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Simulated suspended sediment flows in South America using hydrological-hydrodynamic modeling

Hugo Fagundes¹, Fernando Fan¹, Rodrigo Paiva¹, Vinicius Siqueira¹, Diogo Buarque², Luisa Kornowski¹, Leonardo Laipelt¹, and Walter Collischonn¹

¹Institute of Hydraulics Research, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

²Federal University of Espirito Santo, Vitória, Brazil

Suspended sediments (SS) have an important role in the maintenance of several ecosystems by supplying them with nutrients. On the other hand, erosion and sediment transport can carry pollutants and pesticides, contributing to the negative impacts on the aquatic biota. Besides that, sediment supply for the rivers is often a driver to geomorphologic changes occurring in the rivers. Erosion and sediment rates in South America are considerably high in comparison to northern continents in the world. In this study we modeled the natural (non affected by reservoirs) spatio-temporal dynamic of suspended sediments in South America, including deposition rates in floodplain areas, using the sediment continental model MGB-SED SA. The model performance was evaluated against 595 in-situ stations; 80 sites using results from regional studies; and 51 sites using results from a global sediment model. For most places, model performance analysis shows a better agreement between simulated and observed (in-situ) data than when results were compared to regional studies and a global model data. A better representation of sediment flow in rivers and floodplains was possible due to the use of hydrodynamic river routing. Based on MGB-SED SA estimates, South America delivers to the oceans 1.00×10^9 t/year of SS. The bigger suppliers are the Amazon (4.36×10^8 t/year), Orinoco (1.37×10^8 t/year), La Plata (1.11×10^8 t/year), and Magdalena (3.26×10^7) rivers. Around 12% (2.40×10^8 t/year) of SS loads reaching the rivers are stored in the floodplains, showing the importance of these regions.