An instrumented river buoy for measuring temporospatial water quality data on whole river reaches.

P. Scholefield (1), C. Neal (1), J. Kelly (1), S. Nutter (1), Y. Takeuchi, (2), S. Maberly
(1), H. Zhang (2), J. Hamilton Taylor (2), A. Folkard (2)

(1) Centre for Ecology and Hydrology, UK, (2) Lancaster Environment Centre, University
University, UK

Spatial monitoring of whole river reach chemistry and flow is rarely if ever undertaken in conjunction with intensive "static" high resolution monitoring. Few studies have ever tried to integrate this data with speciation of phosphorus. In order to address this knowledge gap, and to relate land use to water quality, drifting instrumented buoys were deployed in a reach of the River Ribble. The drifting buoys contained GPS receivers to monitor the movement and transport of the system downstream, and were fitted with a sonde (Hydrolab Datasonde) configured with pH, conductivity , dissolved oxygen , temperature and pressure sensors. Additionally, the buoys were fitted with an accelerometer for the detection of pitch and yaw, and also an above-water light and temperature logger. The system was deployed in parallel with a group of up to 9 companion buoys that were solely configured with GPS systems. These were used to investigate the flow paths down the river and turbulent dispersion characteristics. In addition DGT (diffusive gradients in thin-films) devices consisting of layers of diffusive and biding hydrogel were attached to the buoy to measure the speciation of phosphorus along the reach.

These data are the first to show temperospatial water quality data for rivers in the UK, combined with data on phosphorus speciation, and may assist in the identification of hotspots of pollution, groundwater sources, and the interaction of chemistry and environmental parameters on in-stream processes.

Spatial visualisation of the water quality data is presented together with land use information, and point source data to see if the surrounding landscape features can assist in the interpretation.