ABSTRACT: Satellite radar altimetry is a valuable tool in providing surface height (stage) measurements of inland water targets. Clearly demonstrating a non-ocean application, hydrological-based altimetric studies have been ongoing for well over a decade. This technique has been utilized in many inter-disciplinary projects seeking surface elevation changes for lakes, rivers, and reservoirs, in many cases providing new datasets for regions with sparse traditional ground-based measurements. A comprehensive look at the paper will be provided in the context of Jason and TOPEX/POSEIDON missions, as well as data from the original TOPEX/POSEIDON (T/P) mission. The study mission is a unique opportunity to use the improved spatial and temporal resolution of stage data to greatly enhance knowledge of the dynamics of the Amazon River. The additions of ENVISAT and Jason-1 (EOS) and ENVISAT’s data further improve this non-ocean study. This NASA-funded project consists of a technical group which is linked to an on-going, semi-annual, near-real time reservoir monitoring program that has evaluation of regional drought and irrigation potential as part of its overall goal. Two science programs are also proposed with objectives aimed at exploring dynamics and climate variability change issues. Current to all of these programs is a rigorous examination of the performance of the Jason instrument.

Objectives:

1. To observe the overall performance of the Jason altimeter over inland water targets. To develop data evaluation methods to maximize accuracy and resolution, to provide feedback to the SWT community and to the reservoir monitoring program, and to advise on the role of altimetry within hydrology, in regards to annual real-time data, operational hydrology programs, and future missions.

2. To investigate the dynamics of the Amazon River. To use the posteriori multi-sensor dataset to update and divorce river stage variations along the main stem. To use the increased spatial resolution to enhance existing knowledge of the water surface gradient along river reaches. To examine the temporal variability of the deduced gradients in lieu of flood-wave and tributary influences. Through collaborative efforts, contribute specifically to studies of basin hydrology (floodplain storage) and sediment dynamics.

3. To examine the correlations between observed lake/instream stage variations and climatic indices (e.g. ENSO, NAO). The long-term goals are the evaluation of regional vulnerability to droughts and floods and the utilization of inter-annual time elevation data. The focus will have a global outlook using time series of stage variations from the Jason and TOPEX/POSEIDON missions.

River Dynamics, Lake Level Variability
And
Near-Real Time Reservoir Monitoring
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The long-term goal of the project is to infer climate indices in the form of predicted seasonal surface temperature (SST) variations with surface elevation, and in the form of a continuous drought and flood. There are three main objectives:

1. Using altimeter data to confirm high-water river stage and river channel morphometry for specific time periods.

2. To compute high-resolution flood stage variations for specific time periods.

3. To compute flood stage variations for the month of June.

These results will be used to predict future flood stages and to assess the vulnerability of these regions to short-term climatic events and to look towards the future role of these regions in the context of increased greenhouse gas emissions.