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Combining Passive and Active Microwave Remote Sensing Data to Assess the Impact of Forest Fires on the Hydrology of Boreal Forests

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The observed warming of temperatures in boreal regions in the past decades has led to an increase in the frequency, intensity and size of forest fires with numerous consequences on ecosystems and water budget. Hydrological models can be used to assess the impact of these fires on the hydrological regime, but they necessitate sufficient input data to produce reliable results and ground measurements can be difficult to obtain in such remote regions. The objective of this project is to use a combination of passive and active microwave remote sensing data to estimate soil moisture in boreal forests and to see if the impact of forest fires can be modeled using these inputs. The study area is situated in Northern Quebec within the Rupert and Manicouagan river catchments, which were affected by large forest fires during the summer of 2013. The first step consists in downscaling data from passive microwave sensors (SMOS and SMAP) at the watershed scale. This is accomplished by using a relationship between Synthetic Aperture Radar (SAR) backscattering from Sentinel-1 data and optical thickness measured with SMOS. The produced soil moisture map will then be introduced into a semi-distributed hydrological model to assess the impact of forest fires.

Which session would you like to present in?

1. Remote sensing, hydrological modelling and data assimilation

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