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Generating Water Quality Rating Curves using in situ Spectrophotemeters

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The newly available in situ sensors are notoriously expensive, and it is the advantage of everybody to maximize the information obtained from them. Optical spectrophotometers offer the advantage of acquiring a large number of absorbance values (>200) at each measurement. This opens the potential to explore whether one instrument can measure a suite of parameters, rather than just 2 or 3. Surely, all absorbance values are auto-correlated to some extent, but yet, statistical techniques such as Partial Least Square Regressions (PLSR), have been specifically created to handle such data. We are showing that at a particular station in streams, wetlands and lakes, it seems possible to make significant and robust correlations between the absorbance spectra and concentrations. We are coining these correlations/calibrations ‘water quality rating curves’ (WQRC). We have been able to create such WQRC for nitrate, phosphate, organic nitrogen, total phosphorus, total suspended solids, dissolved organic carbon, iron, manganese and silica. We believe that the WQRC reflect a co-variability of concentrations with the general ‘color matrix’ of the water. We have observed that this co-variability seems to be rather stable at a given station.