SWOT Raster: Update

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Current Status of the SWOT Raster Product (1)

- Raster will be produced systematically at 100 m and 250 m resolutions over all regions where the pixel cloud is collected and there is water.

- We will use a fixed grid with fixed boundaries, divided into tiles of ~120 x 120 km, for raster storage and distribution.

- Raster will be produced in netCDF format, with on-demand processing to geoTIFF, JPEG2000, etc. to be discussed with data distribution centers.

- Prototype software for producing the raster product has been developed at UNC (in python) and has been delivered to JPL for evaluation.

Current Raster Data Fields

Identifying Information

- Cycle Number
- Tile ID
- Time
- Projection Information

Data Fields

- Height (m)
- Height Error (m)
- Inundated Area (m^2 or %)
- Inundated Area error (m^2)
- Cross-track distance (m)
- Average sigma0 (dB)
- Sigma0 uncertainty (dB)

Just received key doc from JPL

Flags

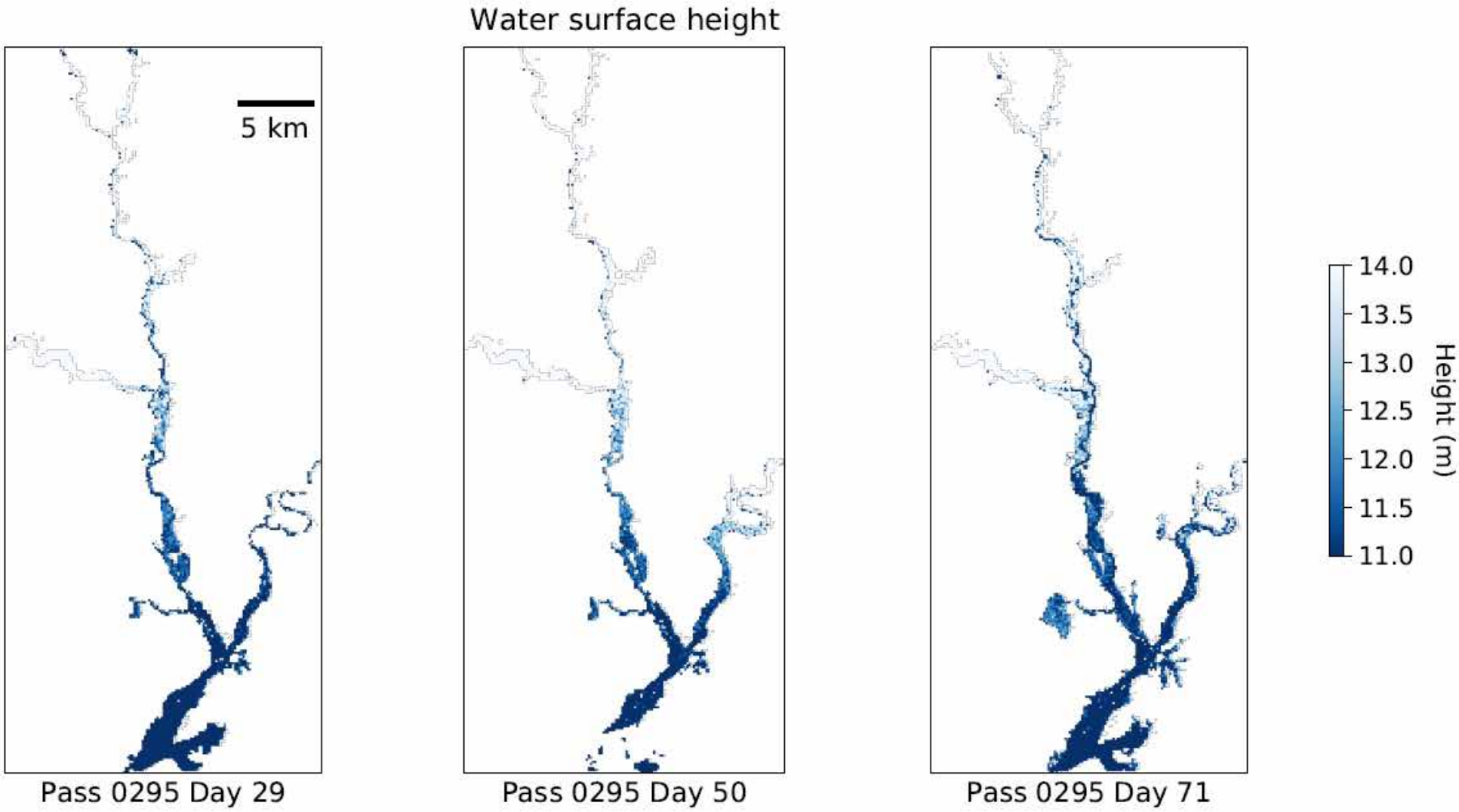
- Data quality flag
- Low SNR
- Ice Cover
- Layover
- Geoid: geoid height above reference ellipsoid
- Geoid Slope
- Solid Earth tide model
- Pole tide model
- Orbit quality flag
- Instrument flags
- Wet tropospheric correction
- Dry tropospheric correction
- Ionospheric correction

Implemented

Not implemented, simple

Not implemented, requires work

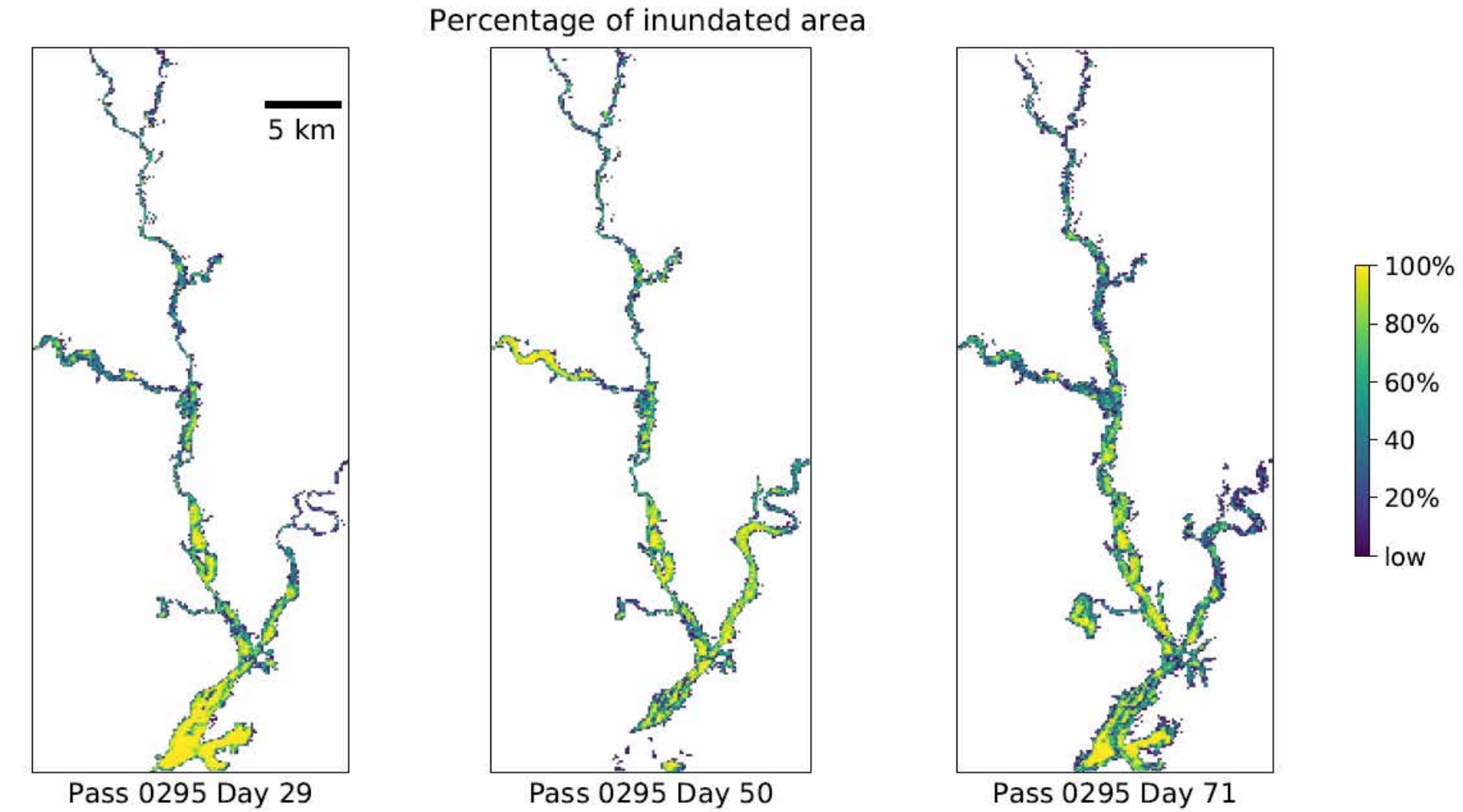
Example Raster Height Data Product, Severn River Flood



100 m resolution UTM Rasters

Heights measured as weighted average of pixel cloud heights

Example Raster Inundation Data Product, Severn River Flood



100 m resolution UTM Rasters

Inundation Extent measured as % area of interior water, water near land (note: might need to add land near water)

Projection Options

Problem: any reprojection of a raster product will require resampling, which will introduce errors

Latitude/Longitude

+ Uniform global grid system, simple to understand
- Grid cells vary in size, resulting in changing error characteristics and problems calculating area.

UTM or Similar Equal Area

+ Equal area pixels, works very well at local scales, matches up with planned inundation extent product from NISAR.
- Each tile must be assigned a UTM zone, which might require reprojection for large areas.

Recommendation: baseline UTM, make Lat/Lon on demand

Plan Going Forward

- Test whether inundation extent is more robust when including land near water (at least partially).
- Implement agreed-upon projection and gridding strategy
- Implement additional variables as example pixel cloud data and suitable algorithms become available
- Test prototypes on a wide range of simulator output
  - Need input of existing simulator cases from ADT/ST (contact Shuai Zhang, zshuai@email.unc.edu)
  - Plan to develop additional cases
- Incorporate feedback from JPL, eventually from CNES, ADT, and interested ST parties.