Dear Water Resources Research Editor,

Please accept our manuscript entitled “Porosity-Permeability Relationships in Mudstone from Pore-Scale Fluid Flow Simulations using the Lattice Boltzmann Method” for review for publication in Water Resources Research. This manuscript presents a new approach to quantifying permeability evolution in mudstones during burial and during fluid injection. The approach is validated against observations that have been compiled through field and laboratory studies. Our modeling approach accessible to most and is simple to implement as it uses open source code (OpenLB) for numerical solutions of fluid flow based on grain size/type and porosity information which can be easily constrained. Thus, our work provides a new approach to assess mudstone permeability that does not require costly sample collection or time-consuming experiments. This work will be of interest to a broad readership as mudstone permeability is essential to understanding and characterizing geological phenomena (e.g., generation of overpressure, slope stability) and anthropogenic activities (e.g., geological CO2 sequestration, wastewater injection).Please feel free to contact me (hv6@rice.edu) if you have any questions about our manuscript. Thank you for considering this manuscript for review. We look forward to your response.

Sincerely,

Harsh Vora