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Estimating uncertainties on annual nutrient loads using sensor concentrations

François Birgand and Chiao-Wen Lin
North Carolina State University, Biological and Agricultural Engineering, United States (francois_birgand@ncsu.edu)

We have found that in situ spectrophotometers could be used to measure a suite of parameters of interest at a particular station thanks to Water Quality Rating Curves (WQRC). However, these WQRC only correspond to a statistical relationship between absorbance and concentrations. It is thus important to qualify and quantify how good such relationships are to provide uncertainty estimations on the concentrations calculated. We report here the uncertainty that may be expected on annual loads of Nitrate, Organic Nitrogen, Dissolved Organic Carbon, Total Phosphorus, and Total Suspended Solids, due to sensor uncertainty in coastal plain watersheds of North Carolina. For this, we tested the impact of the stratification and number of discrete samples to calibrate UV-Vis spectrophotometers from S::CAN for three watersheds. We compare the uncertainty calculated on the annual loads to those induced by infrequent sampling.