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I joined Lancaster University and the DURESS project in September 2012. My research involves the hydrological monitoring and investigation of physicochemical responses to biodiversity and land-use change in the Llyn Brianne Stream Observatory. This is part of DURESS Work Package 4, led by Dr Nick Chappell.

My previous research has included hydrological monitoring of Yorkshire moorlands as a research technician, investigating long-term forest dynamics in Amazonia as a Post-Doctoral Researcher, and using palaeolimnological approaches to reconstruct climate change in the eastern Mediterranean for my PhD.

Monitoring: Water quantity and quality sensing of controls on stream ecological response (15 min resolution) has been initiated on 4 streams at the Llyn Brianne Observatory (LI3, LI6, LI7 and LI8). Each stream has:



i) Water Quality Box (left)

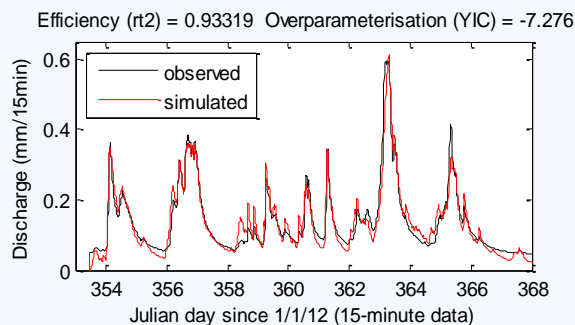
This includes a CR1000 Campbell logger recording stream water pH, electrical conductivity, turbidity and temperature. It also includes a state-of-the-art S::CAN spectro::lyser, allowing in-situ recording of concentrations of nitrate, dissolved organic carbon (DOC), total organic carbon (TOC), as well as water colour. An automatic water sampler collects storm water for chemical analysis and equipment calibration.



ii) Flume (left)

Trapezoidal flumes fitted with pressure transducers allow highly accurate measurement of stream discharge. Two flumes also have an adjacent rain gauge allowing for modelling of rainfall to flow.

Modelling: The water quantity and quality data are being used to identify objectively relationships between controls on each hydro-chemical variable. We are using an inductive Data-Based Mechanistic (DBM) approach to modelling. The next step will be to forecast/hindcast long-term climate and land-cover change scenarios, and assist ecologists in determining how aquatic biodiversity is regulated by the short-term dynamics in hydrochemistry.



Above example: LI6 streamflow modelled from rainfall, using a 2nd-order Continuous-Time Transfer Function (CT-TF) model. Models routines are from Lancaster University's CAPTAIN TOOLBOX for Matlab.



Automatic Weather Station data from Llyn Brianne at 15 minute resolution is available to view [online](#).