RIVER DATA PRODUCT STATUS

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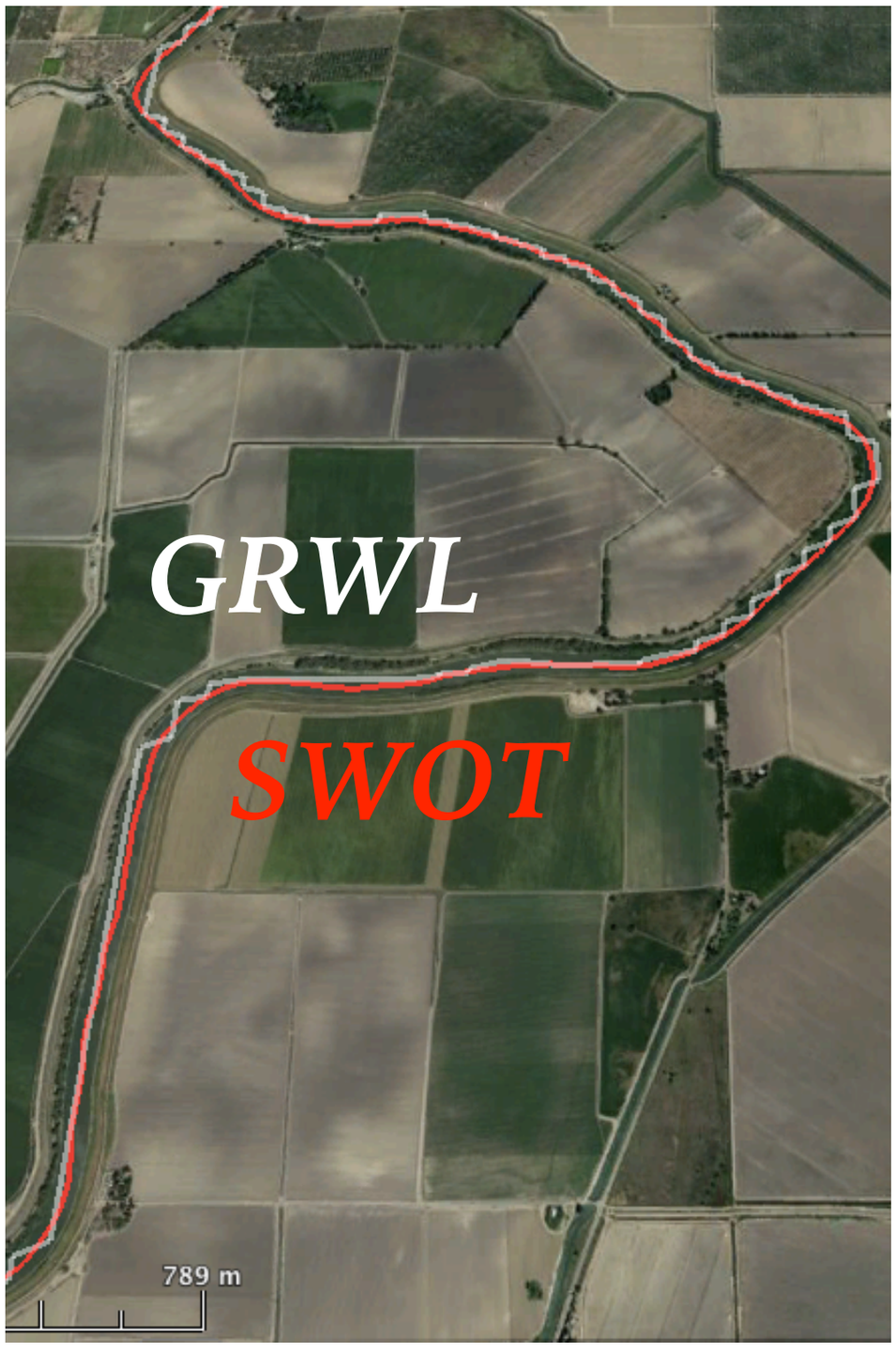
OVERVIEW

Tanana River, Alaska

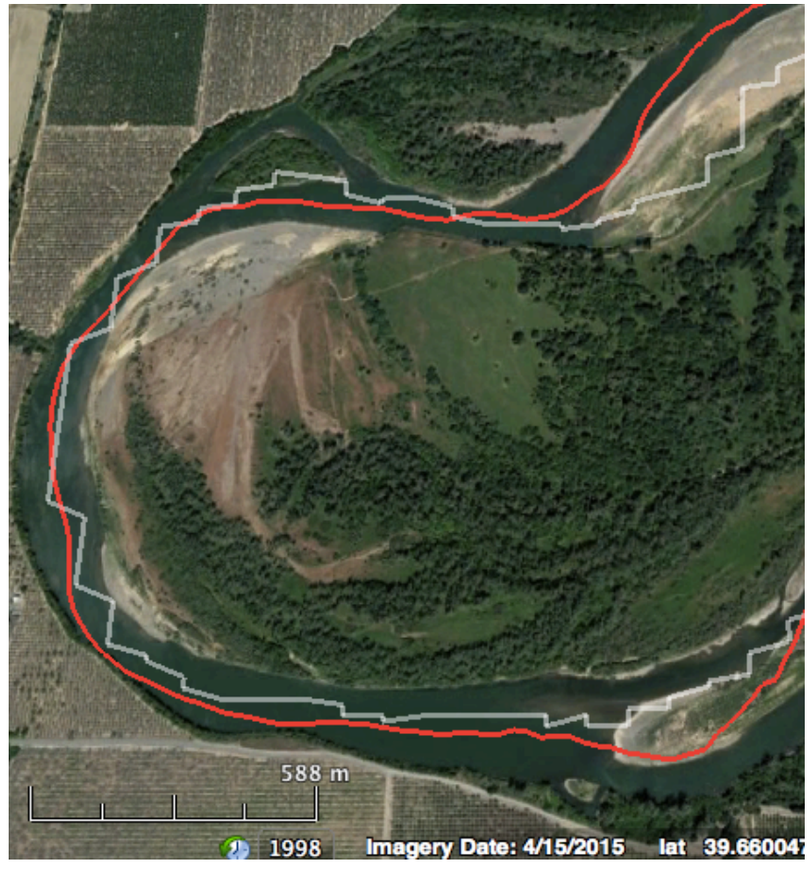
River data products are constructed by attaching the pixel cloud to a centerline for each pass. Node averages are computed along the centerline. Reach averages are computed from the nodes. Cycle average data products are computed from the single pass data. (Unofficial) example data products are now available to the Science Team.

CENTERLINE: FROM 2-D TO 1-D



Centerlines are computed starting from GRWL† and then adjusted based on composite low-flow pixel cloud.

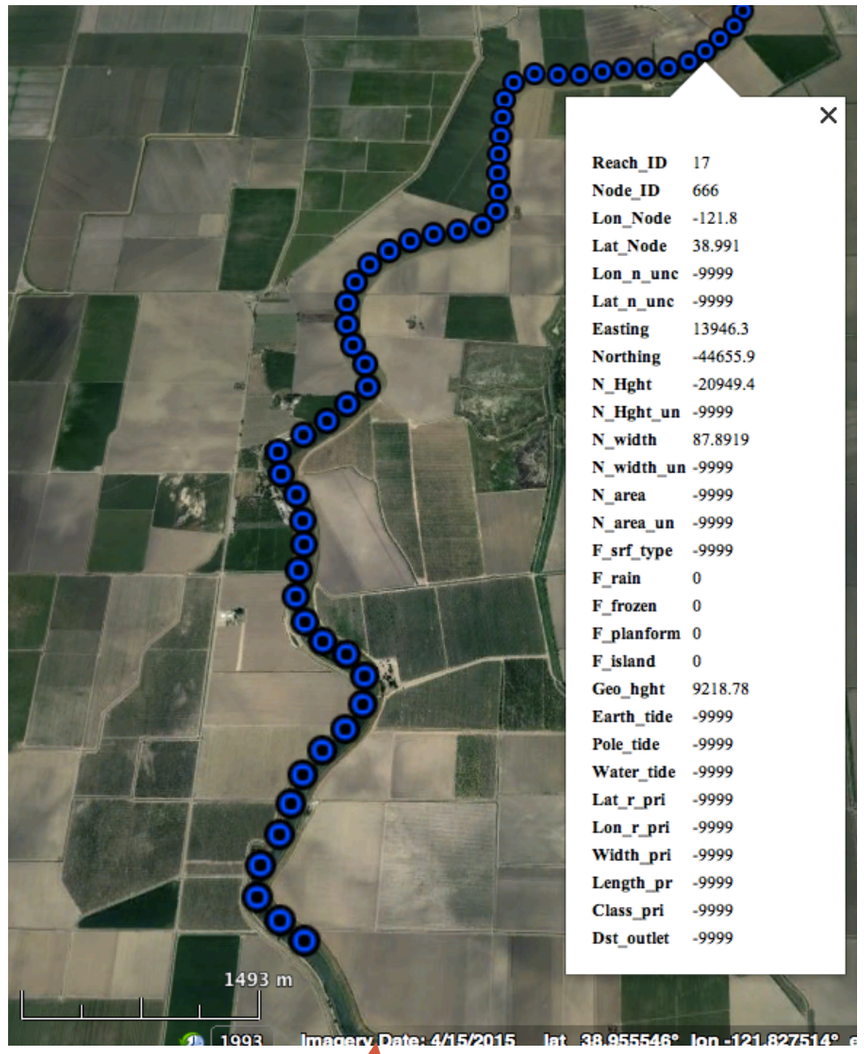
Centerlines are "fixed": they do not move pass-to-pass. They will be updated periodically (nominally yearly)

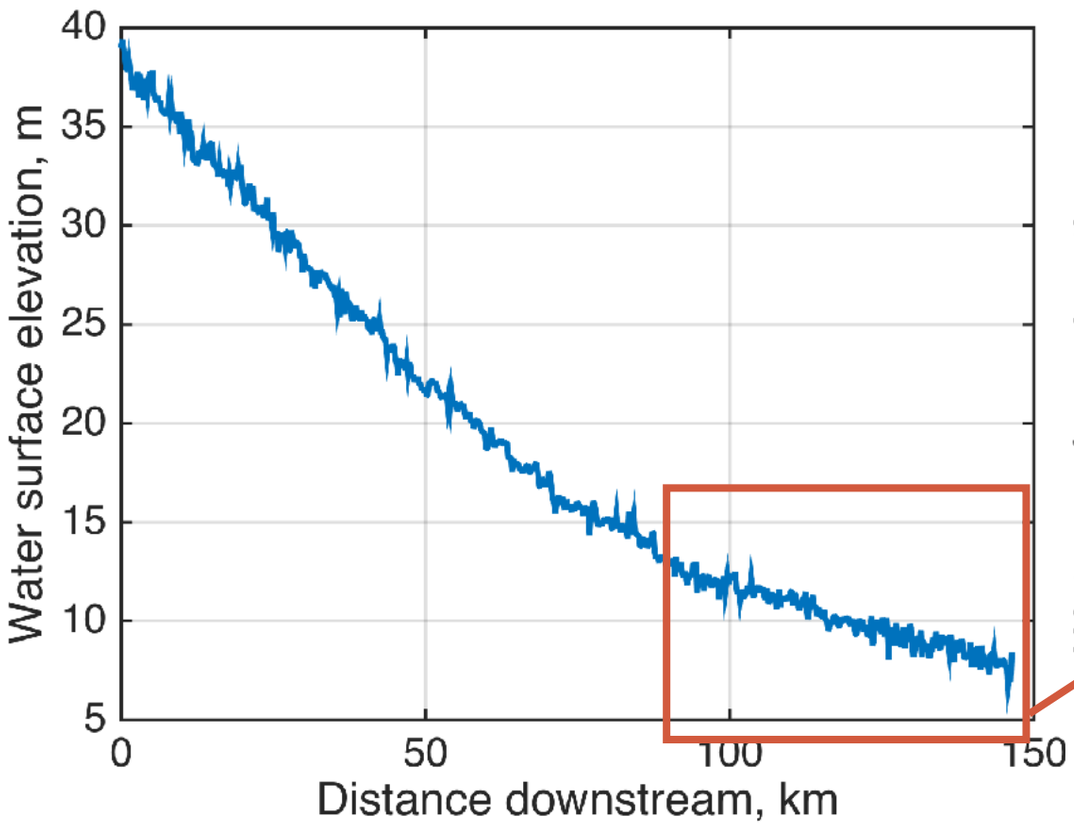


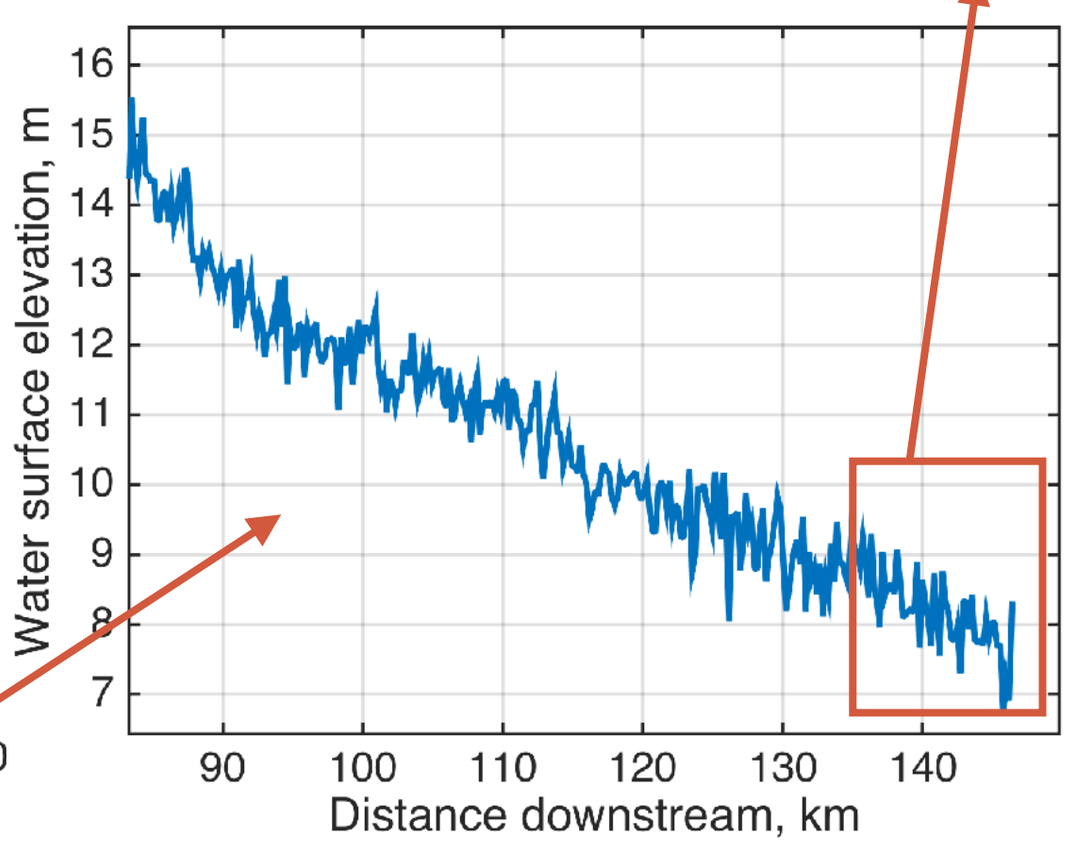
†*See talk on a priori data by T. Pavelsky this afternoon*

NODES

- Node locations are defined at 200 m intervals along the centerline. Pixels are mapped to the closest node.
- The *x*,*y* center-of-mass of pixels mapped to each node is an additional data element

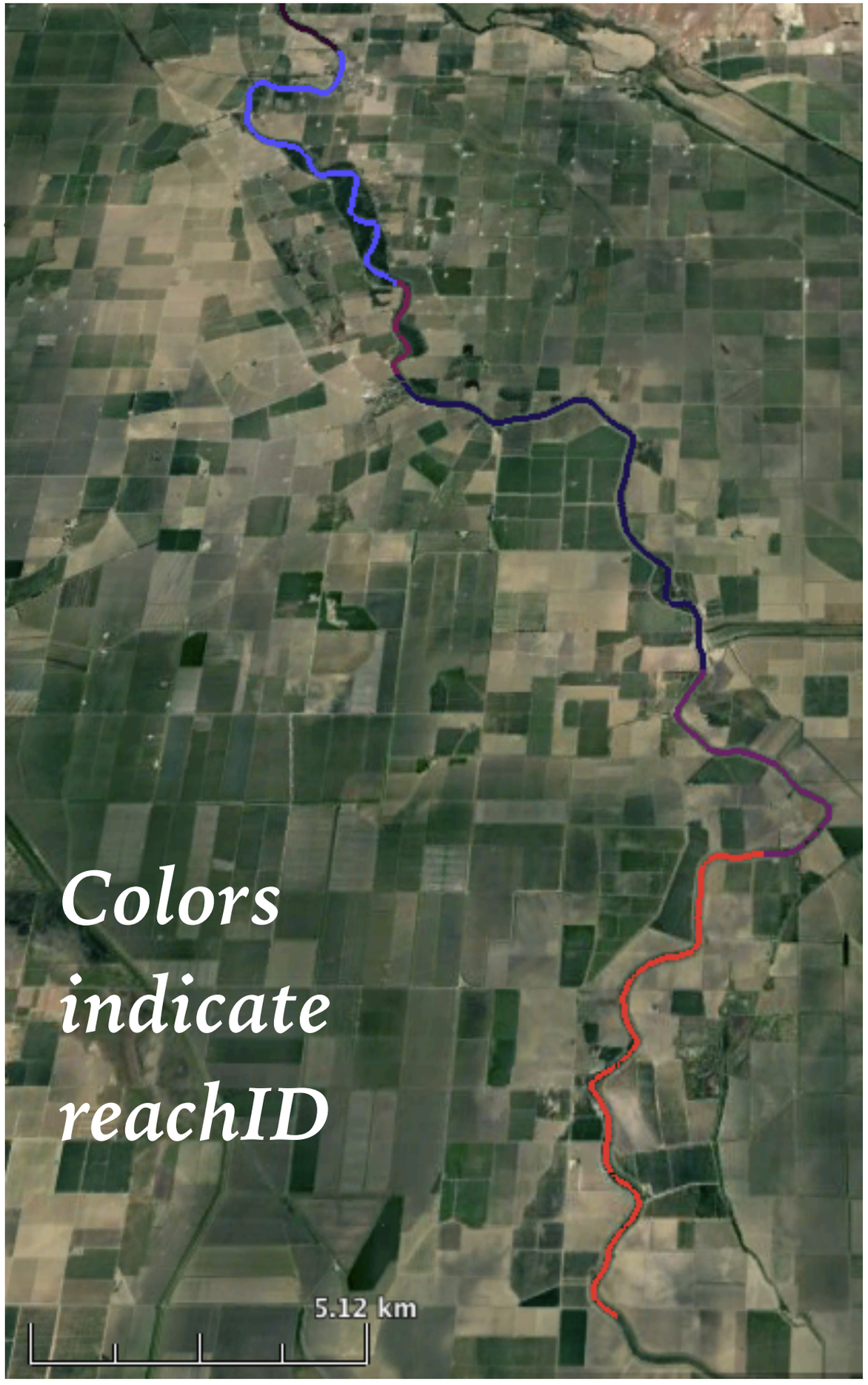






REACHES

- First version of reach boundaries are based SWOT swath edges, tributaries, etc.[†] Research to optimize this is ongoing (Frasson et al., *WRR*, in rev.; Garambois et al.).
- Version two (pre-launch) may use sinuosity, low-head dam locations, et al. to determine reach boundaries
- May use SWOT heights to refine reach boundaries post-launch



[†] *See talk on a priori data by T. Pavelsky this afternoon*

CYCLE AVERAGES: CURRENT BASELINE

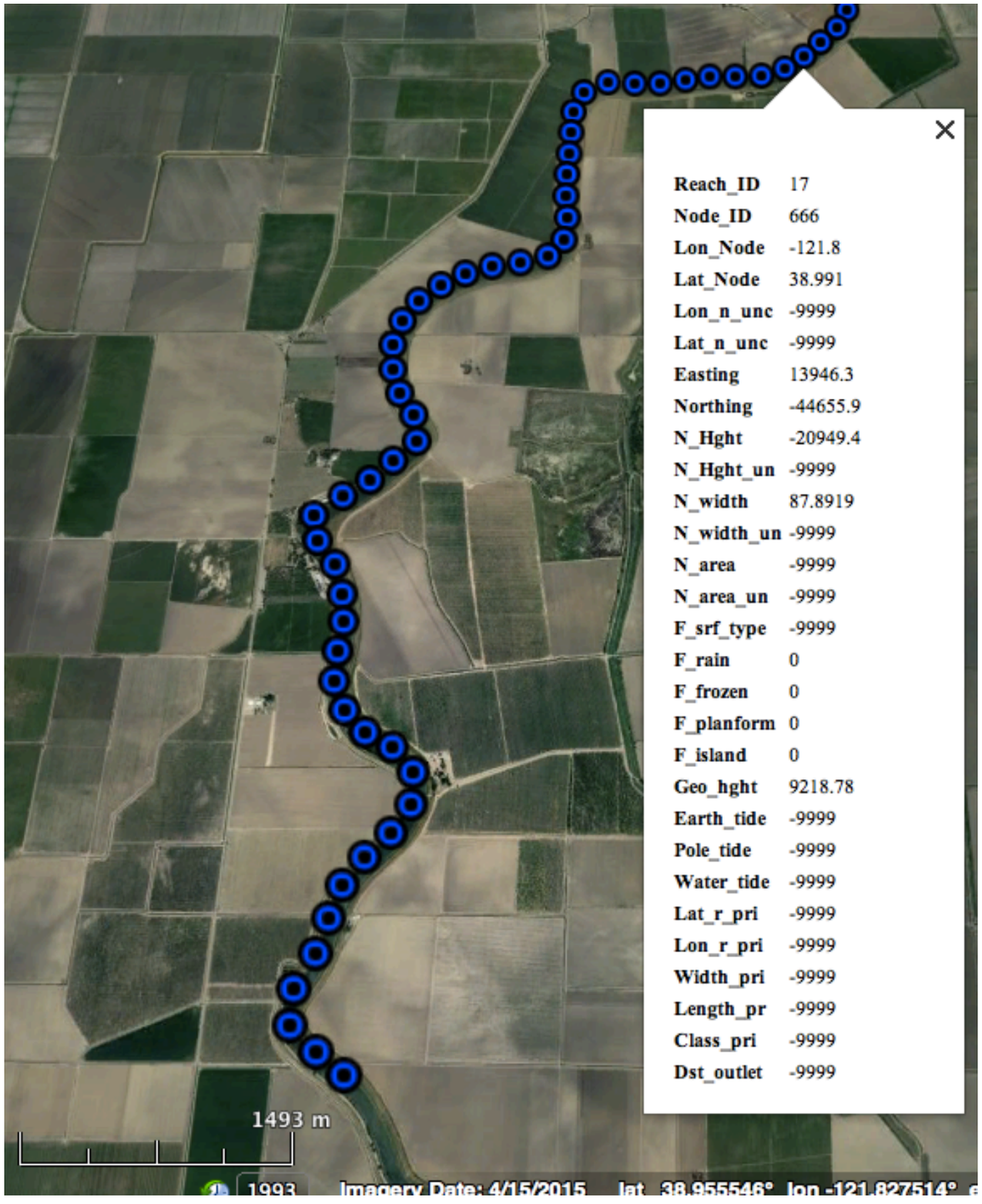
- Distributing cycle averages of all products is prone to possible artifacts due to sampling (e.g. water going uphill)
- Interpolation or assimilation are non-trivial
- Current baseline: for a given cycle the user would download shapefile databases including simple cycle average, reach statistics for the cycle, all passes associated with the cycle.
- In the meantime, Kostas Andreadis is characterizing the expected errors due to these artifacts (see his splinter discussion on Wednesday)

DATASET DOWNLOAD FORMAT(S)

- Goal with dataset formats for reach and node data products was to create the lowest possible bar for a wide range of potential users of the data products
- At this time, baseline is to distribute the nodes & reach data as .shp. Maximizes ease of bringing into ArcGIS or Google Earth.
- For the reach products, the reach average data elements will be attributes attached to the high-resolution river centerline
- We have presented PO.DAAC with a features “wishlist” for downloading flexibility. Some users will prefer .nc, etc.
- We have asked for ability to download by e.g. feature name, geographic box, etc.

DATA ELEMENTS

- Data elements will be comprehensive, including corrections, uncertainties, geoid elevations, etc.
- We have requested that PO.DAAC make options available to download subsets. E.g. could define a typical “basic” download set of elements for novice users



EXAMPLE DATA PRODUCT: SACRAMENTO RIVER

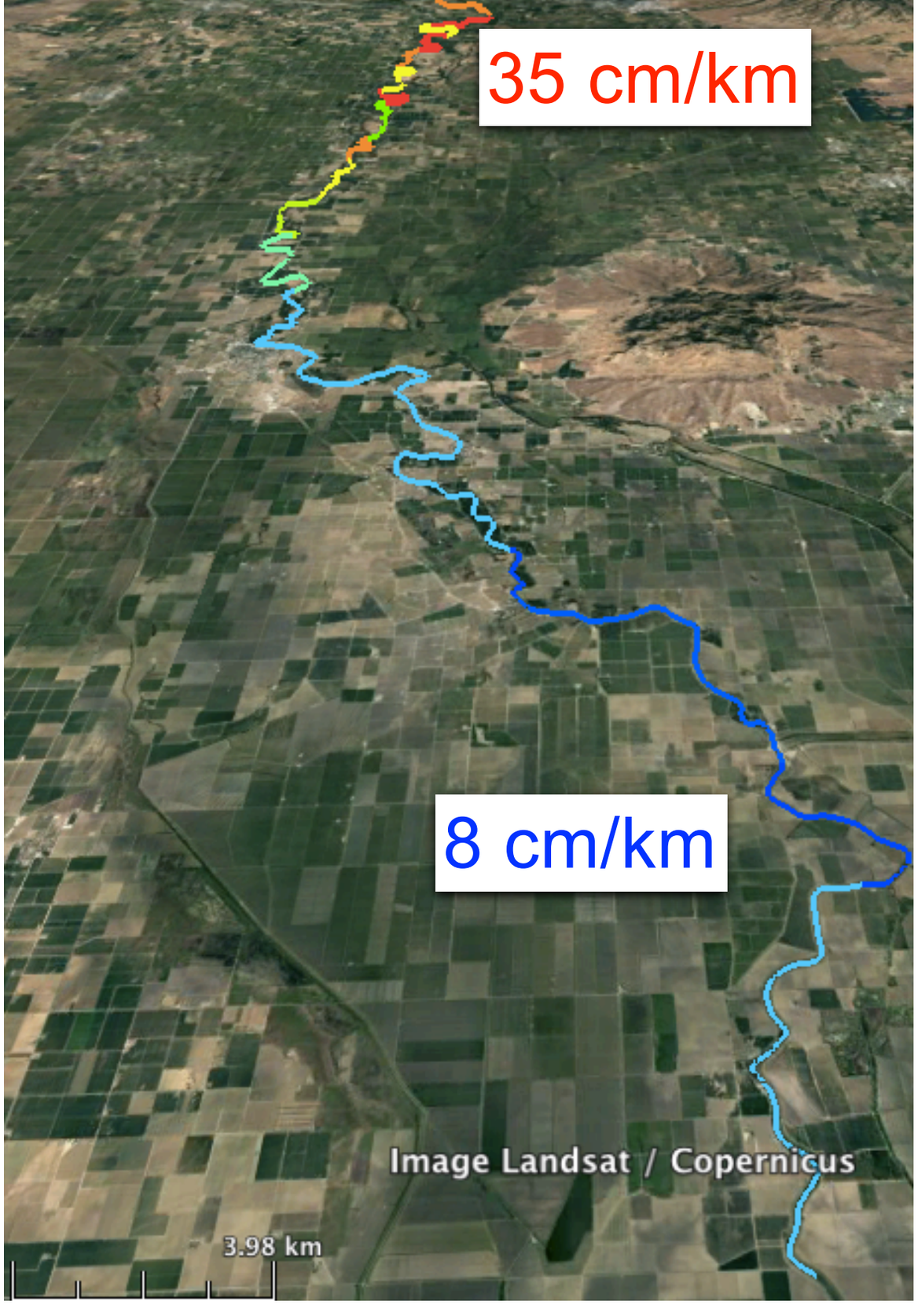
- As an exercise, the Ohio State group has produced example river data data products for the Sacramento
- Based on HEC-RAS hydraulic model (146 km of river distance) for six months of 2009, HEC-GeoRas mapping, SWOT instrument simulation (1 meter), vectorizing using RiverObs. Bypass, diversions, etc. are not included in this version. One pass & 9 cycles. True quantities resampled to SWOT sampling resolutions.
- This is not an "official" SWOT Project / JPL example data product, however. The official products will begin being produced ~mid to late 2018. Discharge is not included in this version.
- As a reminder, the simulator does not include roll errors, vegetation errors, so height, width, and slope errors are all underestimated. Note that for the Sacramento, layover may well dominate.

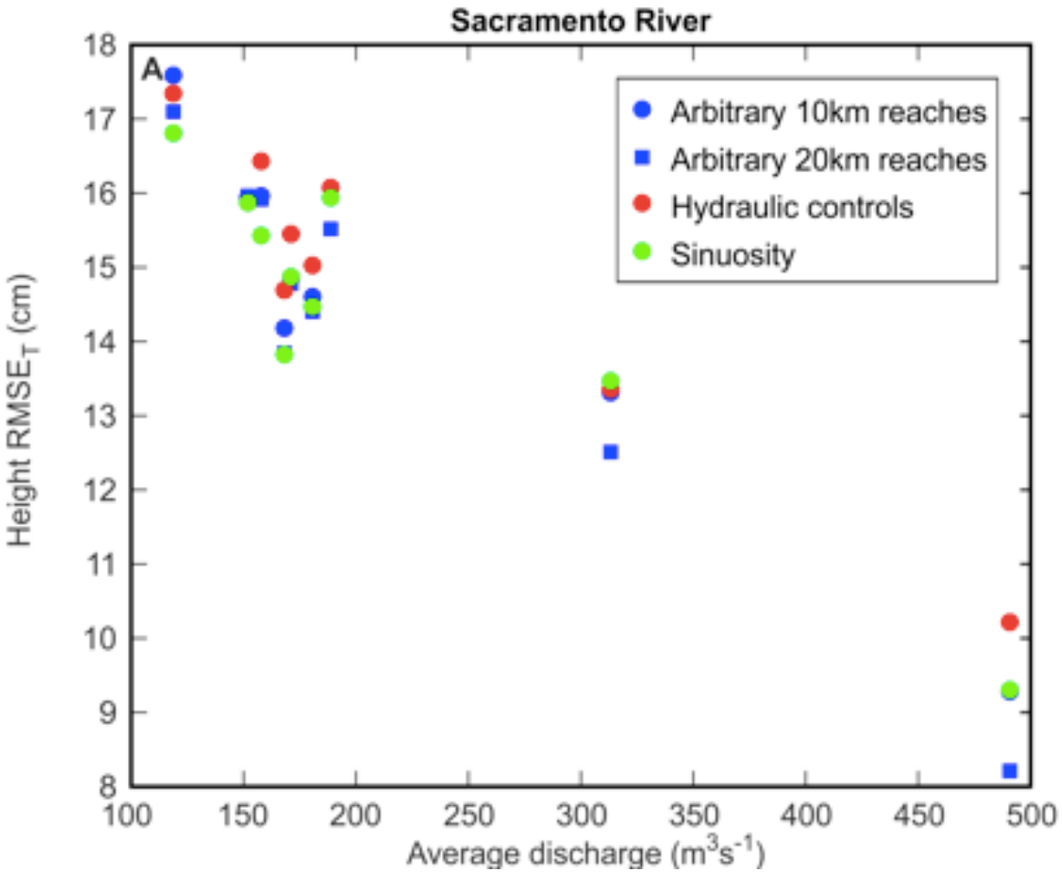
NODE HEIGHTS ON THE SACRAMENTO

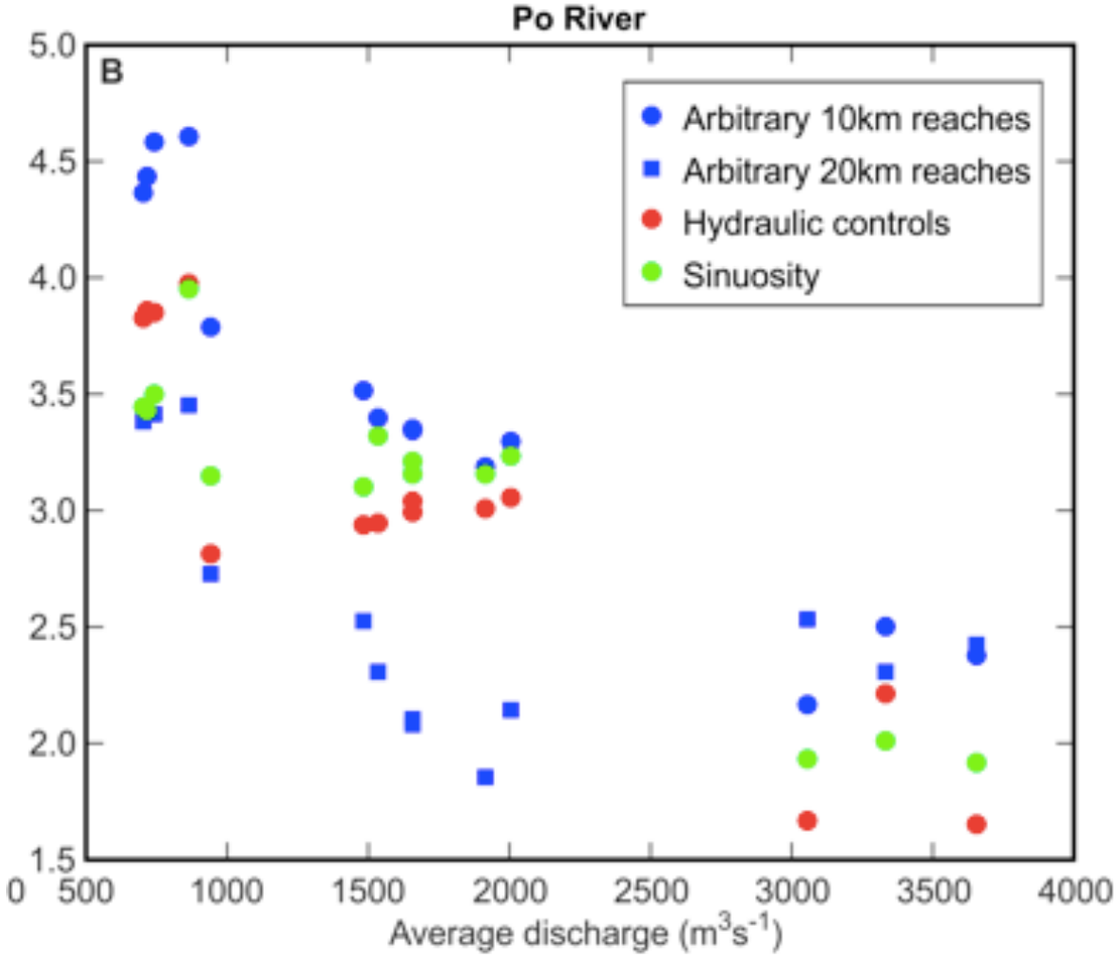
Node spacing is 200 meters. Noise is ~1.0 meter for this width river (~100 m).

REACH-AVERAGED SLOPES ON SACRAMENTO (150 KM TOTAL)

Shorter reaches help to show slope dynamics







AFFECT OF LAYOVER

- Layover adds a high bias of ~10 cm in this case. This is due to the averaging of land heights into the water heights
- This effect is strongly reduced at high flow: the water-land height difference and the number of water pixels both help
- Note that these behavior contrasts with similar vector data products on the Po River, which is ~300 m wide

Frasson et al., *WRR*, in revision

DOWNLOAD AND TRY OUT!

- Example dataset available for download on the Sacramento
- Only one pass produced! Another pass is forthcoming. Nine cycles available covering a range of flows. Both reaches and nodes available.
- Link: go.osu.edu/swotbeta
- You are a Beta tester! Send feedback: durand.8@osu.edu