Assessing Water Infiltration and Soil Water Repellency in Brazilian Atlantic Forest Soils

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This study presents the results of the soil hydraulic characterization performed under three land covers, namely pasture, 9-year-old restored forest, and remnant forest, in the Brazilian Atlantic Forest. Two types of infiltration tests were performed, namely tension (Mini-Disk Infiltrometer, MDI) and ponding (Beerkan) tests. MDI and Beerkan tests provided a complementary information, highlighting a clear increase of the hydraulic conductivity, especially at the remnant forest plots, when moving from near-saturated to saturated conditions. In addition, measuring the unsaturated soil hydraulic conductivity with different water pressure heads also allowed to estimate the macroscopic capillary length in the field. This approach, in conjunction with Beerkan measurements, allowed to generate better estimates of the saturated soil hydraulic conductivity under challenging field conditions, such as soil water repellency (SWR). This research also reports for the first time evidence of SWR in the Atlantic Forest, which affected the early stage of the infiltration process with more frequency in the remnant forest.