Organic Matter Characterization from sediments of the Tietê and Piracicaba rivers dam (Brazil).

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The sediments are complex and heterogeneous environments, thus, besides determining the concentration of potentially toxic metals present in sediments, it is necessary to understand the sediment’s ability to accumulate or release contaminants, because many biogeochemical processes are involved, influencing the fate of these metals. The main modes of dispersion, which can lead to remobilization of contaminants are (i) early diagenesis, (ii) natural or anthropogenic resuspension of the sediment and (iii) the diffusive flow at the water-sediment interface. In this context, it is important to understand in how sedimentary organic matter (SedOM) acts in the retention and remobilization of metals, what environmental risks and how climate change influences the flow of rivers and causes remobilization of sedimentation, resulting in the release of these metals. As a result, it will be possible to evaluate if SedOM is a danger or protection against contaminants. In this work were used 69 samples collected at different depths at 3 points on the Tietê river, at 3 points on the Piracicaba river and at one point in the confluence region. The samples were freeze-dried, crushed, and sieved through a 100 mesh sieve. Two SedOM extraction methods were conducted in this work: NaOH extraction and deionized water extraction. Approximately 1.0 g of each sediment was placed in polypropylene flasks with 45.0 mL of 0.1 mol L⁻¹ NaOH and 45.0 mL of deionized water, and then shaken for 24 h in an overhead shaker at 10 rpm. Then the samples were centrifuged at 3,000 g for 10 min and filtered over a 0.45 μm syringe filters. To study the fluorescence mode in EEM, 1.0 mL of each diluted with same absorbance sample was placed in quartz cells with 1.0 mL of 0.3 mol L⁻¹ HEPES and 1.5 mL of 0.1 mol L⁻¹ NaClO₄. The fluorescence spectra were acquired in scan speed of 2,400 nm min⁻¹ from 250 to 700 nm in emission and from 200 to 500 nm in excitation. The steps and slits of emission and excitation were fixed at 5 nm, and the detector voltage was 700 V. EEM data were processed using the method of Parallel Factor Analysis to determine the contribution of each component using homemade PROGMEEF software. SedOM samples extracted with NaOH and deionized water from Tietê and Piracicaba rivers presented Core Consistency Diagnostic of 83.3% with the contribution of four components or fluorophores. According the components obtained by PARAFAC, the component 2 is noise and it was excluded. The emission wavelength of fluorophore 1 is
approximately 450 nm, fluorophore 3 is 550 nm and fluorophore 4 is 400 nm. Therefore, the fluorophore 4 refers to OM fresher, simpler and less humidified. Whereas fluorophore 3 refers to OM older, more complex and more humidified, that is, it is from the terrestrial environments. According to data obtained by EEM and treated with PARAFAC was possible to determine the presence of three fluorophores and the complexity of their structure.