Combining field experiments and modelling to improve representation of hydrometeorological processes across scales: Are we over-complicating our models?

Soil moisture is a key environmental variable of the hydrological cycle in the critical zone (the earth's outer layer from vegetation canopy to the soil and groundwater that sustains life). Despite its importance, our understanding of key soil moisture controlling factors across spatiotemporal scales still remains limited due to a lack of soil moisture measurements compatible to new scientific efforts towards "hyper-resolution" hydrological models. Recently, the development of new Cosmic-Ray Sensors (CRS) technology for monitoring soil moisture at unprecedented sub-kilometer scales provides ways to reduce this missing link between traditional point-scale sensors and large-scale satellite remote sensing products. The CRS relies on cosmic-ray neutron interactions that are scattered back depending on the amount of hydrogen atoms within the footprint (mainly soil water), so that wetter (drier) soils correspond tom fewer (more) neutrons measured by the CRS. In addition, the limited representation of key hydrological processes in current Earth System Models (ESM), in particular the role of preferential water flow in soils and groundwater-to-surface interactions, poses extreme challenges when interpreting hydrometeorological predictions for adaptation strategies. Recent studies show the benefits of explicitly simulating those processes but such parameterizations are often computationally demanding, resulting in limited application for large/global-scale studies using ESMs. This talk will summarize current research efforts from our Bristol group to tackle some of these issues, as part of the NERC "A MUlti-scale Soil moisture Evapotranspiration Dynamics" (AMUSED) project. The presentation will focus on the following specific points: (1) the recent development and application of CRNS with hydrometeorological models, (2) current results from CRNS monitoring stations and mobile capabilities in Southern UK; and (3) our efforts to build simpler, efficient, and yet robust representation of key hydrological processes to allow for easy implementation in ESMs globally.

Palestrante: Prof. Rafael Rosolem, Ph.D.

Department of Civil Engineering, University of Bristol
Bristol, United Kingdom
Webpage: http://www.bristol.ac.uk/engineering/people/rafael-rosolem/index.html

University of BRISTOL

Local:	**Teatro de bolso (UFMS)**
Data:	07/08/2017
Horário:	9:00-11:00hs
Informações:	**Prof. Dr. Paulo Tarso S. Oliveira (paulotarsoms@gmail.com)**
	Secretaria do PGTA (pgta.faeng@ufms.br) - (67) 3345-7392