
The state of the DAWG
ST Meeting Chapel Hill June 2024

What is the DAWG?

Discharge Algorithm Working Group

GOAL: produce river discharge from SWOT according to the mission design

We generate many more data products in service of that goal

Open to, and including, non SWOT funded scientists

The current state of the DAWG

- 'One-click' global runs in AWS: “Confluence”
  - Confluence is fully realized from cloud data to gauge comparisons
- We ran on >1,500 n.r.t. gauged reaches
- We ran an entire large basin (Ohio) over science orbit
- We have 6 working algorithms
- First discharge paper submitted in May
- PO.DAAC is preparing to run Confluence
- The SoS is public and available on PO.DAAC
- We produced notebooks to easily access the data
- All code open source
- The DAWG continues to be a community

Brief DAWG history

Geophysical Research Letters

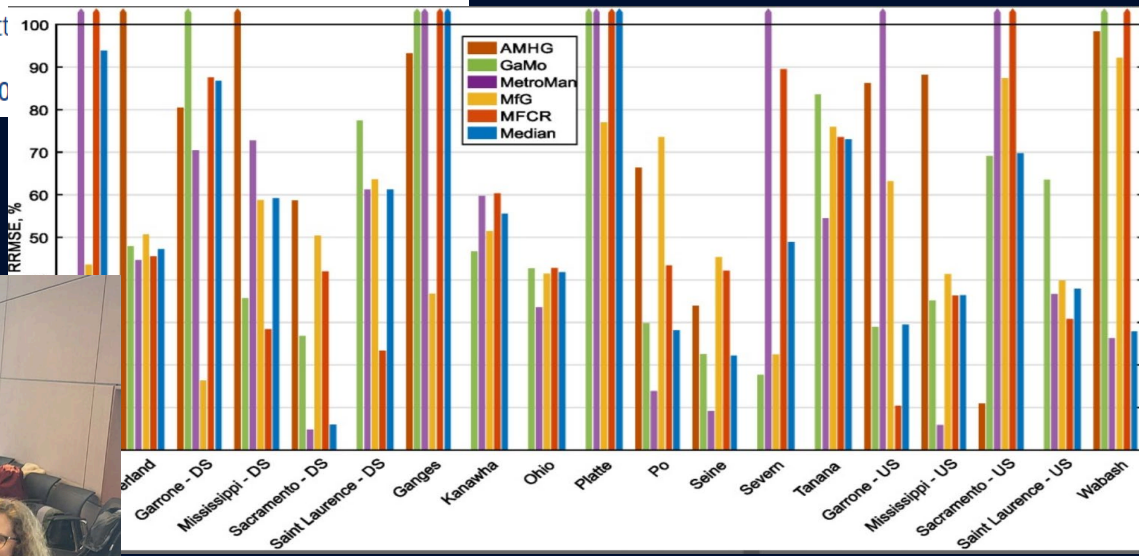
Hydrology and Land Surface Studies | Free Access

Prospects for river discharge and depth estimation through assimilation of swath-altimetry into a raster-based hydrodynamics model

Konstantinos M. Andreadis, Elizabeth A. Clark, Dennis P. Lett

First published: 22 May 2007 | https://doi.org/10.1029/200

<2000-2013 'SDT' era: What is possible?

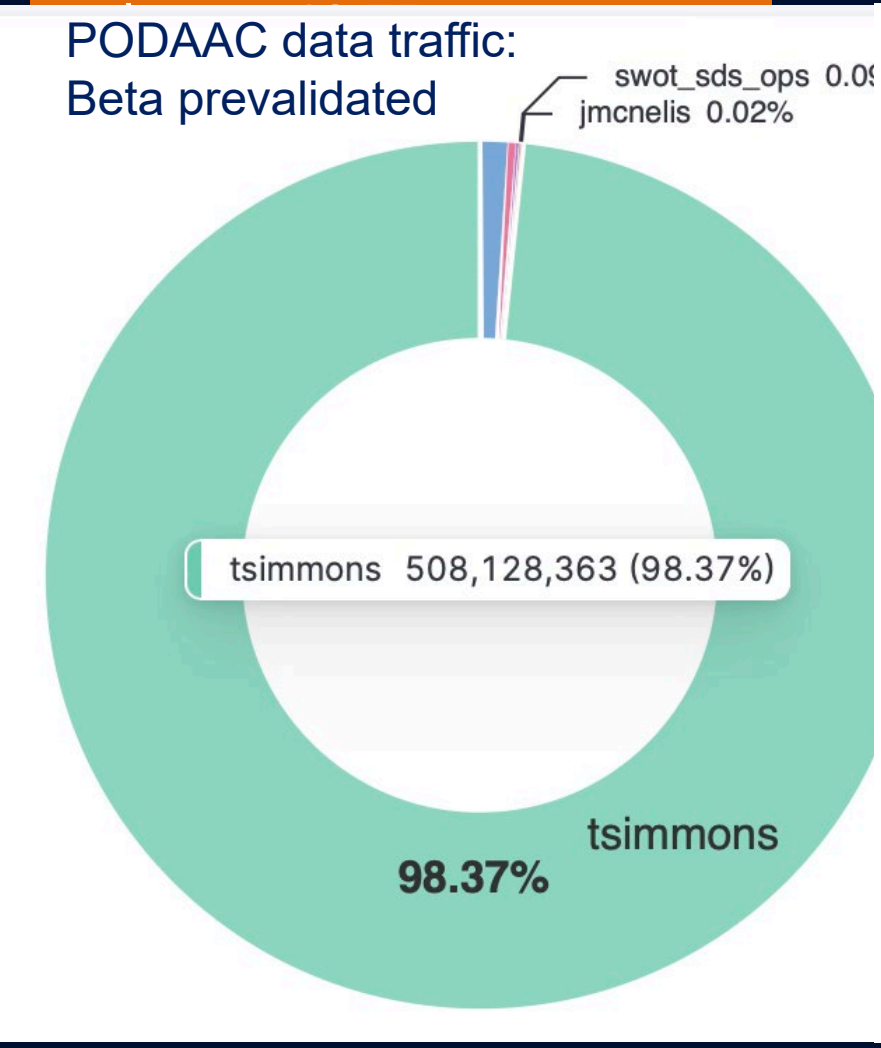


~2013-2019 'Pepsi Challenge' era: Should be possible >200 citations!

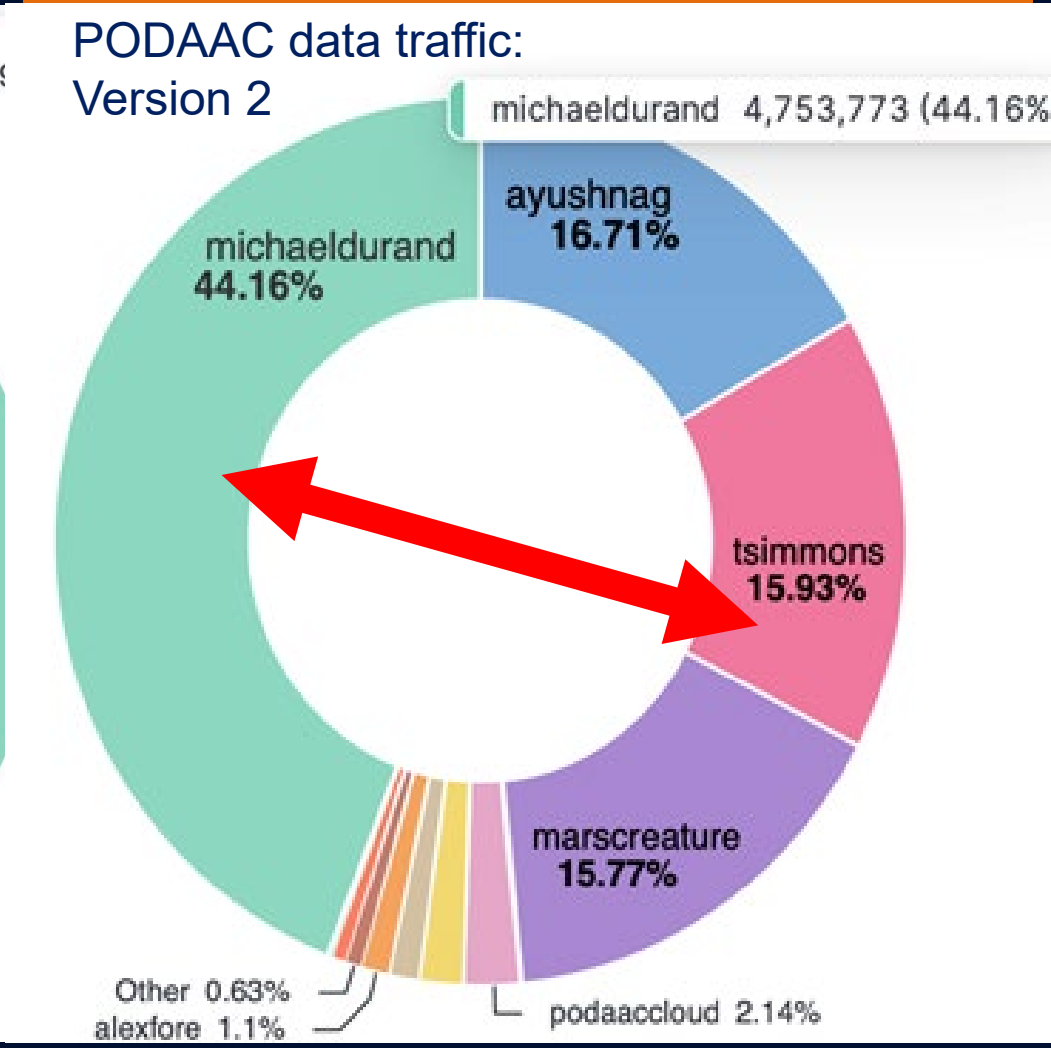
2019-2024 'Confluence' era: Prove it

- 'One-click' global runs in AWS
- Confluence

$331.59 to run 5,870 reaches



32 hours to run 5,870 reaches



- First discharge paper submitted in May
- The DAWG led an open process to select a lead for the 'first' SWOT discharge paper
- Kostas Andreadis submitted a paper to GRL with >30 authors, 17 years after he submitted the first SWOT discharge concept paper
- … it is already out of date before review is finished!

- PO.DAAC is preparing to run Confluence
- The SoS is public and available on PO.DAAC
- We produced notebooks to easily access the data
- All code open source

Exploring gauges and river discharge in the SWORD of Science (SoS) dataset

Mapping all discharge algorithms, integrator results, and gauge data

Author: Nikki Tebaldi, NASA JPL PO.DAAC

Summary

Looking at discharge in the SoS

It can be helpful to plot the flow law parameter estimation (FLPE) algorithm discharge alongside the integrator (MOI) discharge produced for that algorithm PLUS overlapping in situ gauge data. Note that not all rivers have gauge data associated with them. In this notebook we will look at the steps to plot SoS discharge values produced from running the Confluence workflow alongside in situ gauge data gathered and stored in the priors.

Granule structure (background)

- The DAWG has had a sleepless week
  - First ever at scale run finished Friday, explored on Sunday at a workshop
  - Results puzzling, so we kicked off another run Sunday, finished Monday late night
  - Shows Confluence's maturity

- We really, really, really want to give you all excellent discharge everywhere, right now

- A bit of fun to explain the true "state" of the DAWG

The state of the DAWG

A one-act play

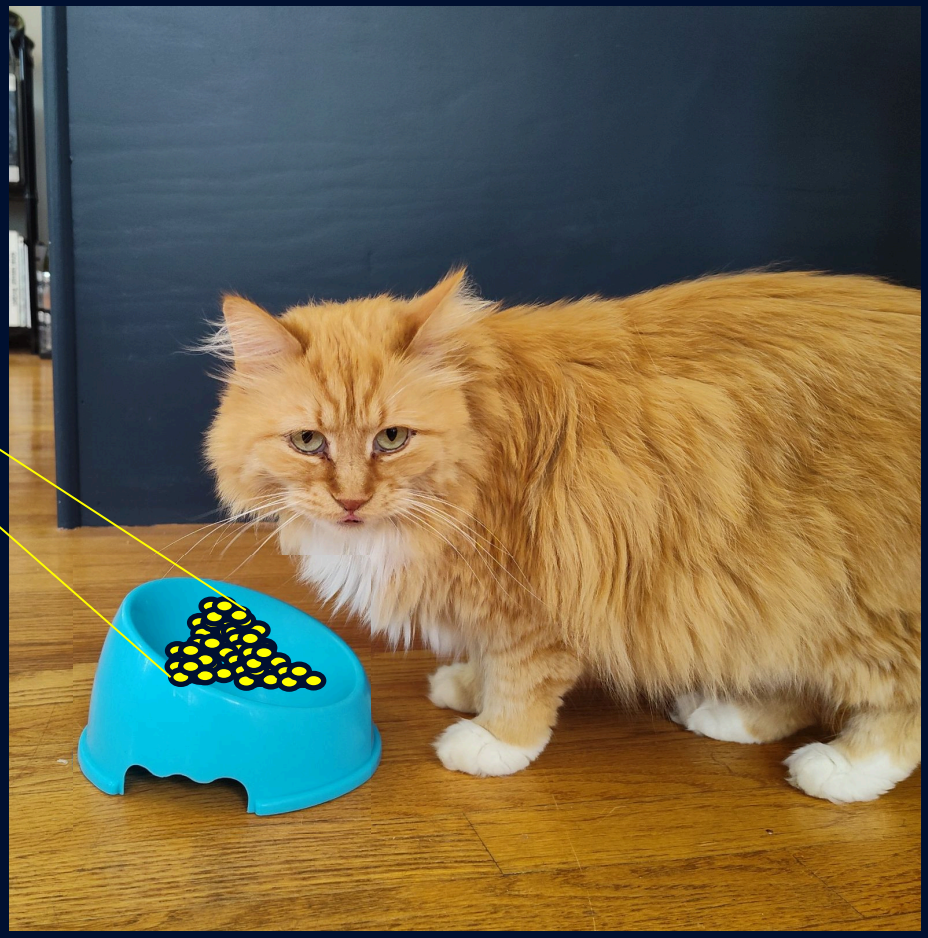
This is the DAWG
The DAWG is happy and going about their day

JPL: SWOT data are coming
The DAWG: oh?

JPL: SWOT data will go in this bowl when it is ready
The DAWG: Let us wait exactly here then

The DAWG, over many years waiting at the bowl:
We should prepare for when data comes into that bowl.
We want to eat all the data.

Confluence



JPL: Version C is ready, but please pay attention to these caveats, all of which we are working on improving

Shailen: Significant improvements coming next version

JW: 26% error in area at node Version C

Cassie: Version C to dev version reach heights 17cm > 10cm

Cassie: please use the quality flags

JW: area performance is highly variable

JW: we don't understand area(width) performance as well as height

Cassie: river performance is highly variable river to river, with consistently good and consistently bad rivers

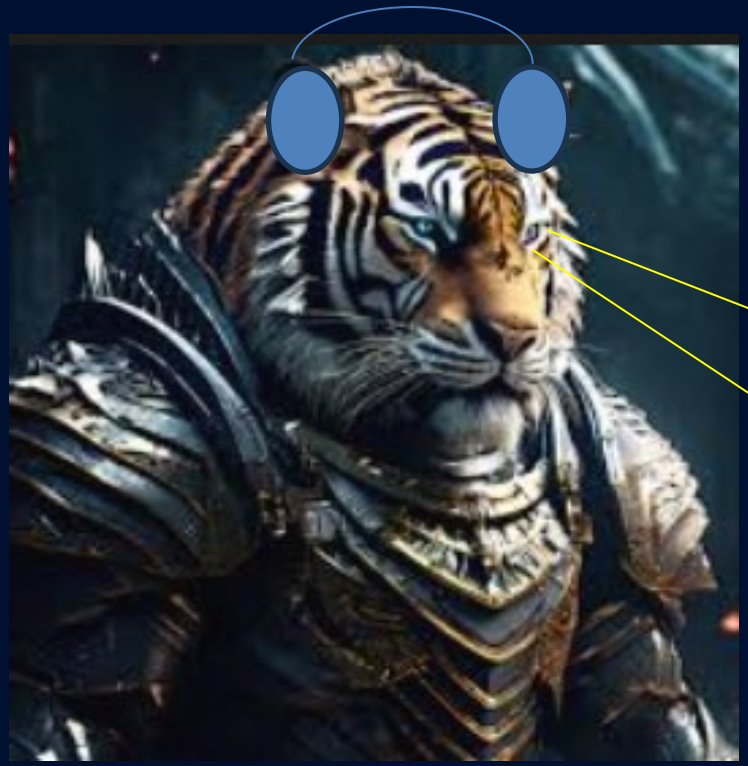
Cassie: node error 15-17cm
Cassie: reach error is 10-17cm

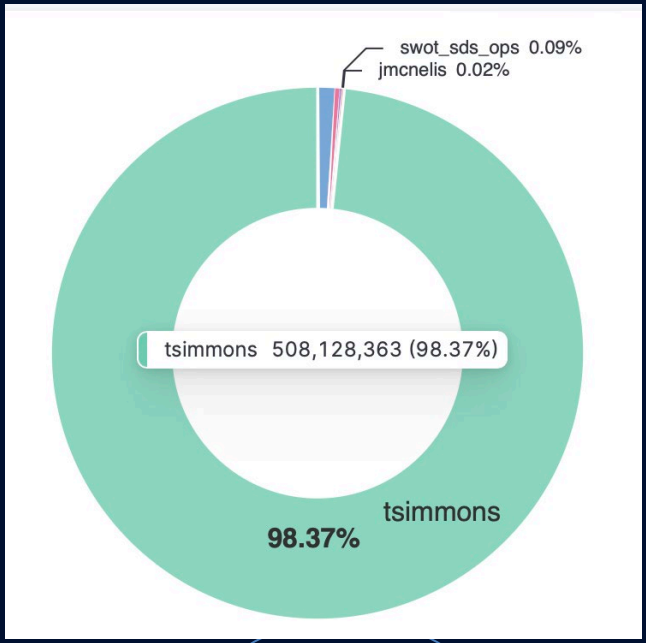
Cassie: 50-60% of nodes pass quality and dark water filters

Cassie: 3% of nodes are good, 60% are suspect, 20% are bad

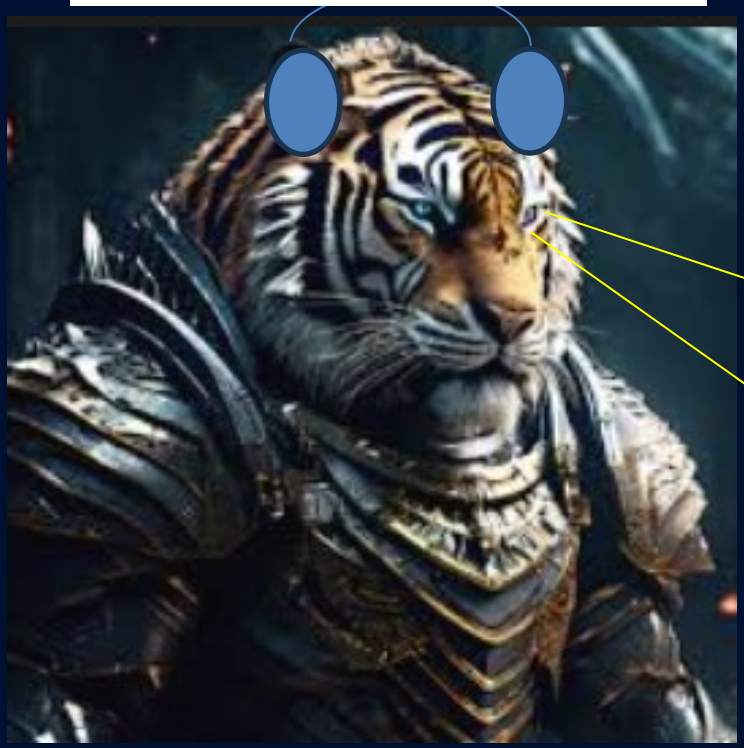
JPL

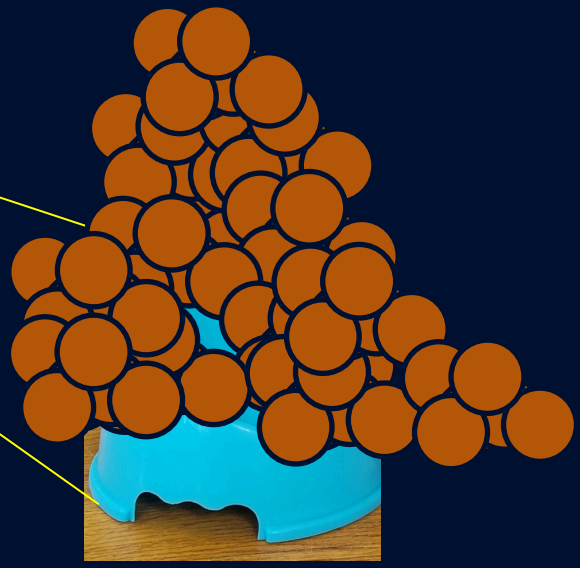
We’re putting data in the bowl now…
Please use the quality flags




swot_sds_ops 0.09%
jmcnelis 0.02%
tsimmons 508,128,363 (98.37%)
tsimmons
98.37%


SWOT
Mix
Version C
ORIGINAL CHOICE
24 LB






~fin

Starring
Luna *as* The DAWG

Executive Producer
The DAWG

Written and Directed by
Colin J Gleason

Photography
Binglei Gong
Snipping Tool

Version C Stats
Colin J Gleason, taking notes on Wed AM

- The rest of this session shows results of Confluence runs
- We used Version C data with no quality filtering
- We really, really, wanted to do a big reveal, and forged ahead with a run
- Expect results accordingly
- We've implemented a few tweaks this week, but a full re-run with flags is not ready
- …. But we did eat all the data

- The state of the DAWG is then:

1. Confluence is running perfectly, and this amazing tool enables us to sprint before we walk

2. We’re able to rapidly diagnose and understand output

3. Where SWOT data are good, discharge is good