Geophysical Research Abstracts
Vol. 19, EGU2017-10074-1, 2017
EGU General Assembly 2017

Assimilation of river altimetry data for effective bed elevation and roughness coefficient

João Paulo L.F. Brêda, Rodrigo C.D. Paiva, Juan Martin Bravo, and Otávio Passaia
Institute of Hydraulic Research, Federal University of Rio Grande do Sul, Porto Alegre, Brazil (rodrigo.paiva@ufrgs.br)

Hydrodynamic models of large rivers are important prediction tools of river discharge, height and floods. However, these techniques still carry considerable errors; part of them related to parameters uncertainties related to river bathymetry and roughness coefficient. Data from recent spatial altimetry missions offers an opportunity to reduce parameters uncertainty through inverse methods. This study aims to develop and access different methods of altimetry data assimilation to improve river bottom levels and Manning roughness estimations in a 1-D hydrodynamic model. The case study was a 1,100 km reach of the Madeira River, a tributary of the Amazon. The tested assimilation methods are direct insertion, linear interpolation, SCE-UA global optimization algorithm and a Kalman Filter adaptation. The Kalman Filter method is composed by new physically based covariance functions developed from steady-flow and backwater equations. It is accessed the benefits of altimetry missions with different spatio-temporal resolutions, such as ICESAT-1, Envisat and Jason 2. Level time series of 5 gauging stations and 5 GPS river height profiles are used to assess and validate the assimilation methods. Finally, the potential of future missions are discussed, such as ICESAT-2 and SWOT satellites.