SUPPLEMENTAL MATERIALS

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Revised Soil Classification System: Implementation and Engineering Implications

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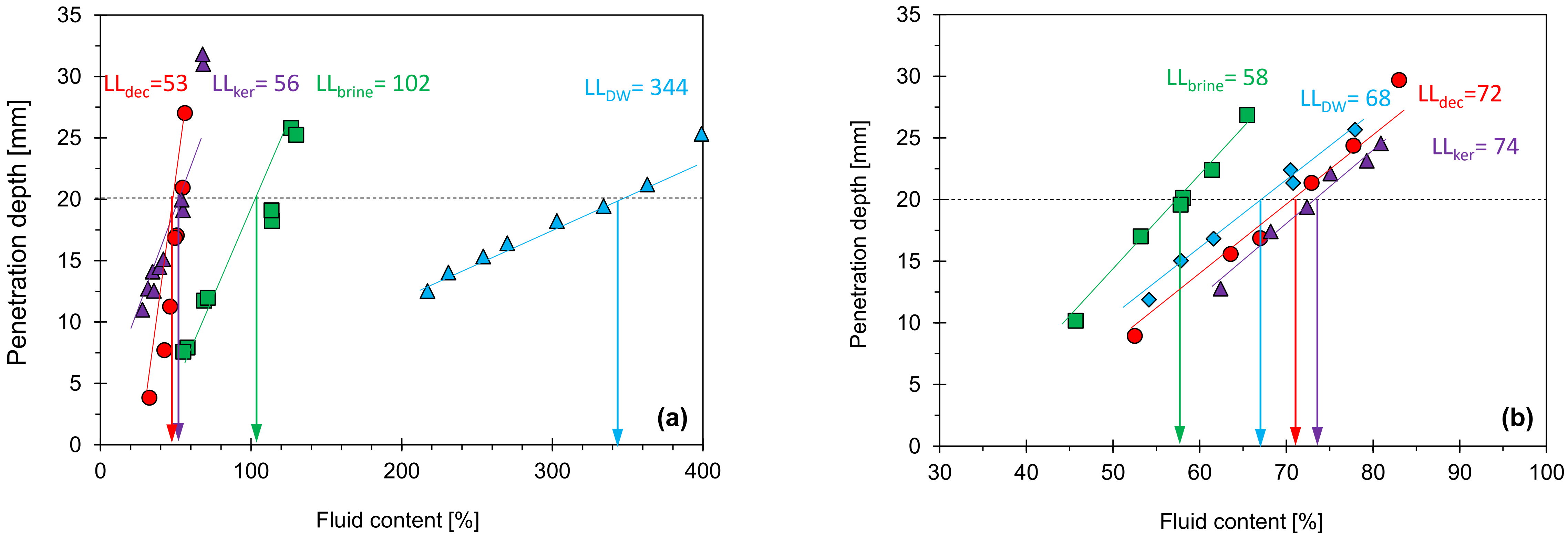
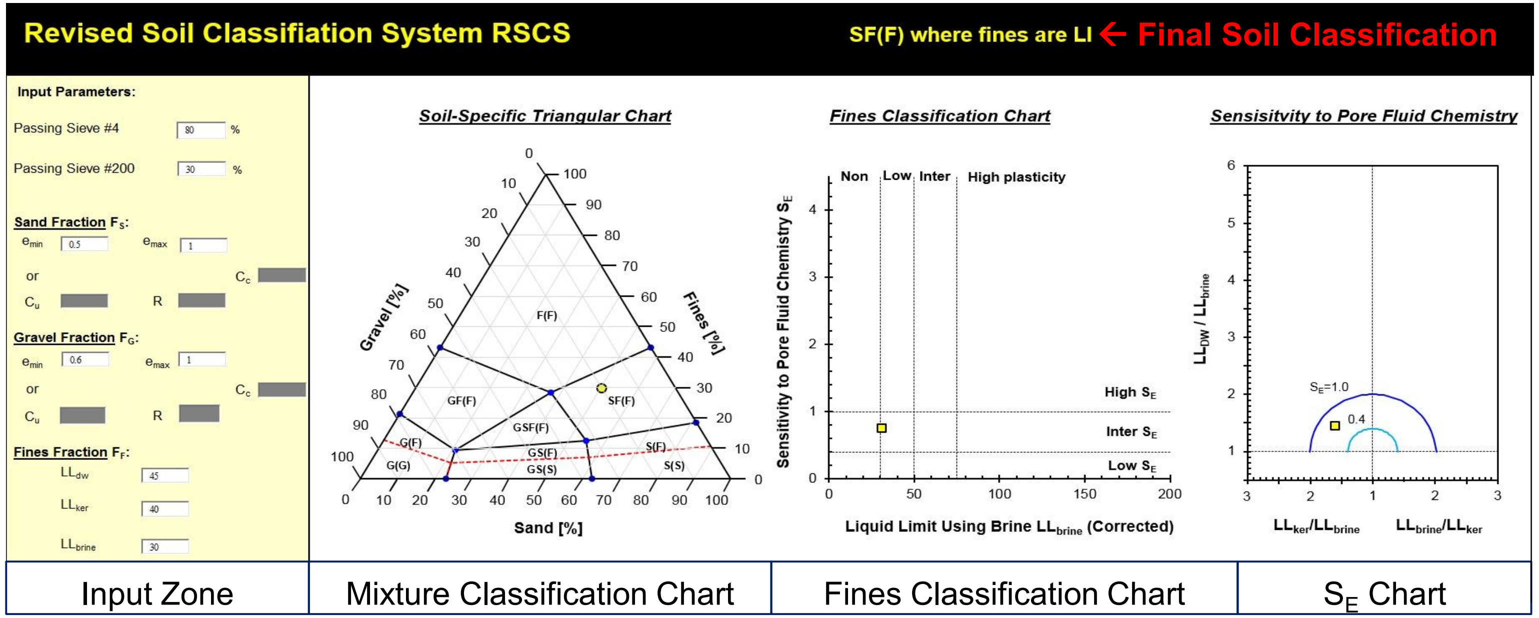


Fig. S1. Liquid limit with different fluids – Kerosene or decane? Data gathered with the cone method show that kerosene and decane produce similar results and either one can be used to represent non-polar fluids. (a) Bentonite and (b) Kaolinite.

(a)



(b)

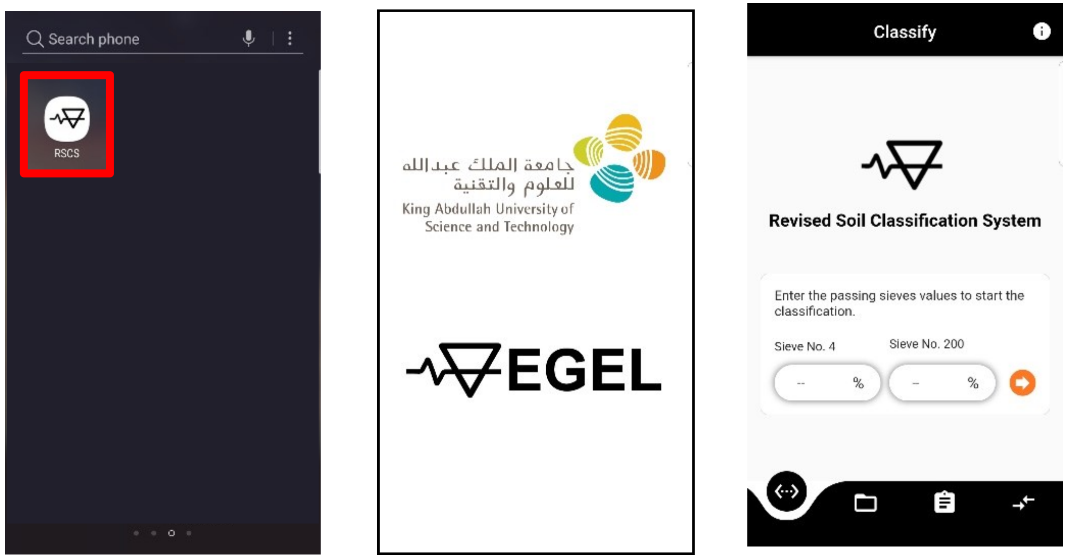
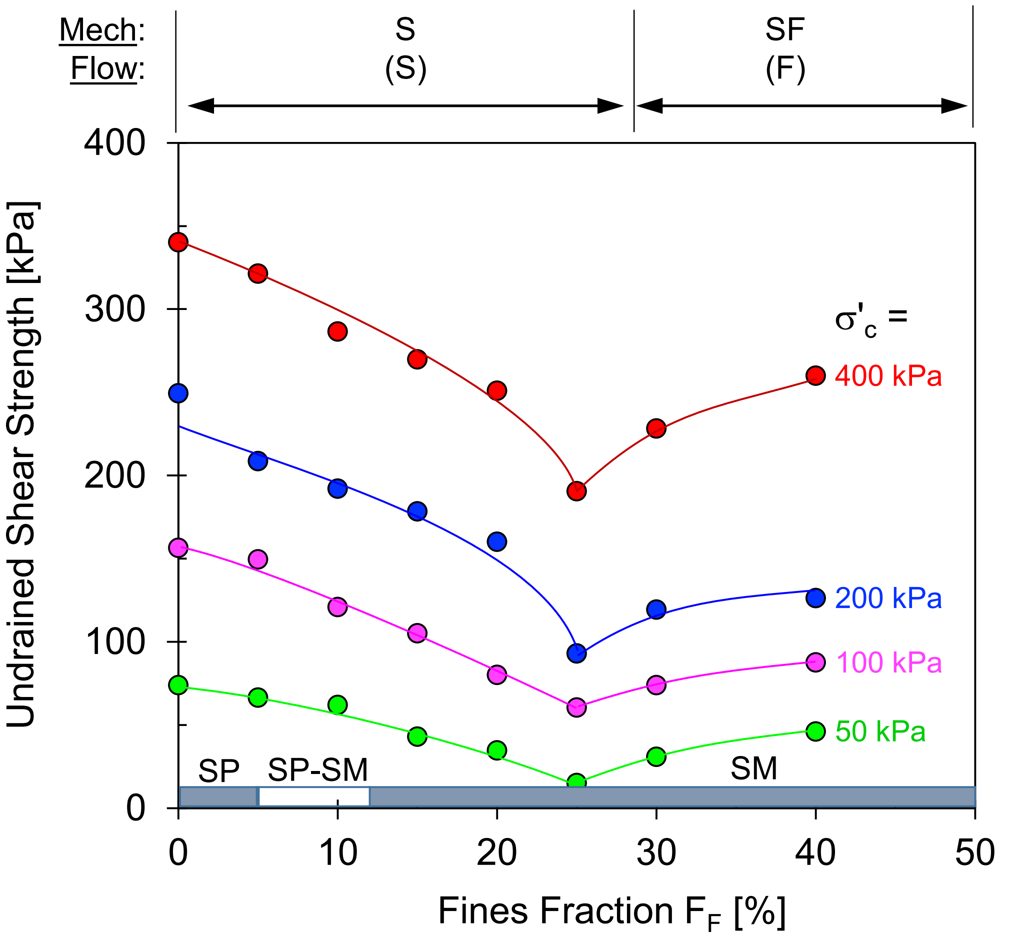


Fig. S2. RSCS implementation tools (a) Excel macro (reprinted from EGEL 2023); (b) Mobile application – available from the Android Play Store.



F_F [%]	e
0	0.78
5	0.74
10	0.71
15	0.67
20	0.64
25	0.60
30	0.69
40	0.83

Fig. S3. Undrained shear strength of sand-kaolinite mixtures (sand: uniformly graded medium sand from a river in Johor Bahru, Malaysia, e_C^{max}= 0.92, e_C^{min}= 0.65; kaolinite: LL= 38 manufactured by Kaolin Sdn Bhd, Malaysia). Effective confining stress σ'_c during undrained shear are shown for each trend. The mixtures void ratios at σ'_o= 10 kPa are tabulated on the right and the target initial relative density is D_r = 50% in all cases. (Data from Marto et al. 2014.)

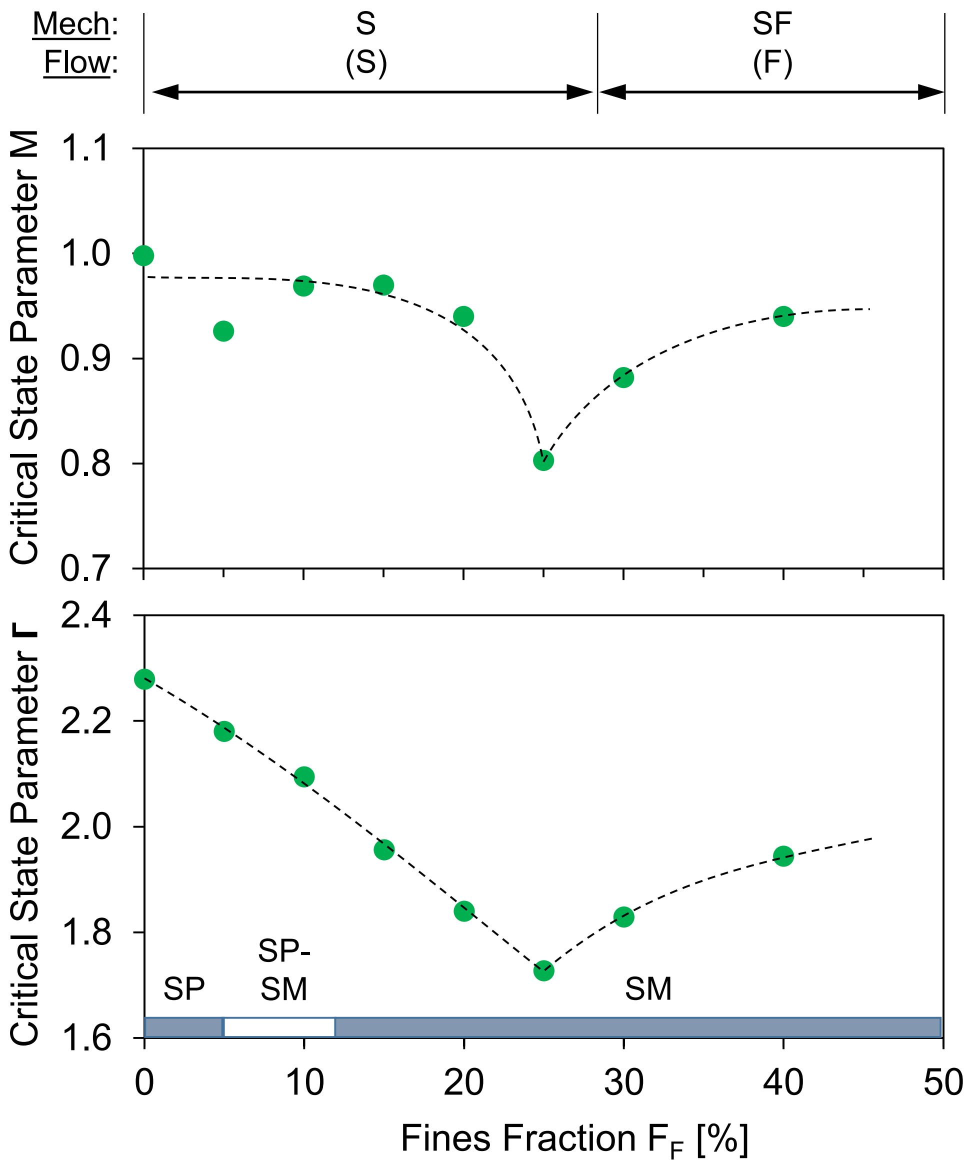


Fig. S4. Critical State Parameters. Sand-kaolinite mixtures. (sand: uniformly graded medium sand from a river in Johor Bahru, Malaysia, e_C^{max}= 0.92, e_C^{min}= 0.65; kaolinite: LL= 38 manufactured by Kaolin Sdn Bhd, Malaysia). (Data from Marto et al. 2014.)

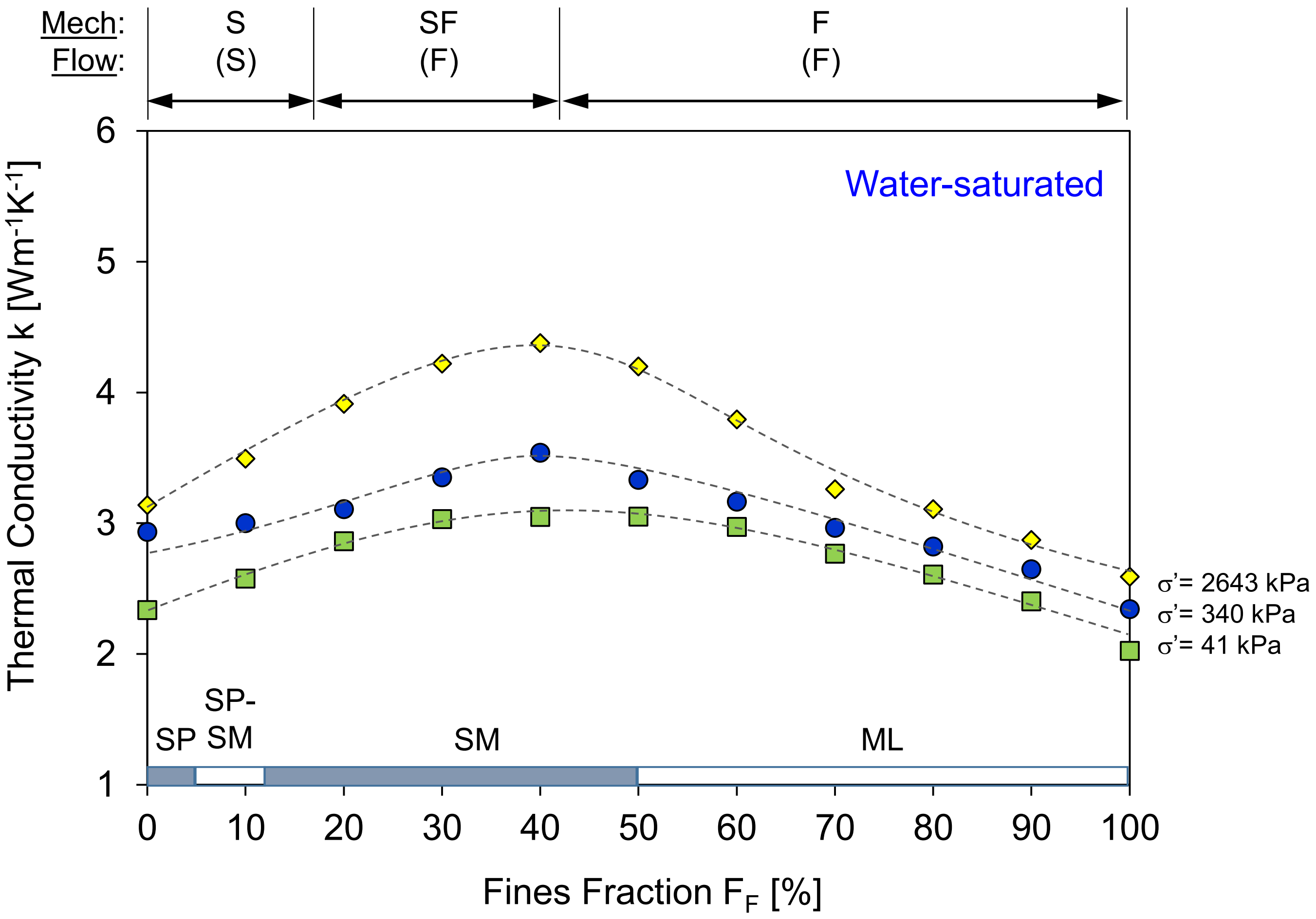


Fig. S5. Thermal conductivity. Sand-silt mixture. (sand: $e_C^{max} = 0.91$, $e_C^{min} = 0.58$; silt: $e_F^{max} = 1.81$, $e_F^{min} = 0.64$). (Data from Roshankhah et al. 2021.)

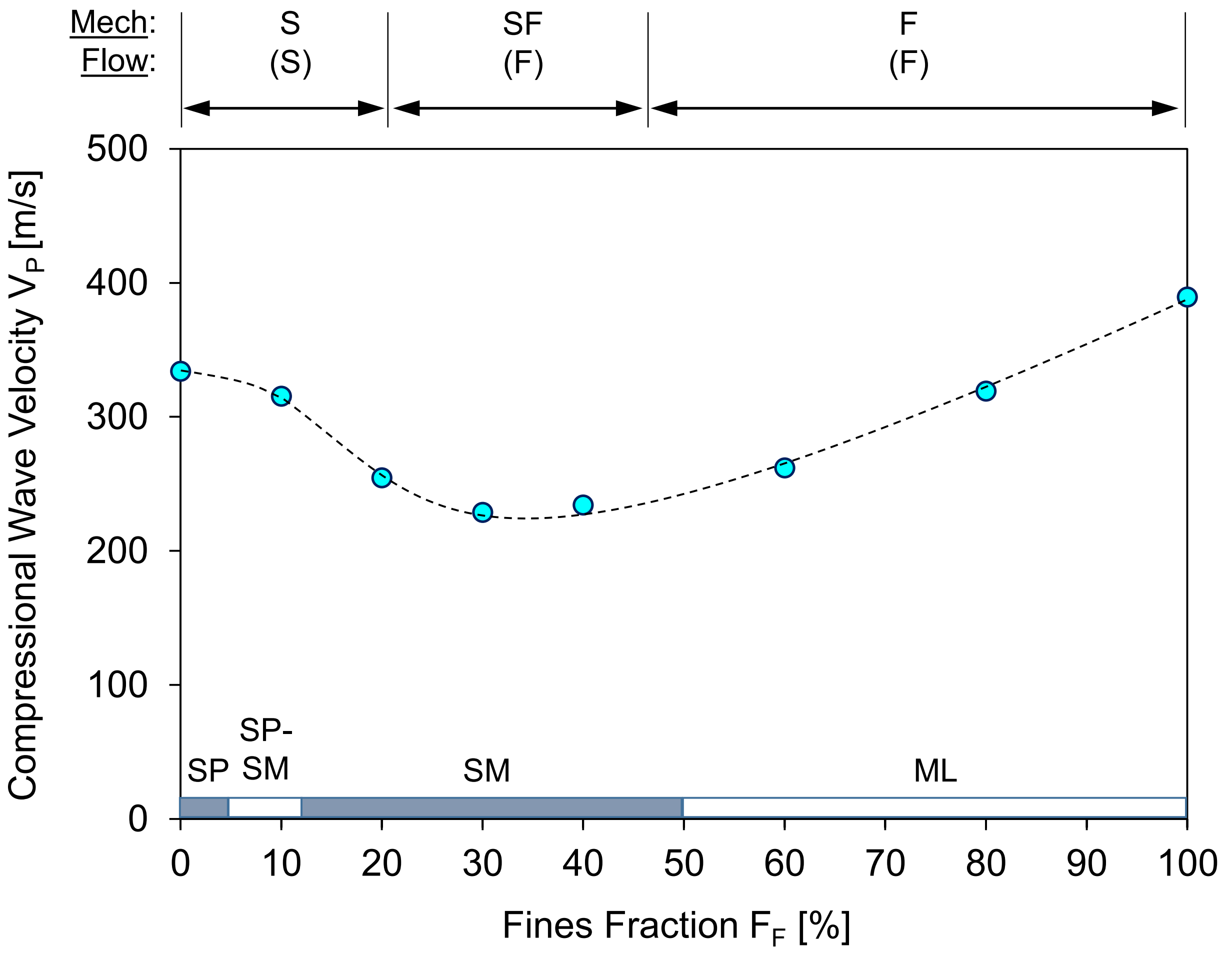


Fig. S6. Compressional wave velocity. Sand-silt mixture. (sand: $e_C^{max} = 1.02$, $e_C^{min} = 0.57$; silt: $e_F^{max} = 1.21$, $e_F^{min} = 0.50$). (Data from Kang and Lee 2015.)

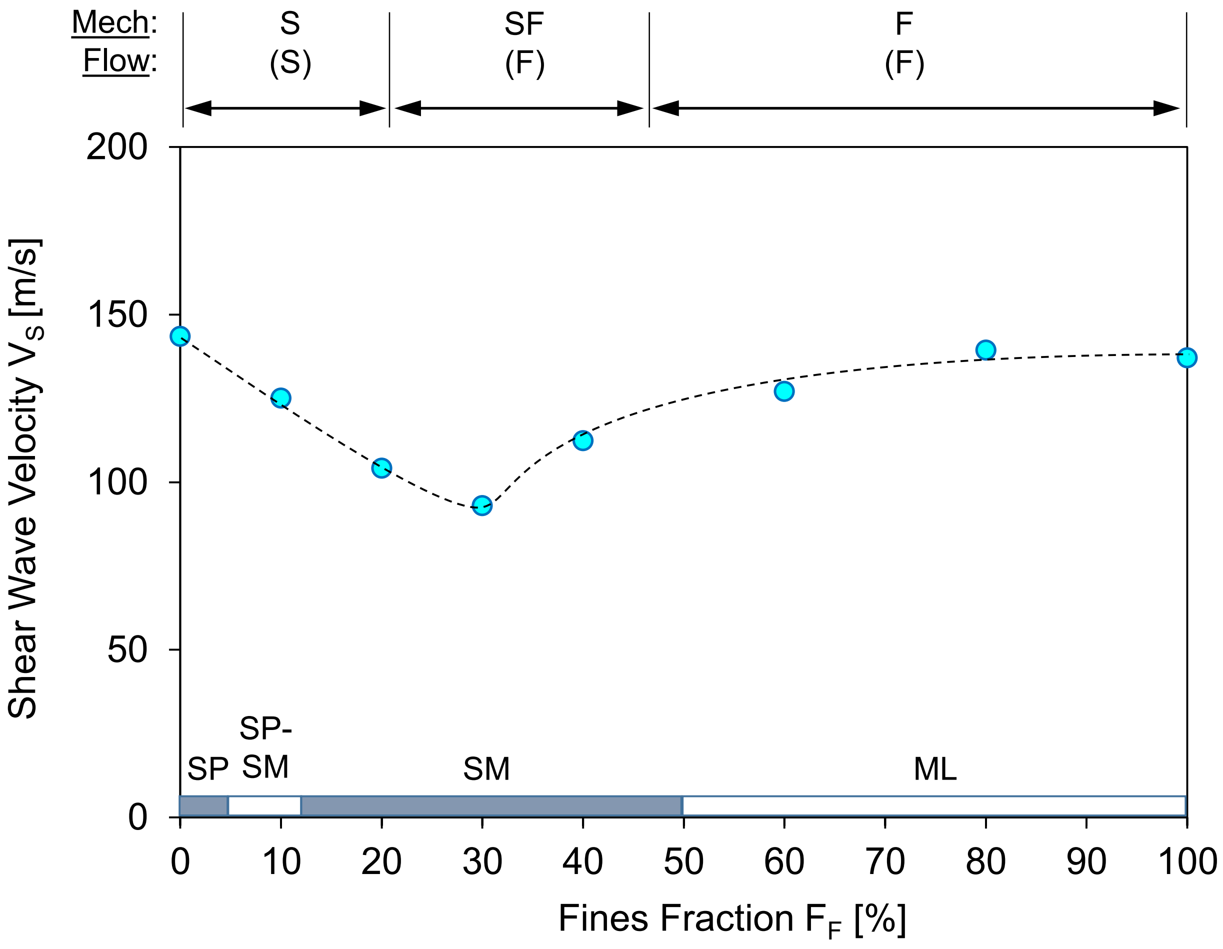


Fig. S7. Shear wave velocity: Small strain stiffness. Sand-silt mixture. (sand: $e_C^{max} = 1.02$, $e_C^{min} = 0.57$; silt: $e_F^{max} = 1.21$, $e_F^{min} = 0.50$). (Data from Kang and Lee 2015.)

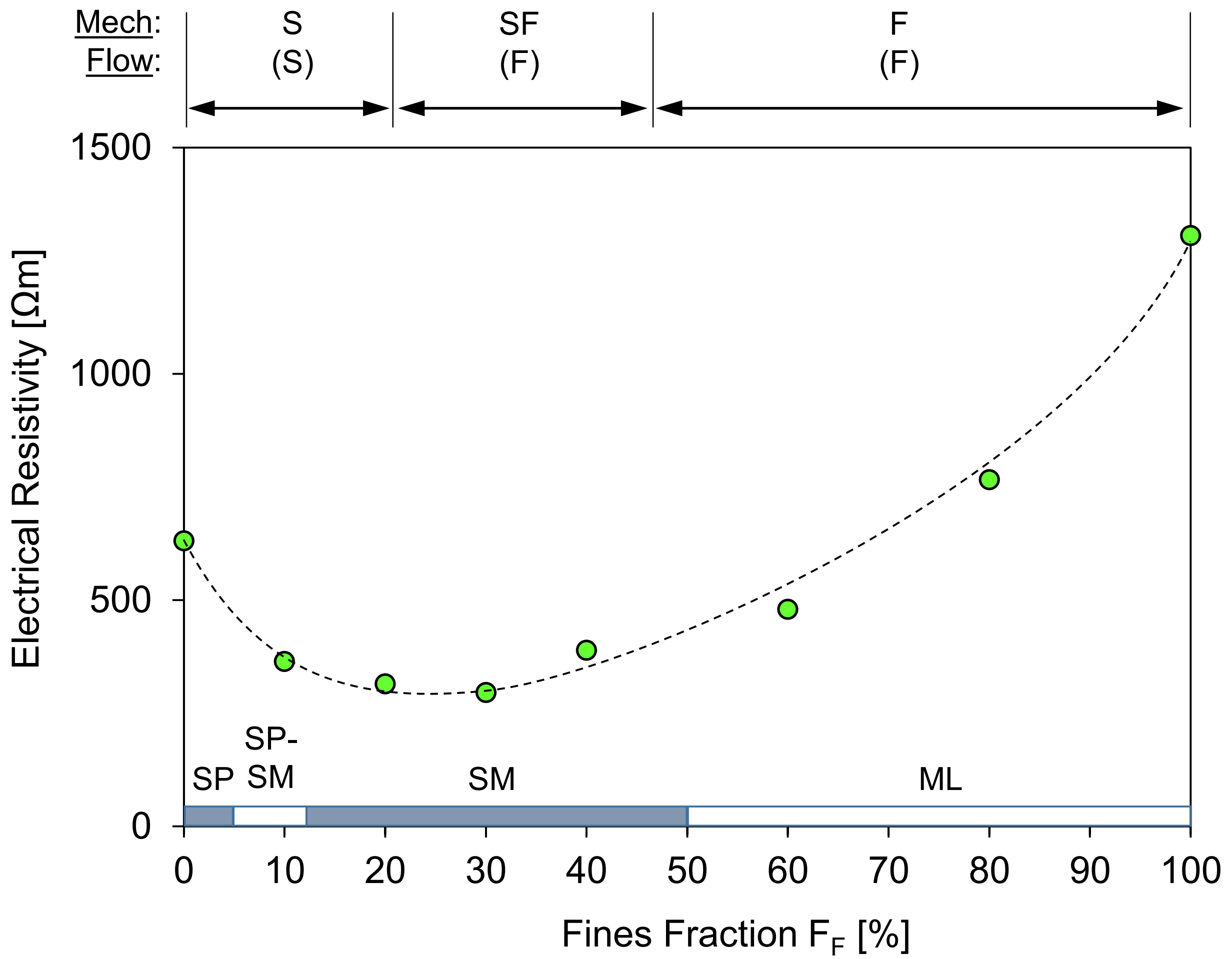


Fig. S8. Electrical Resistivity. Sand-silt mixture. (sand: e_C^{max}= 1.02, e_C^{min}= 0.57; silt: e_F^{max}= 1.21, e_F^{min}= 0.50). (Data from Kang and Lee 2015.)

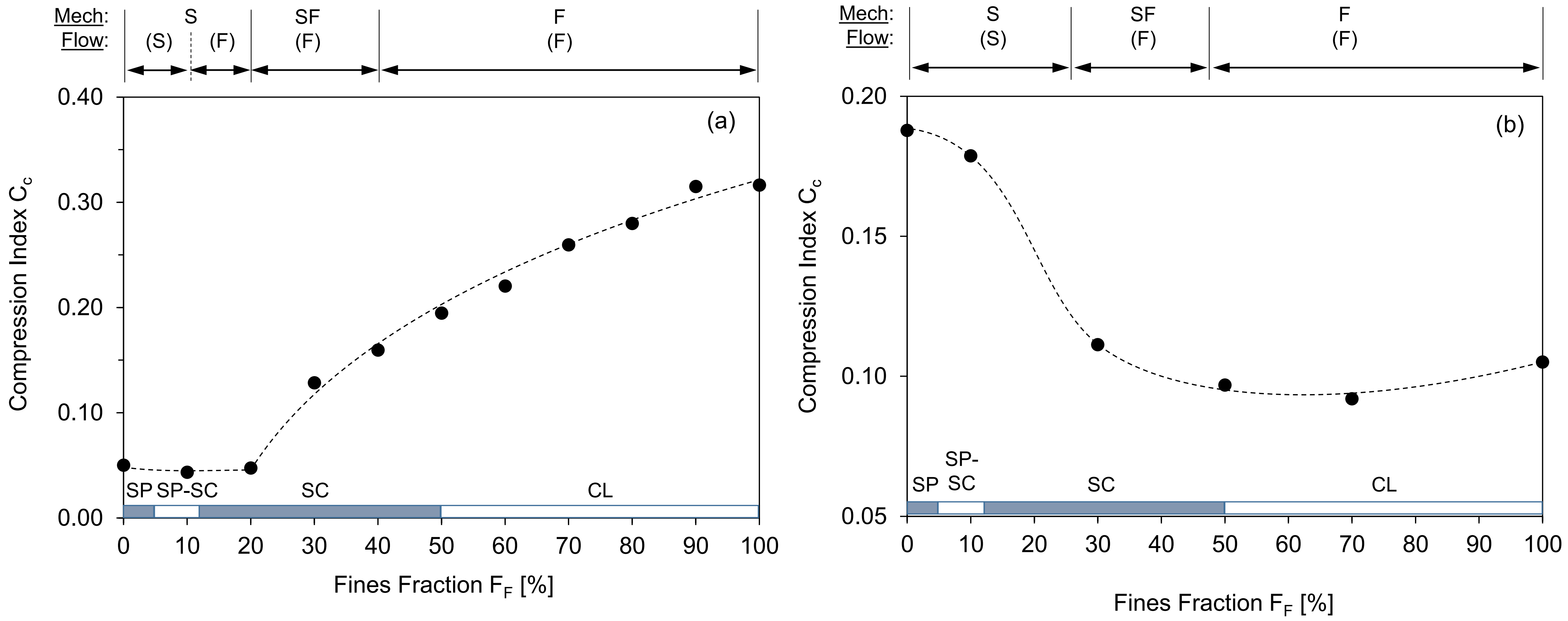


Fig. S9. Compressibility: Large strain. (a) Sand-clay mixture. (sand: e_C^{max}= 0.912, e_C^{min}= 0.584; clay: LL=49) (data from Simpson and Evans 2015); (b) Sand-Silt mixture (sand: e_C^{max} = 1.068, e_C^{min} = 0.615; silt: LL=27) (data from Carrera et al. 2011).

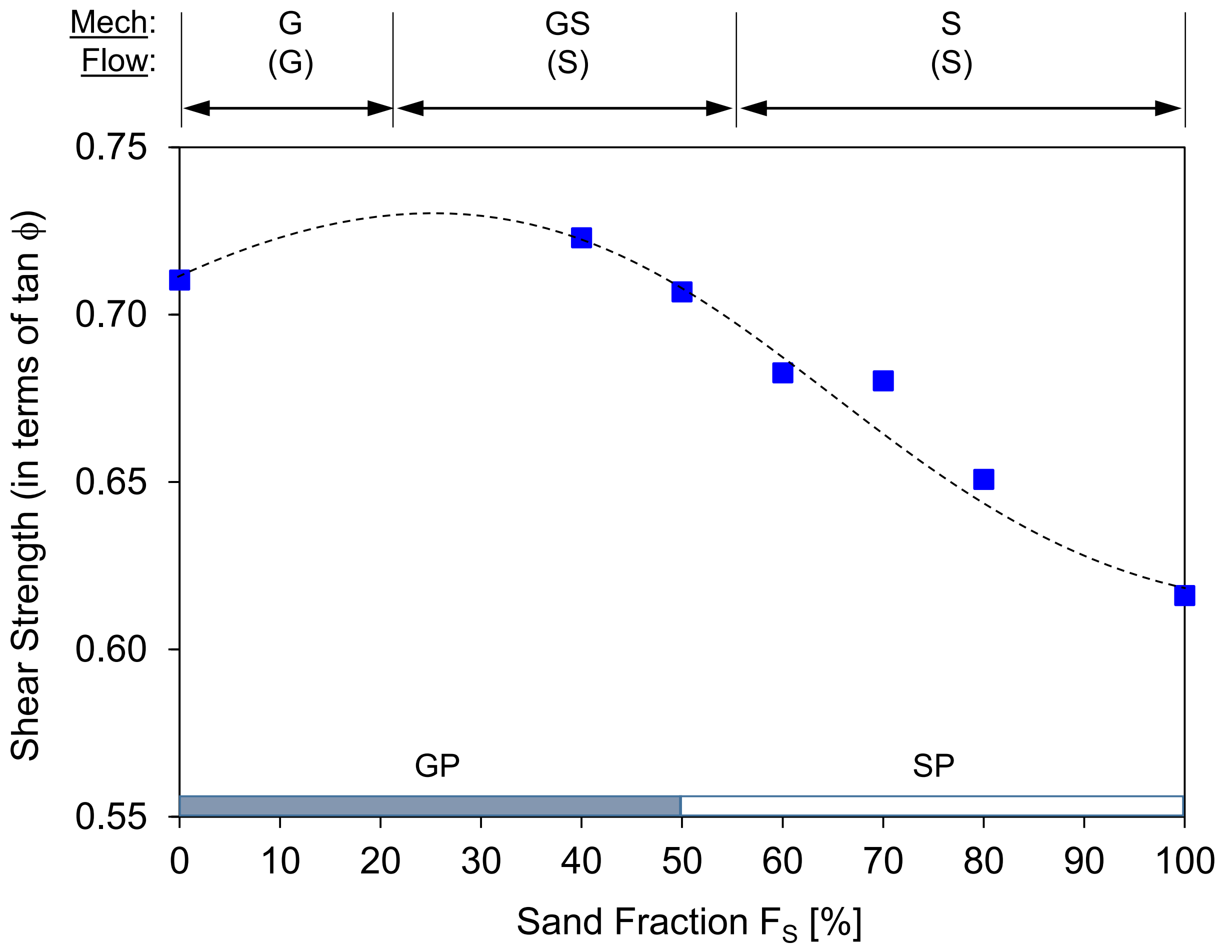


Fig. S10. Shear strength (in terms of tan ϕ). Gravel-sand mixture. (gravel: $e_C^{max} = 0.68$, $e_G^{min} = 0.44$; sand: $e_S^{max} = 0.62$, $e_S^{min} = 0.38$). (Data from Simoni and Houlsby 2006.)

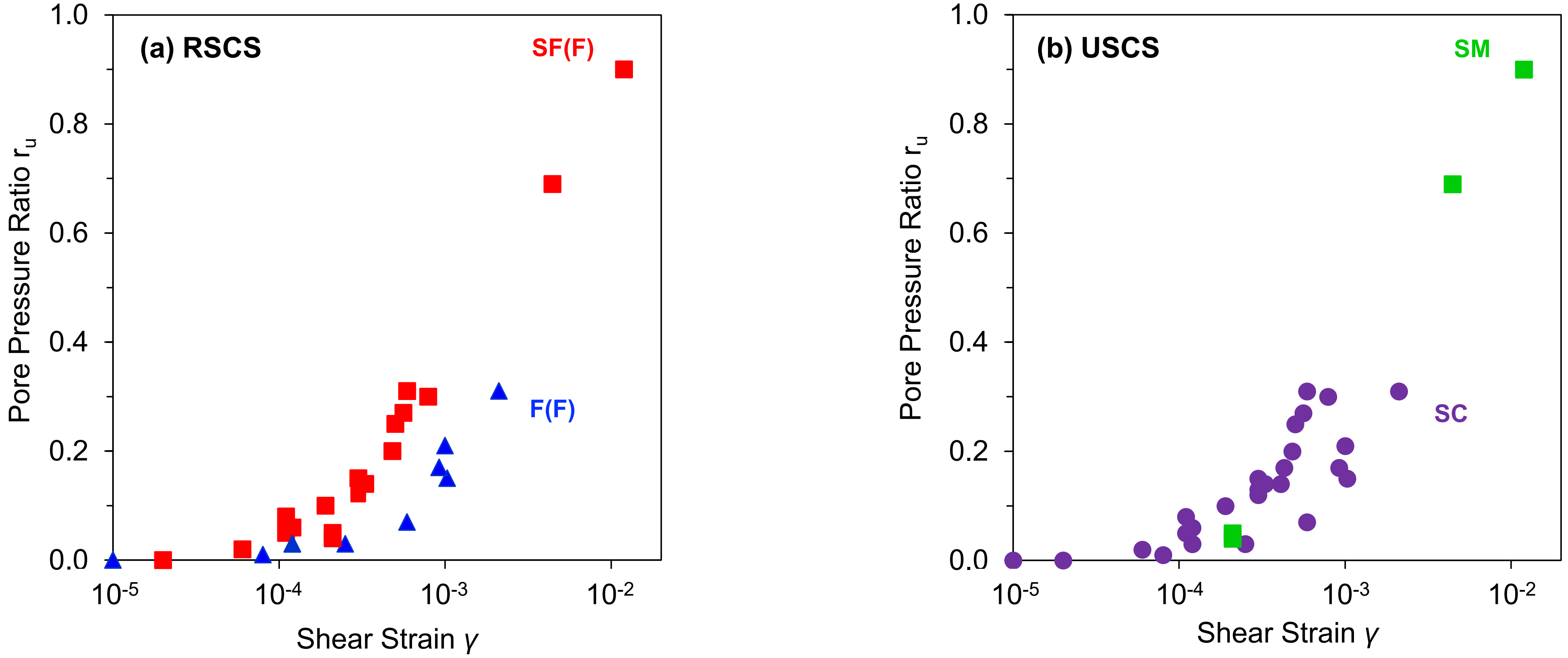


Fig. S11. Savannah River soil classification: Low amplitude cyclic loading tests. The pore pressure ratio is the ratio between the residual pore pressure and the initial confining stress $r_u = \Delta u/\sigma'_c$ in undrained tests (In-Tank Precipitation facility). (Data from Law Engineering 1994.)

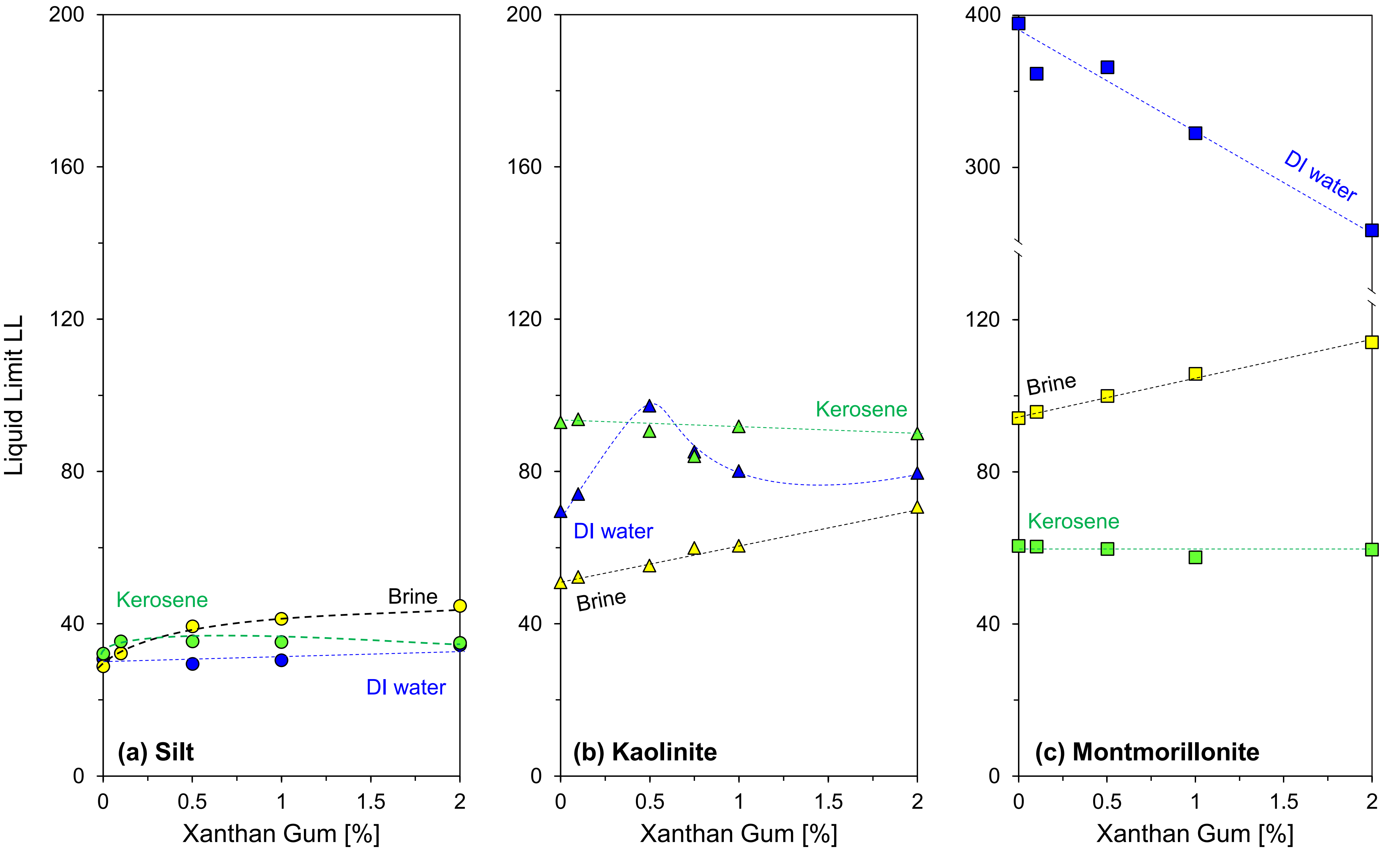


Fig. S12. Analysis of fines fraction response to changes in biopolymers content using different pore fluid chemistries based on the RSCS principles. (a) Silt; (b) Kaolinite; and (c) Montmorillonite. (Data from Chang et al. 2019.)

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