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REQUIRED MINIMAL RESOLUTIONS FOR MODELING AND MONITORING THE WATER QUALITY DYNAMICS OF PASSAUNA'S RESERVOIR

Luziadne Katiucia Kotsuka Gurski¹

Tobias Bleninger²

Heloise Garcia Knapik³

ABSTRACT: The construction of a dam alters the course of a river modifying its dynamics. Usually, several substances carried by runoff or point sources, such as nutrients - fundamental for phytoplankton growth, are thus retained in the reservoir. This condition interferes with the physical and chemical characteristics of the water and sediment, and thus, the overall water quality dynamics in the reservoir. This research proposes the monitoring and modeling of water quality in the Passaúna reservoir (Curitiba - Paraná) through a fixed platform equipped with advanced technology probes. From existing high-resolution measurements and analysis in the laboratory of several water quality parameters in combination with hydrological and hydrodynamic data, it will be possible to apply this information in mathematical models. The development, calibration, and validation of numerical models for water quality are essential for reducing the complexity of existing models and generating global data. Therefore, the aim of this study is to identify the distribution and variability (spatial and temporal) of nutrients and other natural substances to developing a minimum monitoring program for water quality, from analysis of monitoring data and modeling. Monthly campaigns were performed during February 2018 to April 2019 with conventional sampling. Subsequent laboratory analysis were performed for phosphorus, nitrogen and solids series, dissolved organic carbon (DOC), chlorophyll-a, fluorescence, and absorbance at Uv-vis. In addition, a continuous monitoring was performed through an in-situ probe, with 15 minutes of temporal resolution, measuring concentrations of nitrate, DOC and chlorophyll-a. The preliminary results based on partial data already indicate a seasonal distribution of nutrients, which is strongly influenced by thermal stratification. So far, comparisons between sensor data and conventional analysis indicate satisfactory probe measurements for chlorophyll-a and nitrate concentrations. However, for DOC no correlation was found between measured data by the sensor and the values obtained through laboratory analysis. This condition indicates the need for calibration in DOC measurements.

Keywords: Monitoring reservoirs. Water quality dynamics. Modeling water quality.

¹ Dr student., Universidade Federal do Paraná, Curitiba, PR, luzi.kotsuka@gmail.com

² Dr Ing., Universidade Federal do Paraná, Curitiba, PR, tobias.bleninger@gmail.com

³ Dr, Universidade Federal do Paraná, Curitiba, PR, helogk@gmail.com