Improving the Accuracy and Reliability of Space-Borne Discharge Estimation from SWOT for Low-lying Humid Tropical Regions of the World

- Discharge estimation during peak season in low-lying humid tropical regions very challenging
- Extensive dams, cloud cover, moist soils, inundation and ‘non-stop’ rain.

- 23% of World landmass; 1/5th of work population
- Represents majority of Global Discharge & Freshwater flux to Oceans: Ganges, Brahmaputra, Nile, Mekong, Amazon, Congo, Irrawady and Indus
- Increasing impoundments (dams) on lower-order (upstream) rivers/tribut.
- Peak discharge is seasonal - During monsoon; extensive cloud cover and widespread rain systems
- Emerging economies, Eight Megacities on Deltas; Rising freshwater scarcity
Specific Objectives

**Obj. 1** What role do the key geophysical features play in the accuracy of SWOT discharge estimation in humid rivers? Herein, the key geophysical features are cloud-cover, land-water mask, rain rate, river morphology and human settlements in floodplain of large rivers.

**Obj. 2** How can the uncertainty of discharge estimation in humid tropical regions be minimized and synergized with the on-going evolution of data assimilation schemes for SWOT?
In the first phase, proposed research will replicate the JSTAR study on the 100+ river system in HEC RAS using SRTM and altimetry data (T/P, JASON-2) to understand/validate:

1) Relationship of rain rate (x-axis), cloud cover (x-axis), river width (x-axis) and land/water mask ($&R_H$) (x-axis) with accuracy of discharge estimation (y-axis).

2) Role of flow regimes, river types (for various widths, depths, conveyance)

3) Ways to minimize outliers in discharge estimation similar to above figure on right

4) Potential extension of work to Indus basin.