Extreme hydrological events in the Amazon basin wetlands by radar altimetry

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Many human catastrophes are associated with extreme hydrological events. They cause immense damage and account for a large number of casualties worldwide during the time of the event, and they also may be followed by a related chain of indirect calamities. Presently the Amazon basin is the place of such events. Extreme hydrological events in the Amazon basin have the potential to cause considerable harm to riverine populations and their related activities, which can cause difficulties of transport and navigation, shortages in food and water supply and epidemic diseases. One of the flood components that are routinely considered when evaluating environmental impacts from extreme hydrological events is the water stage elevation. In this study, we present a methodology based on radar altimetry data to help monitoring water stage elevation in the Amazon basin wetlands. The study spans between years 2008 to 2010 when the Amazon basin has experienced both floods and water shortages. We used the JASON-2 GDRs (Ice/OCOG tracking algorithm) to determine the water stage throughout the wetlands. The temporal resolution of this mission is 10 days. We used also the TRMM data to compute rainfall. As a result, we present the capability of satellite data to help monitoring extreme hydrological events with less than two week delays.