

# GNSS-R ocean properties by Delay Doppler Map stare processing

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- Need for winds from SO
- GNSS-R Basics
- What is GOODIE
- Stare processing
- Preliminary Conclusions & Future work

# Scatterometry

- Pros:
  - High accuracy
  - Med-high spatial resolution
- Cons:
  - Time lags (**up to 6-h**)
  - Expensive
- Solutions:
  - More Scatterometers (coming soon)
  - **Signals of opportunity(?): GNSS-R**



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The screenshot displays the SGRPC3 software interface. The main window, titled "SGRPC3 - C:\aal\IVE\_c\temp\GP090100.SGRble - [Ground Track]", shows a map of the Atlantic Ocean with a grid overlay. A ground track is plotted, consisting of 32 numbered markers (1-32) connected by lines. A yellow dot is visible on the track near marker 21. The DDM Form window is open in the top right corner, showing a blank form with a menu bar (File, Connection, Options) and status information: "D/L Rate: 0.0 bytes/s DDM Queue Depth: 0 U/L Rate: 0.0 bytes/s". At the bottom of the main window, there is a status bar with the following information: "Current Plot Time: 09:33:24 UTC Lon, Lat: 96.5,-57.9", "Playback Progress:" with a progress bar, "Log Parsing Progress:" with a progress bar, and "Connection Status: Not Connected Logging Status: Not Logging".

ScreenCast-O-Matic.com

26-04-2018

IOVWST 2018



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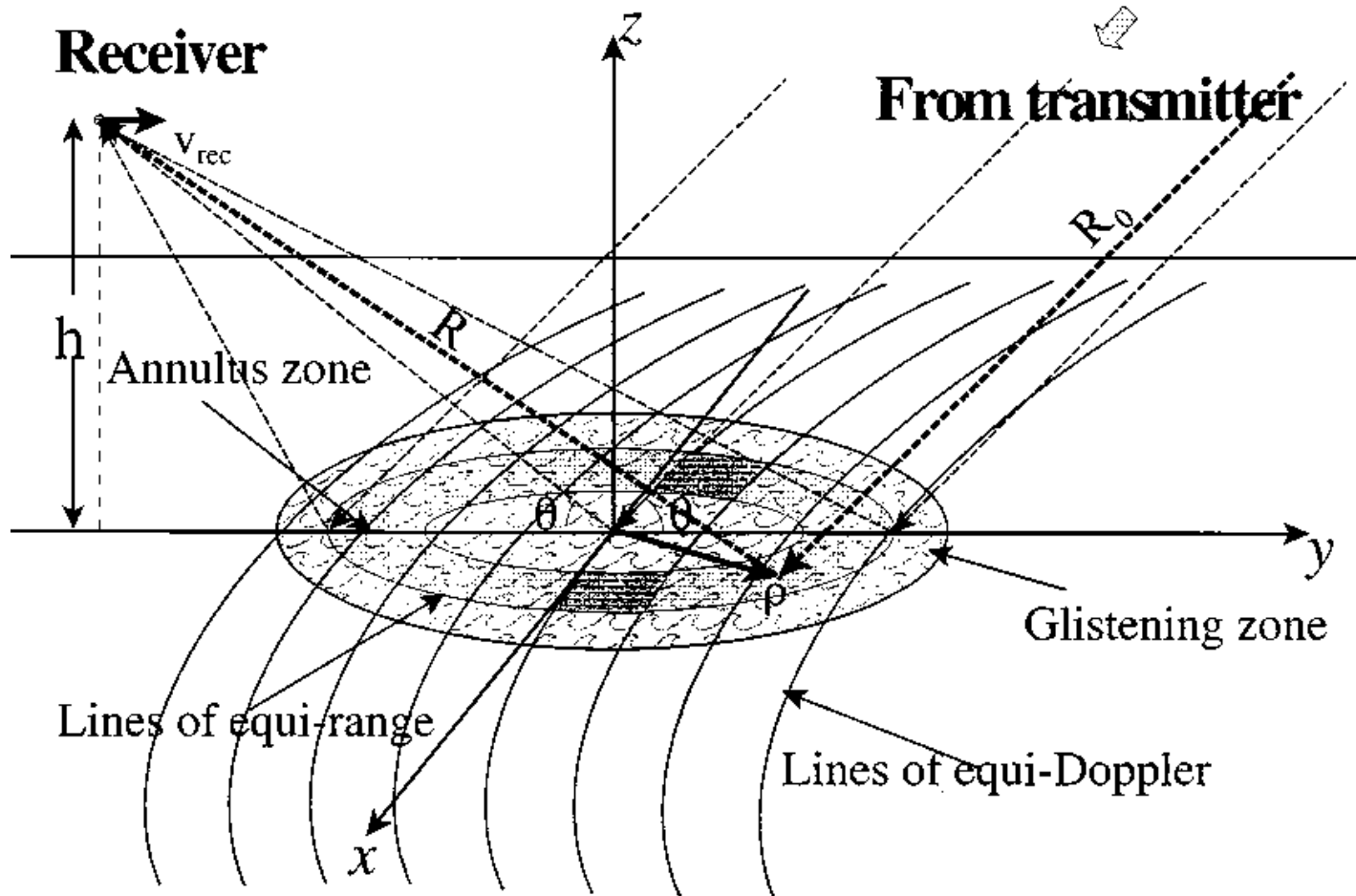
CSIC  
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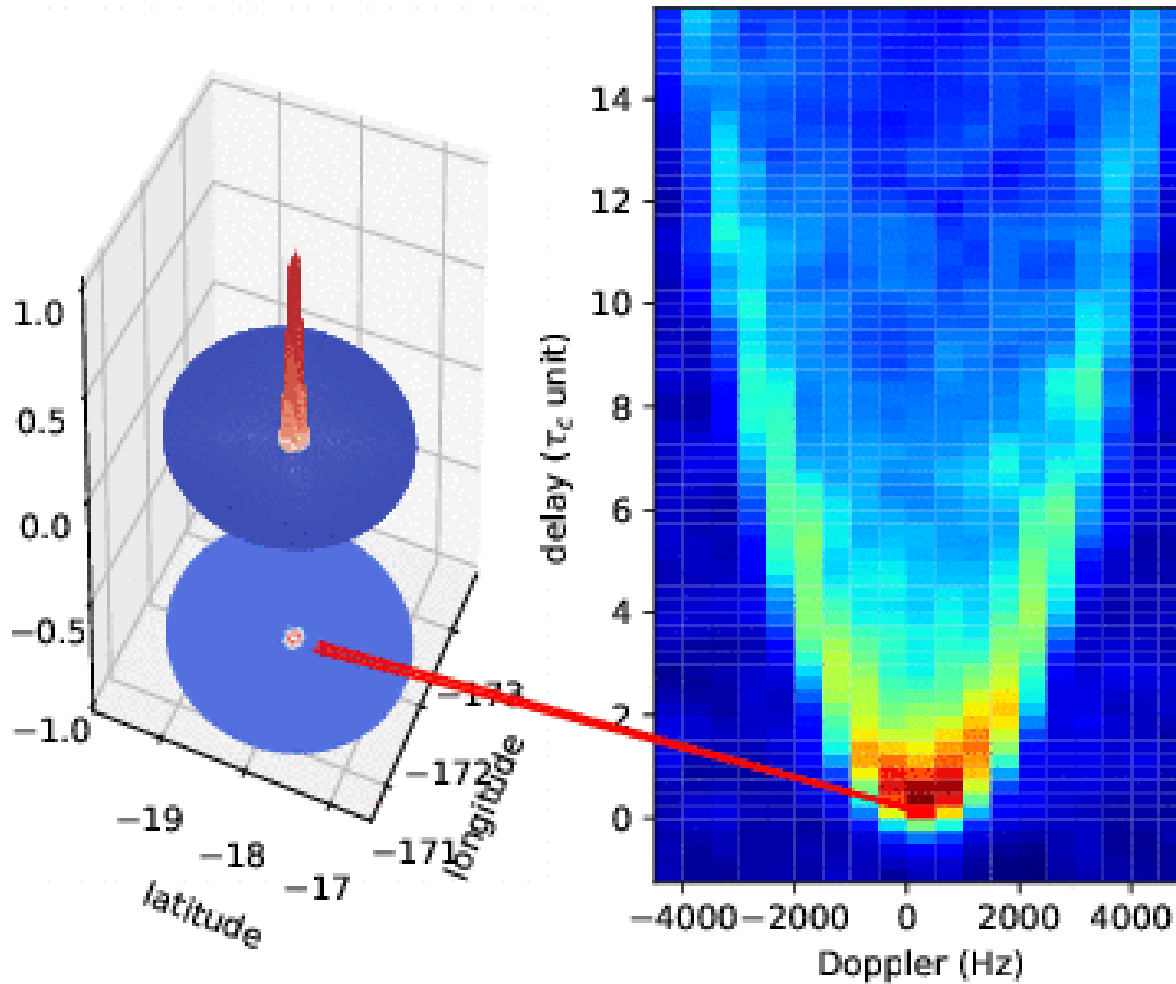
# Bistatic Radar Equation (BRE)

$$P_R(\tau, f) \cong \frac{\lambda^2}{(4\pi)^3} \frac{P_T G_T G_R \sigma_0 A}{R_0^2 R_1^2 N_0 N_1}$$

$$\sigma_0 = \pi \Gamma^2 \left( \frac{q^4}{q_z^4} \right) P \left( -\frac{\vec{q}_\perp}{q_z} \right)$$

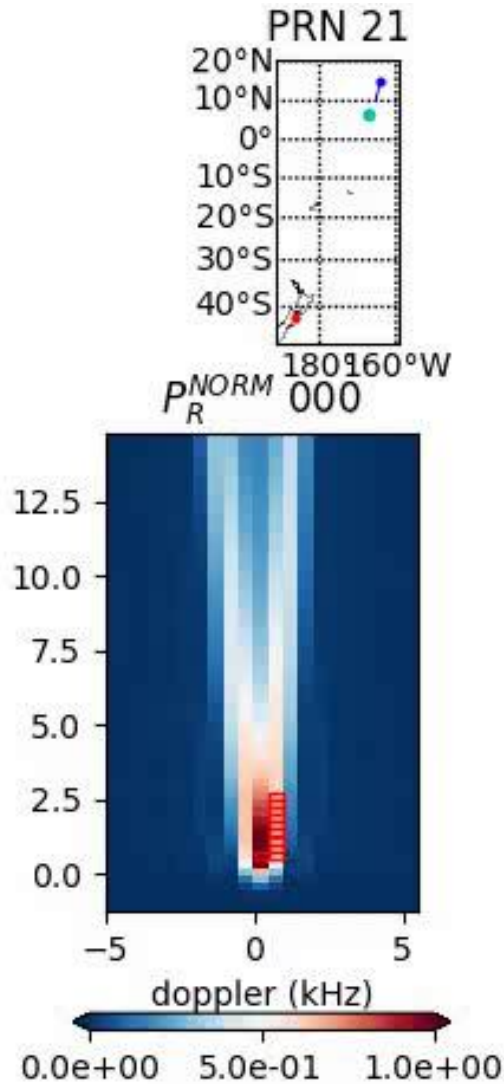


# WAF projection




- Aims:
  - Quality check of TDS1/CYGNSS data
  - GMF:  $\sigma_0 = f(U, \Omega, SST, \dots)$
  - Retrieval of  $U$
  - Observation Operator
  - Assimilation of  $U$  in NWP
  - Google GOODIE+KNMI to know more

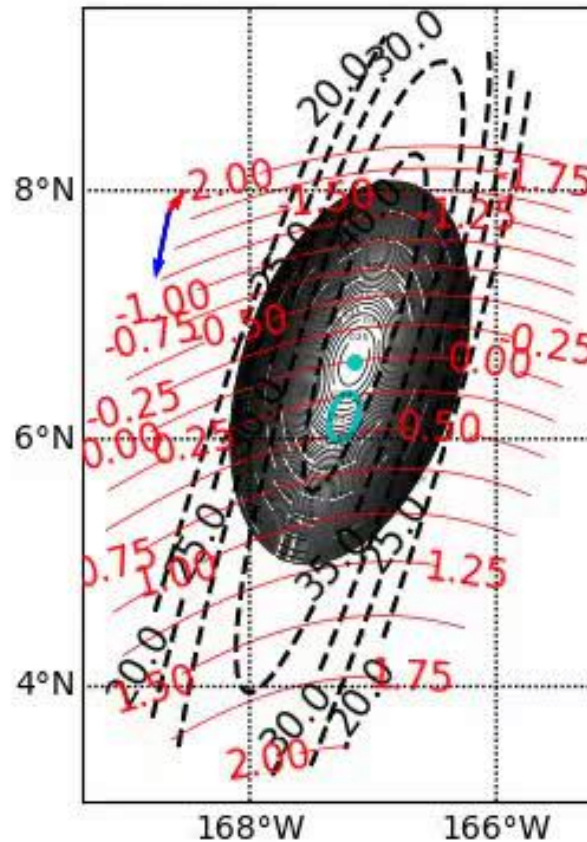
# Stare processing



$\theta = 64.3$

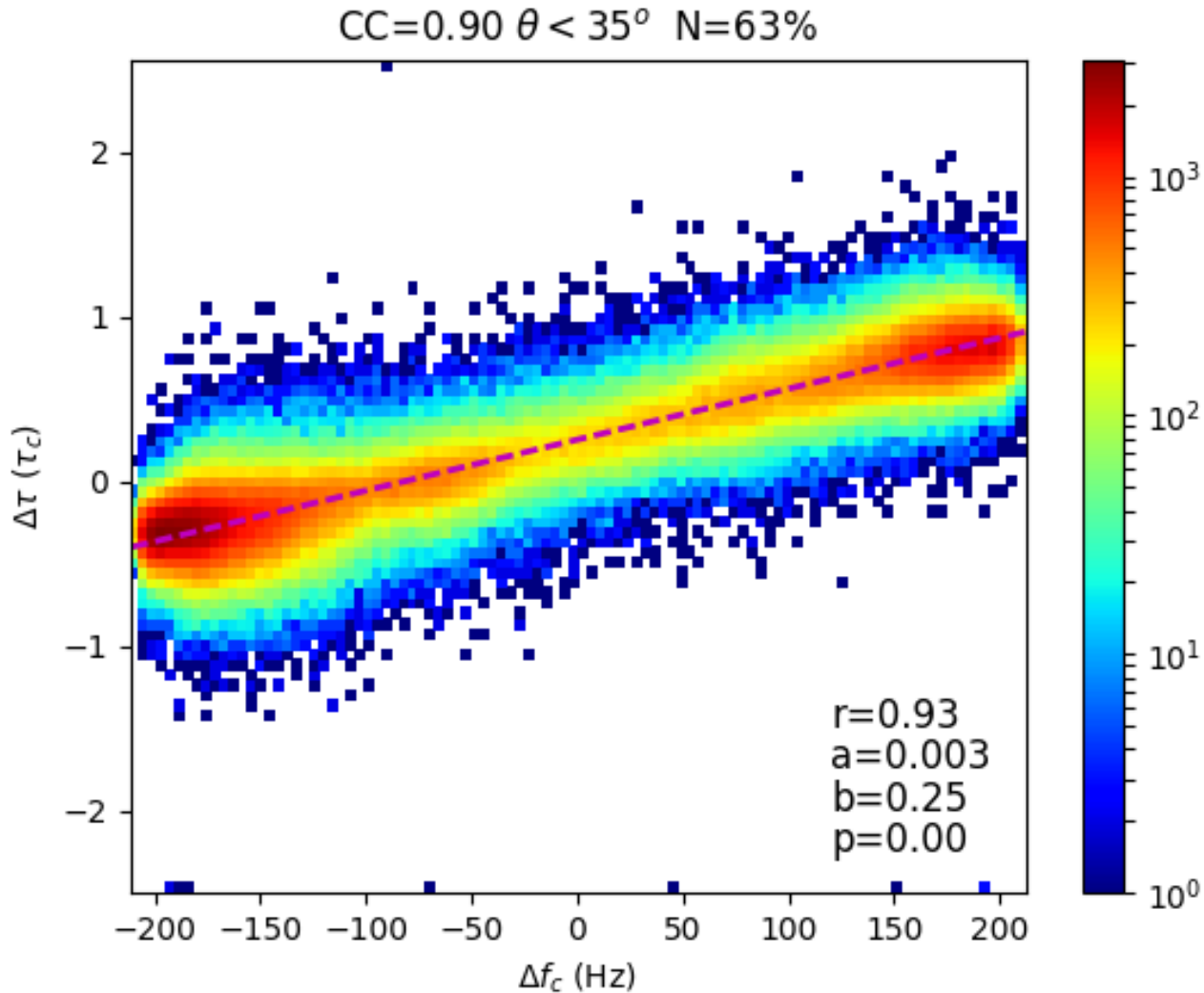


2014-09-01T20:18:08.8  $\Delta L = 133.0$  Km





# Quality Check of TDS-1 DDMs

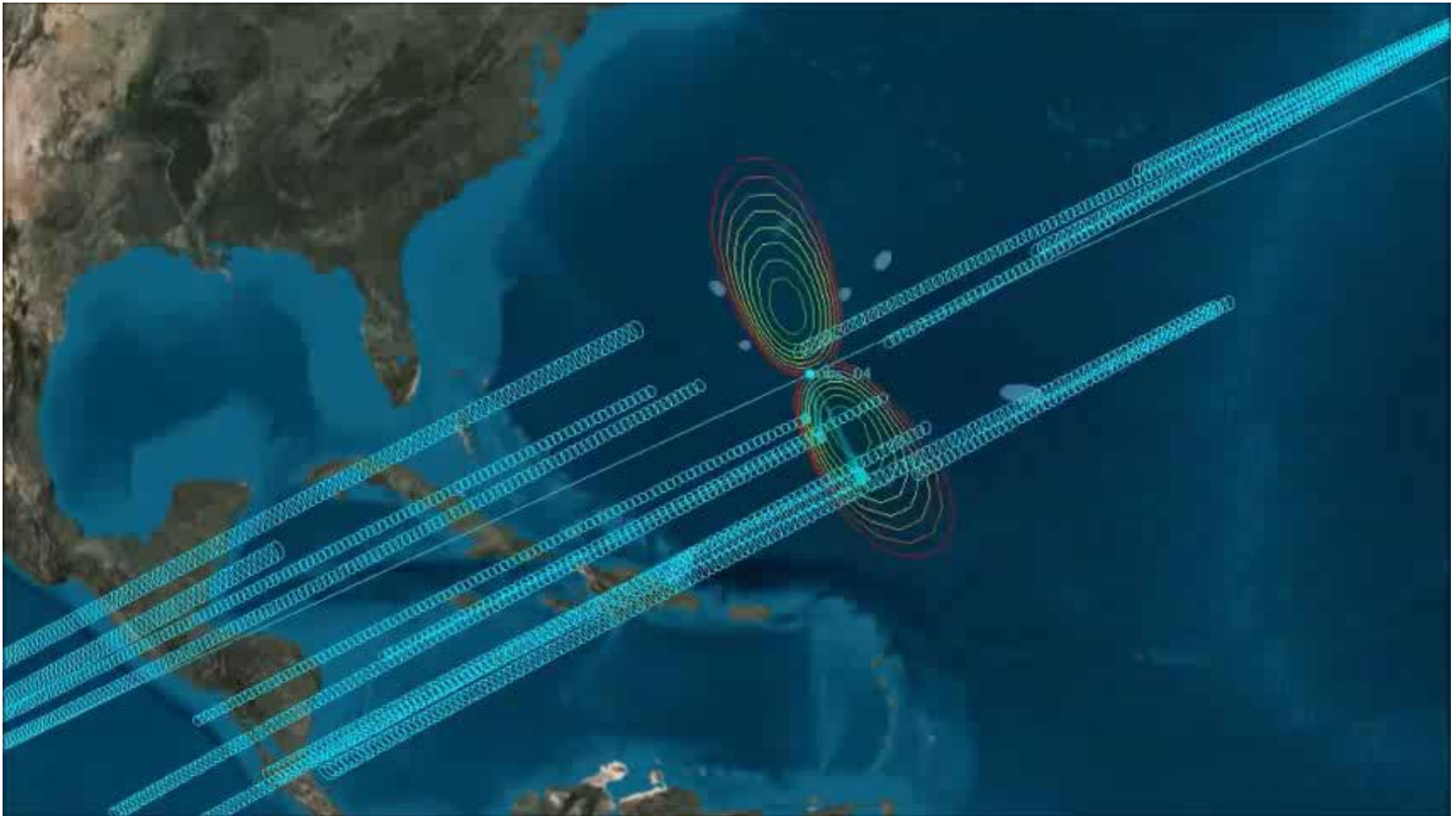


# Preliminary Conclusions & Future Work

- TDS-1 quality seems not good for stare processing
- Application of QC scheme to CYGNSS DDMs
- Going on with stare processing (if possible)
- Simulate distortions in forward model

# Why GNSS-R

- Huge amount of signals of opportunity
- Low sensitivity to rain
- Low cost





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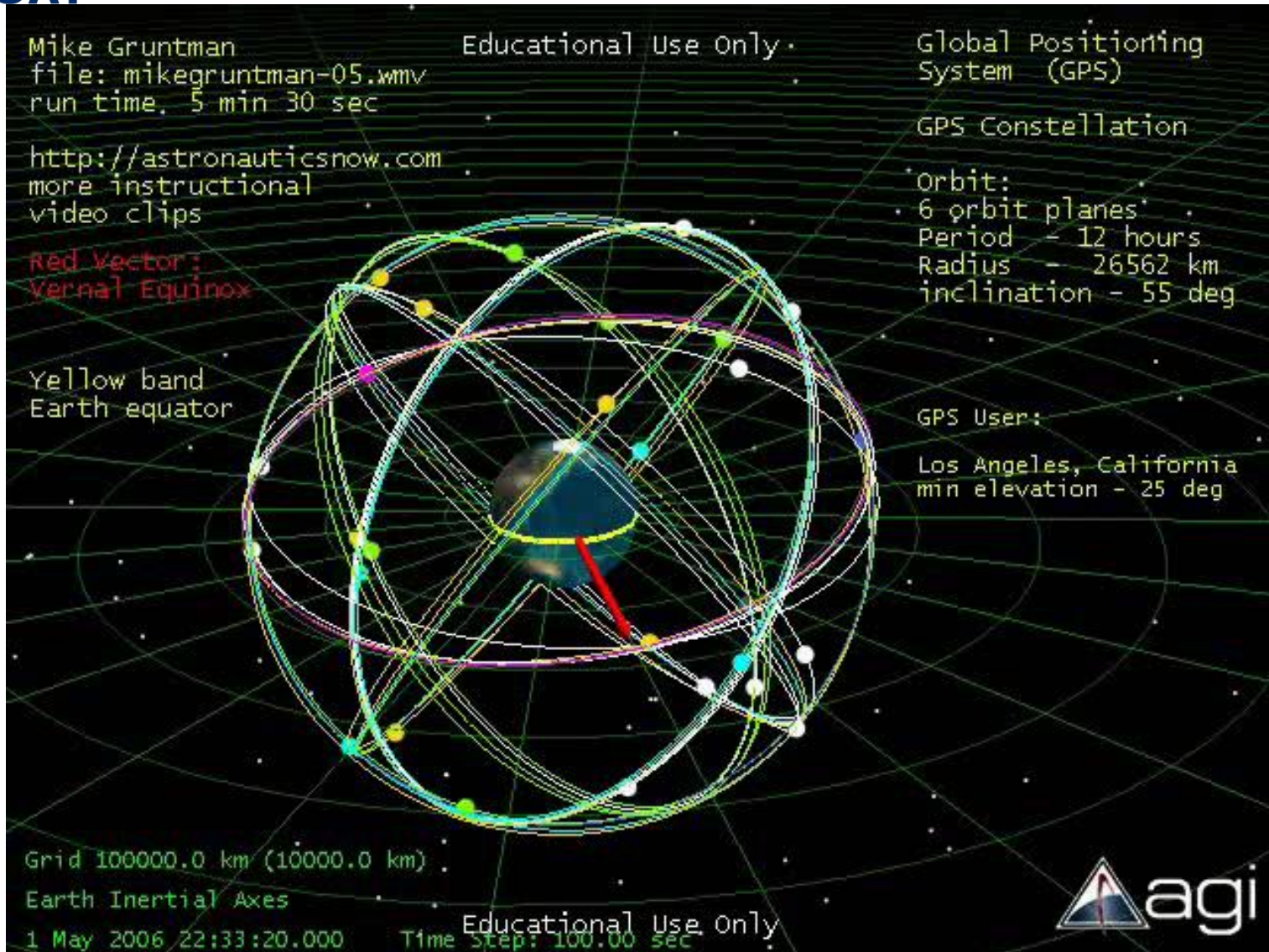


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# GPS constellation



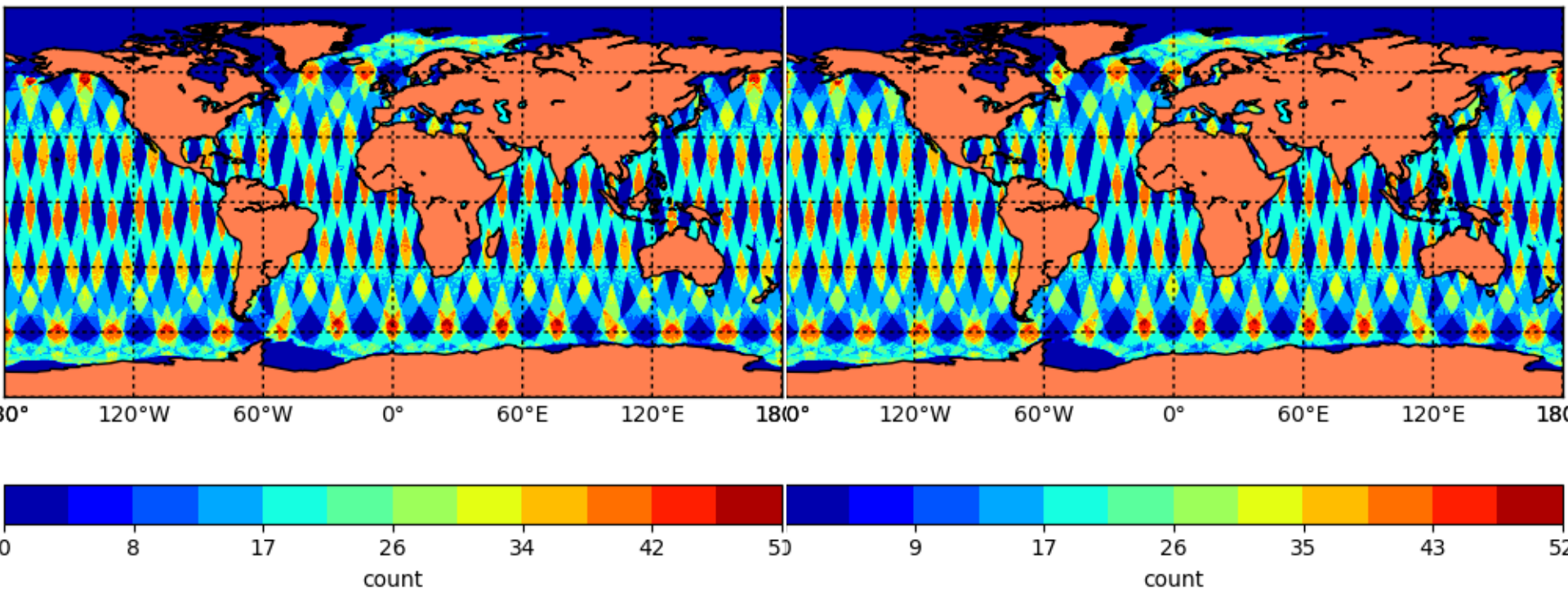
# Upcoming wind sounders

- EUMETSAT MetOp-C 9:30 – 21:30 LT
- CFOSAT/SWIM 7:00 – 19:00 LT
- OceanSat-3(2) 00:00 - 12:00 LT
- HY-2B 6:00 - 18:00 LT
- ESA's Aelous

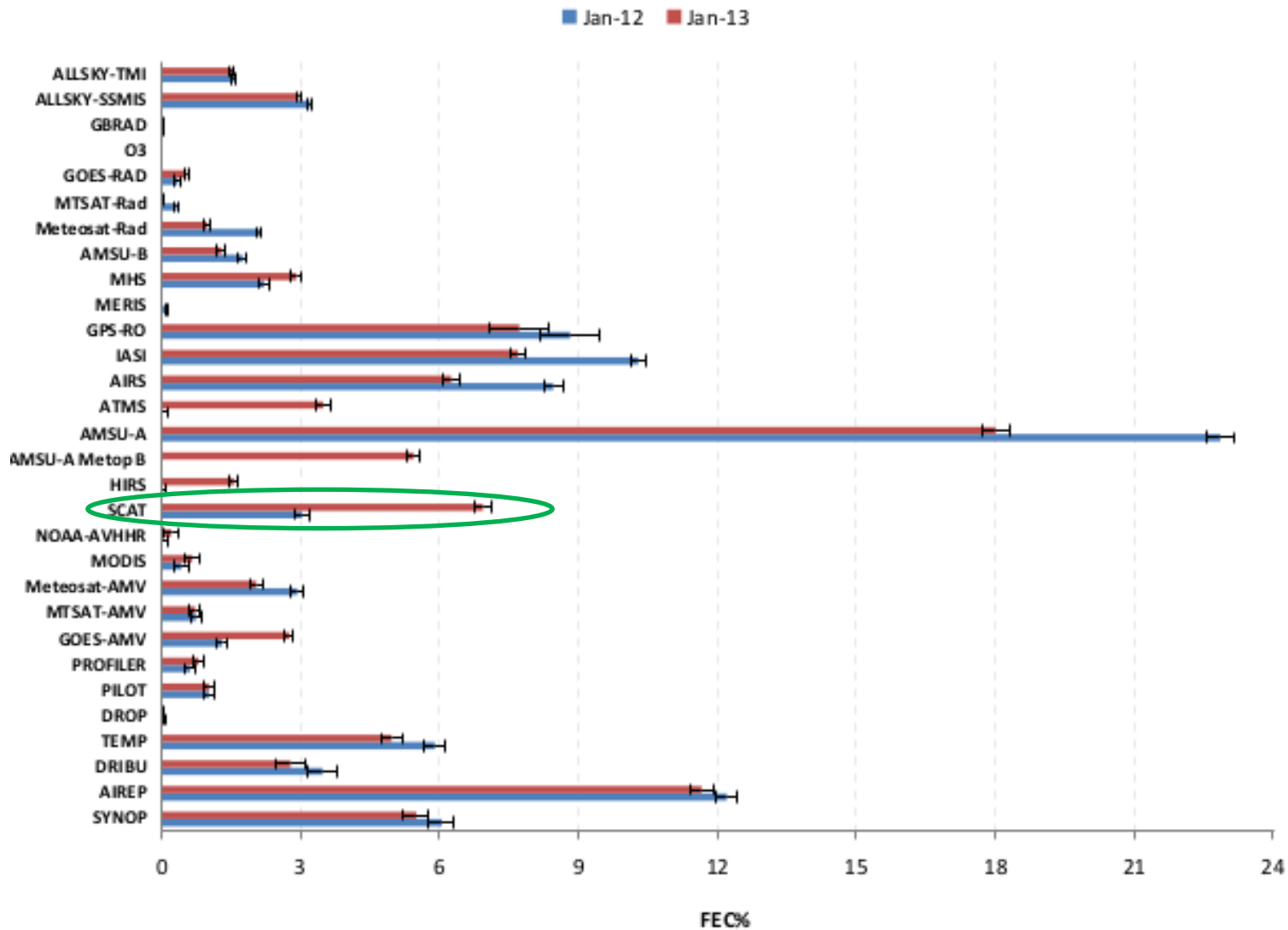
# Scatterometry

ASCATA total count: 2030923

ASCATB total count: 2040371



# Impact of OSCAT DA



# Interest in winds



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