

Special Issue Reprint

Rainfall Infiltration Modeling

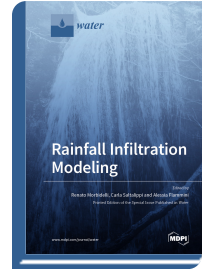
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Rainfall infiltration is an important component of the hydrologic cycle and plays a crucial role in the formation of surface runoff, providing subsurface water that governs the water supply for agriculture, the transport of pollutants through the vadose zone, and the recharge of aquifers. The spatiotemporal evolution of the infiltration rate under natural conditions cannot currently be deduced by direct measurements at any scale of interest. Therefore, the use of infiltration modeling is of fundamental importance in applied hydrology and allows this process to be described through measurable quantities. In spite of the continuous development of infiltration modeling in recent decades, the estimation of infiltration at different spatial scales, i.e., from the local to watershed scales, remains a complex problem because of the natural spatial variability of both soil hydraulic characteristics and rainfall. For many years, research activity has been limited to the development of local or point infiltration models for vertically homogeneous soils with flat surfaces. Recent scientific literature has extended infiltration modeling to many other involved elements whose representation, however, still represents an open problem. In this context, this volume attempts to make a contribution to the modeling of point infiltration into vertically non-uniform soils or soils modified by human activities, infiltration over horizontal heterogeneous areas, infiltration into soil surfaces with significant slopes, interaction between the infiltration process and the groundwater system, and infiltration due to irrigation and the surface water–groundwater dynamics.

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