Biophysical matter in a marine estuary identified by the Sentinel-3B OLCI satellite and the presence of terrestrial iron (Fe) nanoparticles

Alcindo Neckel, Marcos L. S. Oliveira, Lauren J. Castro Bolaño, Laércio Stolfo Maculan, Leila Dal Moro, Eliane Thaines Bodah, Andrea L. Moreno-Ríos, Brian William Bodah, Luis F. O. Silva

Abstract

The analysis of marine matter using the Sentinel-3B OLCI (Ocean Land Color Instrument) satellite is the most advanced technique for evaluating: the absorption of colored detrital and dissolved material (ADG_443_NN), total suspended matter concentration (TSM_NN) and of chlorophyll-a (CHL_NN) on a global scale. The objective is to analyze ADG_443_NN, TSM_NN and CHL_NN using the Sentinel-3B OLCI satellite and the presence of Fe-nanoparticles (NPs) + hazardous elements (HEs) in suspended sediments (SSs) in the maritime estuary of the Colombian city of Barranquilla. The study used the unpublished image of the Sentinel-3B OLCI satellite in the evaluation of ADG_443_NN, TSM_NN and CHL_NN in 72 sampled points. Subsequently, 36 samples of SSs were carried out in the Magdalena River, in the identification of Fe-NPs by advanced electron microscopies. The Sentinel-3B satellite revealed particulate accumulations in OCE1 through the intensity of OLCI in ocean. There was also a high Fe-NPs intensity of SSs in the Magdalena channel, spreading contamination to large regions.

Keywords

Satellite analysis, Yellow coloration in water, Marine estuaries, Hazardous elements, Environmental quality