



Coloured Dissolved Organic Matter (CDOM) dynamics in small surface reservoirs in semiarid Brazil

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Coloured Dissolved Organic Matter (CDOM) is one of the major light absorbing constituents in freshwaters. Supplied from degradation of components of the aquatic environment, it consists mainly of humic substances and its concentration is strongly related to primary production, often associated to macrophytes. It plays a central role in several biological and chemical processes affecting the bioavailability of nutrients in aquatic ecosystems. Therefore CDOM can be regarded as a water quality indicator. We used the spectral absorption and spectral slope for understanding CDOM dynamics in surface reservoirs in the Brazilian semiarid region. The analysis was based on water samples collected in three reservoirs in a total of ten sampling locations in the period June 2014 to November 2015 with monthly to bi-monthly intervals totaling 120 samples. The collected water samples were filtered through cellulose acetate membrane filters. Subsequently, spectral absorbance was measured in a Lambda 950 UV-VIS spectrometer in the spectral range 250 to 800 nm using a quartz cuvette with 5 cm optical path. From the absorbance measurement, we obtained CDOM content using the specific absorption coefficient at 440nm as well as spectral slope. The average slope for the entire period for all reservoirs is 0,018, but we found a considerable increase in spectral slope values after the wet period (between February 2014 and June 2014) for the reservoirs São Nicolau and Paus Branco while Marengo reservoir showed only slight variations during this period, but exhibited an increase only in the dry period. Regarding aCDOM(440), the average was equal to 2,55 for Marengo, 5,70 for São Nicolau, and 3,53 for Paus Branco reservoir indicating different characteristics of these reservoirs. We noticed a decrease in the absorption coefficient for São Nicolau and Paus Branco reservoirs at the end of the wet period whereas for Marengo reservoir this value showed a different behavior. Spectral slope and spectral absorption seem consistent and, among other possible factors, its dynamics were affected by high evaporation and low precipitation, typical conditions for semiarid regions in the tropics. The results show also evidence of the hysteresis phenomenon related to humic substance properties. However, it is important to consider also other water quality parameters in order to assess the whole interaction occurring in the reservoirs under eutrophic conditions. This is a first study of the application of spectral absorption and spectral slope of CDOM for small reservoirs in semiarid Brazil providing additional information to the traditional water quality measurements. In the future, we plan to relate the in-situ measurements to satellite imagery to study spatio-temporal water quality dynamics and relate them to land use changes.