POST LAUNCH HYDRO CAMPAIGNS

The year is 2021…..

We now have simultaneous observations of water surface area and stage arriving every ~21 days.

What field campaigns do we need to maximize the value of these SWOT observations?

C. Gleason, T. Pavelsky
Characterizing post-launch science orbit hydro campaigns

1. ‘Flagship’ campaigns
Large, multi-week, international collaborations aimed at open scientific questions of global relevance

2. Modelling/assimilation campaigns
Campaigns in targeted areas designed to build hydrologic/hydraulic models and assimilate SWOT data

3. ‘Routine’ campaigns
Regional studies for which SWOT is a value-add

4. Cal/val campaigns
Cal/val shouldn’t end with the fast sampling phase
So…..

You’ve decided you’re going to organize a flagship campaign, and you’re preparing to go the Amazon, or the Congo, or the Canadian Arctic, or the Upper Nile or Gangetic plain (ha!)

What should you measure when you get there?
1. Bathymetry

With bathymetry, SWOT can directly measure storage and more easily compute flux.

$\text{WSE} \rightarrow \text{depth and WS area} \rightarrow \text{volume with bathymetry}$
2. Bankfull/floodplain geometry

We are interested in more than just storage and flux: we want to know how river channels interact with the land surface.

Greatly improves the value of SWOT data for flood modelling, geomorphic research, and hydraulic modeling.
3. Watershed characteristics

The better we can characterize a watershed, the better we can utilize SWOT data after we’ve left the field.

In situ observation of:

- soil properties
- land cover
- topology (tributary organization)
- energy balance
- ...others

allow us to build better hydrologic models and assimilate SWOT data.
4. SWOT cal/val measurements

If you’re going to bring half a dozen people halfway across the world for a few weeks, you must make at least the basic ‘Level 2’ suite of cal/val measurements plus key others

- water surface elevations (differential leveling, transducer, gps)
- water surface extents (gps, imagery)
- water surface slopes (transducer array, longitudinal drift)
- energy balance (met station)
- wind speed (met station)
SWOT success ultimately comes from adoption by the broader hydrology community.

The more SWOT is used to augment ‘routine’ regional studies, the better.

Where did you get that amazing data?

Why, SWOT of course.

I want some of that.