

Satellite inspired hydrology in an uncertain future: a H SAF and HEPEX workshop



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Type: **Poster presentation**

Development of a machine learning hydrological forecast model using in-situ and remote sensing data

Machine learning approaches can be considered as a computationally efficient alternative to ‘classical’ deterministic hydrological models. The more commonly used types of machine learning in hydrology are artificial neural networks, support vector machines, and random forests. Regardless of the model structure, machine learning models require inputs which provide information about the hydrometeorological and geomorphological conditions of the study site. The input data are generally in-situ measurements; however satellite images can also be used instead of, or in addition to, ground measurements.

In this research, machine learning hydrological models (with different structure) for the aim of short-term (1 to 10 days) and mid-term (3 weeks to 4 months) forecasts will be developed. The developed models use both in-situ and satellite derived measurements as inputs, such as temperature, precipitation, soil moisture, snow (coverage, thickness), climatic indices (e.g. ENSO) and hybrid indices (e.g. antecedent precipitation index). The applicability of the models will be examined on spring and summer/ fall floods and compared to Hydrotel hydrological model forecasts as reference. Studied watersheds are located in Québec and Ontario provinces, Canada, and northeastern states, USA. First experiments compared performance of machine learning models in a hindcasting study case on the Outaouais watershed, Québec, Canada.

Which session would you like to present in?

1. Remote sensing, hydrological modelling and data assimilation

Primary author: Mr JOUGLA, Renaud (Université de Sherbrooke)

Co-author: Prof. LECONTE, Robert (Civil engineering department, Université de Sherbrooke)

Presenter: Mr JOUGLA, Renaud (Université de Sherbrooke)

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