



Temporal variation and fluxes of dissolved rare earth elements in the lower Orinoco River

Abrahan Mora (1), Alain Laraque (2), Jürgen Mahlknecht (1), and Cristina Moreau (1)

(1) Centro del Agua para América Latina y el Caribe, Tecnológico de Monterrey, Monterrey, Mexico (abrahanmora@itesm.mx), (2) GET - UMR CNRS / IRD / UPS – UMR 5563 du CNRS, UR 234 de l'IRD; OMP 14 Avenue Edouard Belin 31400, Toulouse, France

On a global scale, the Orinoco River ranks third in terms of water discharged to the oceans, with an annual mean discharge of about 37.000 m³/s; its basin covers an area of 990.000 km² and the length of its main channel reaches 2000 km. Although the seasonal dynamics of dissolved rare earth elements (REE) has been documented in large rivers such as the Amazon and Yangtze, this issue has not yet been documented in the Orinoco River. Thus, we present a comprehensive dissolved REE data set for the Orinoco River in its lower section. Water samples of the Orinoco River were taken monthly between January 2007 and December 2008 in the Ciudad Bolivar gauging station. These water samples were filtered through 0.22 μm pore size membranes and preserved for REE determination. The concentrations of dissolved La, Ce, Pr, Nd, Sm, Gd, Dy, Er, and Yb were measured using an ICP-MS on a spectrometer equipped by collision cell. The two-year time series show that dissolved REE vary seasonally with discharge in the lower Orinoco, and indicate a hydrological dominated control. The higher concentrations of REE were observed during the high discharge period and the lower concentrations during the low water stage. The annual dissolved fluxes of REE from the Orinoco River to the Atlantic Ocean were 240 ± 67 T/yr for La, 628 ± 174 T/yr for Ce, 76 ± 20 T/yr for Pr, 336 ± 84 T/yr for Nd, 83 ± 20 T/yr for Sm, 92 ± 29 T/yr for Gd, 70 ± 17 T/yr for Dy, 35 ± 8 T/yr for Er, and 28 ± 7 T/yr for Yb. These results constitute the first estimate of dissolved REE fluxes from the Orinoco River to the Atlantic Ocean.