

## Effect of Hysteresis in the Soil-Water Retention on Gas and Heat Transport Parameters for Sandy Soils

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Gas and heat transport parameters such as soil-gas diffusion coefficient ( $D_p$ ), air permeability ( $k_a$ ), and thermal conductivity ( $k_T$ ) are governing parameters for gas and heat transport behaviors in soils. Degree of water-saturation at different water potentials highly affects these gas and heat transport parameters. In this study, the effects of drying and wetting processes in the capillary water zone (water matric potential ranging from 0 to ? 100 cm H<sub>2</sub>O) on the  $D_p$ ,  $k_a$ , and  $k_T$  were investigated using different sand size fractions at different particle shapes. Degree of soil compaction (i.e., bulk density) on water retention hysteresis, hereunder gas and heat transport parameters was also investigated. Based on the measured data, threshold air-filled porosities for  $D_p$  and  $k_a$ , air-filled pore-tortuosity, and effective pore diameter for gas transport under drying and wetting processes, and their relations with particles shape, particle size, and compaction levels were discussed.