Supplemental Information

- Note that the geometric mean particle diameters and standard deviations provided in Table 2 correspond in fact to statistical parameters incorporated into the particle size distribution provided by Shirazi et al. [1, 2] to obtain the dimensions of the grains. In our simulations, we considered sand-textured soils composed of a large fraction (denoted s_a) of sand-sized grains (particles with dimensions between 0.05 to 2.0 mm) along with a small fraction (denoted s_i) of silt-sized grains (particles with dimensions between 0.002 to 0.05 mm). In the table below, we provide the average dimensions (given in mm) of the major axes m_a and m_i that respectively define the ellipsoids used to represent the sand-sized and the silt-sized particles forming the soil samples considered in our simulations.

s_a	s_i	m_a	m_i
85%	15%	0.2362	0.0452
92.8%	7.2%	0.2656	0.0440

References

[1] M.A. Shirazi, L. Boersma, and J.W. Hart, "A unifying quantitative analysis of soil texture: Improvement of precision and extension of scale," *Soil Sci. Soc. Am. J,*, vol. 52, no. 1, pp. 181–190, 1988.

[2] B.W. Kimmel and G.V.G. Baranoski, "A novel approach for simulating light interaction with particulate materials: application to the modeling of sand spectral properties," *Opt. Express*, vol. 15, no. 15, pp. 9755–9777, 2007.