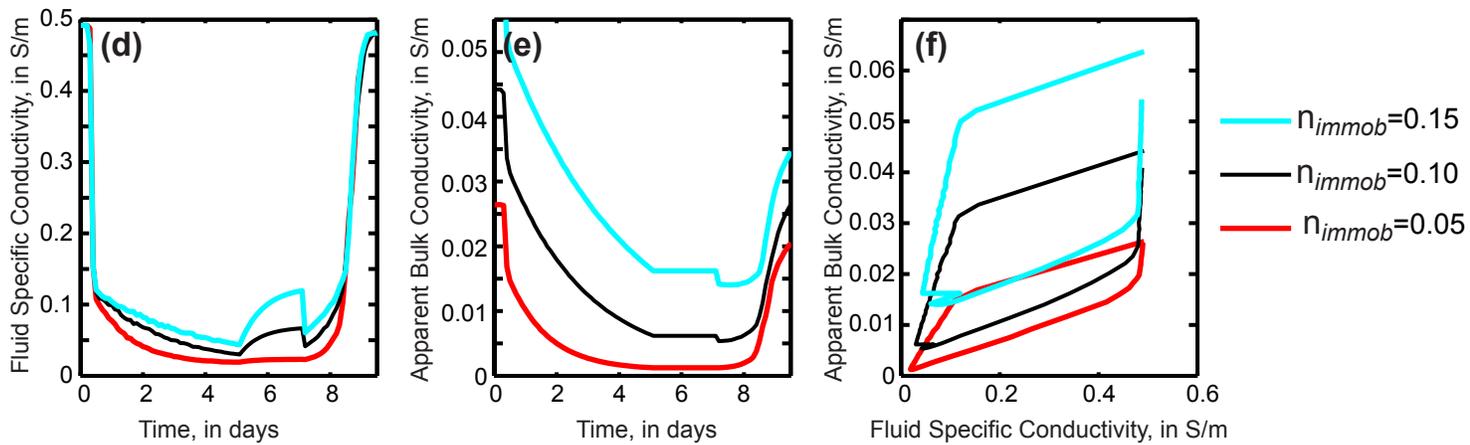


### Sensitivity to mass transfer rate constant ( $\alpha$ )



### Sensitivity to immobile zone porosity ( $n_{immob}$ )



Sensitivity analysis from numerical modeling of rate-limited mass transfer processes for an aquifer storage and recovery experiment: (a) mobile-domain fluid conductivity history (b) bulk conductivity history, and (c) the hysteresis in the bulk versus fluid conductivity curves for three different mass transfer rates; and (d) mobile-domain fluid conductivity history, (e) bulk conductivity history, and (f) hysteresis assuming variation in the immobile porosity of the fracture zone [Singha et al., 2007]. Injection was from 0-5 days, storage from 5-7 days, and recovery from 7-10 days. These results provide evidence that geophysical methods can be used to estimate key parameters controlling rate-limited mass transfer in situ.