Thématiques pour travaux d'étudiants (bachelor, master) entre Prof. Bettina Schaefli (précédemment d'IDYST, maintenant à l'Institute de Geographie, Université de Berne) et IGD (Prof. Christian Kull et Roland Cochard)

The influence of differing forest cover (natural rainforest versus acacia plantations) and terrain on river discharge in Hue Province, Central Vietnam

- **Theme 1: The effect of tree vegetation cover and terrain on the amounts and patterns of river discharge of a set of interlocked catchments.**
- **Theme 2: Small-scale differences in hydrological cycling between a rainforest and a novel (acacia) forest.**

The Truong Son mountains are the water reservoir (forested 'sponge' and hydro-electric lakes) of Thua Thien Hue Province in Central Vietnam. The mountains are mostly covered by dense rainforest, but in the watersheds adjoining Road 49 between the provincial capital Hue and the district town of A Luoi the forests were partly destroyed (by defoliation during the American-Vietnamese war, or logging) and later 'restored' with alien acacia species (mainly *Acacia mangium* from Australia), creating a specific forested landscape mosaic. In general there is a scarcity of information on monsoonal rainforest hydrology, but we can also assume that natural and 'novel' (i.e. acacia) forest ecosystems differ markedly in their hydrological functions. Especially in the light of changing climate (with increases in extreme events such as typhoons and extended droughts already being observed) a better understanding of these variably modified eco-hydrological systems can provide a basis for informed future landscape management, and better risk mitigation/adaptation planning.

We offer the possibility to work on at least one of two systematically interconnected themes/datasets:

1.) **The effect of tree vegetation cover and terrain on the amounts and patterns of river discharge of a set of interlocked catchments**. We have vegetation cover data from a GIS map, and until now there exists about a year of data from ten river data loggers below variably-sized catchments covered entirely or partly with rainforest. This is complemented with rainfall information from six rain buckets and additional information from official stations.

2.) **Small-scale differences in hydrological cycling between a rainforest and a novel (acacia) forest**. In one of these catchments we have already installed (May 2019) a soil moisture probe in a rainforest fragment and in a nearby 'novel forest' where the tree canopy is composed of Australia-originated acacia trees. There exists the possibility to complement the data from these loggers with further

elements of data collection (to be discussed) in order to gain information on the rainfall water throughfall, soil infiltration and runoff, tree surface and ground evaporation, and transpiration through the main tree canopy.
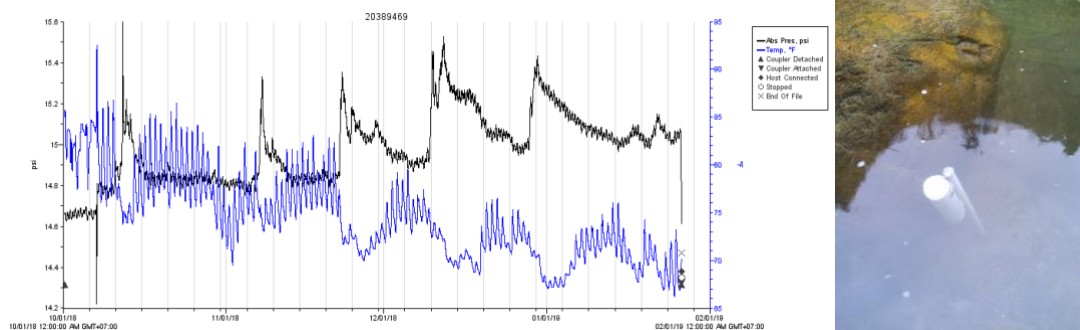
Contacts :

- Dr. Bettina Schaefli, bettina.schaefli@giub.unibe.ch, aspects hydrologiques surtout thème 1
- Dr. Natalie Ceperley, natalie.ceperley@unil.ch, aspects hydrologiques surtout thème 2
- Dr. Roland Cochard, roland.cochard@unil.ch, aspects terrain & biologiques
- Dr. Christian Kull, christian.kull@unil.ch, , aspects sociaux