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Tab D, No. 4(a)

NMFS' Side-by-side Pilot Testing of cVMS and Historical cELB Units for Gulf Shrimp Vessels

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Shrimp Committee Meeting - 10/24/2022



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Why are we conducting this evaluation?

Transmission using the current cELB program is facing a sunset as support for the 3G network fades.

Given the differences between cELB and cVMS programs, the Council requests that NMFS fully evaluate and consider draft approval specifications.

Objective here: Because of the potential move to a new GPS system - Compare cELB and cVMS data, as well as cELB and Faria data.

Who manufactures cVMS Units?

Both cVMS providers agreed to deploy units free of charge for testing



3G CDMA cELB



3G transmission used in cELB is facing a sunset.



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What is the underlying technology?

A **Global Positioning System (GPS) chip** is a microchip that is used in a GPS receiver, which receives signals from four or more of the 27 GPS satellites currently orbiting Earth. A GPS device can calculate its position based on the amount of time it takes to receive a signal from each of the four satellites.

Recording device (SSD card or miniUSB drive) and all devices can be set to record location at any interval.

Cellular device to call home and upload data when in range of port.

Data Logger also incorporates motion sensor.



Deployments Examined

Vessel	cVMS (WHG)	cELB	Faria Beede
RV Caretta	X	X	
RV Southern Journey	X	X	
Shrimp Vessel I		X	X
Shrimp Vessel II		X	X
Shrimp Vessel III		X	X

NMFS thanks the three industry vessels for volunteering for this project. For additional information contact Farron Wallace Farron.Wallace@noaa.gov.

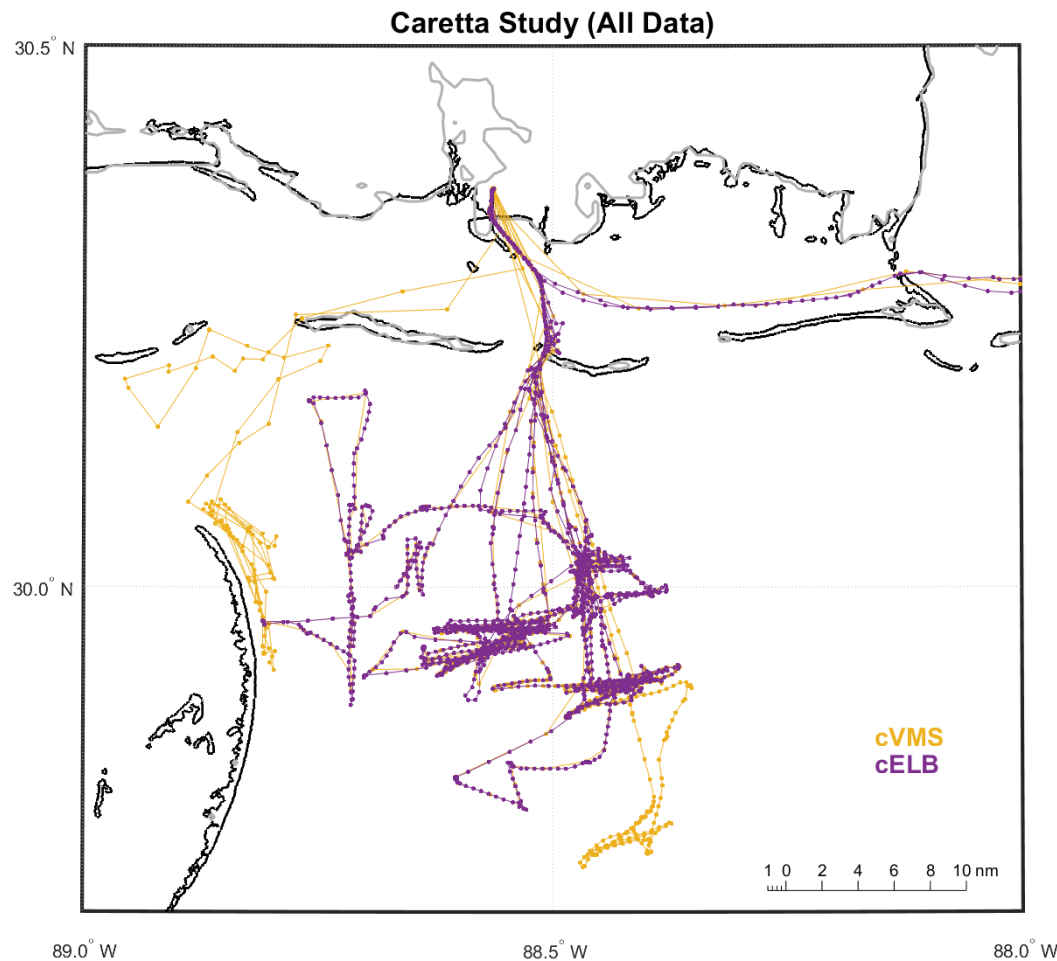
Securing and processing data

- cVMS data were retrieved from Woods Hole Group's Thoriumweb.com password protected web service.
- cELB data were retrieved via miniUSB drives from the device itself.
- Data were cleaned (to find overlap and ensure ten-minute ping rates for both sensors), processed, and plotted in Matlab.

All data available for NOAA vessel Caretta

Note: Many tracks were not covered by both sensors, or cVMS had one hour ping rates.

Additional tracks to the east had one hour ping rates for cVMS and were not used.



cVMS is shown in GOLD.

cELB is shown in PURPLE.

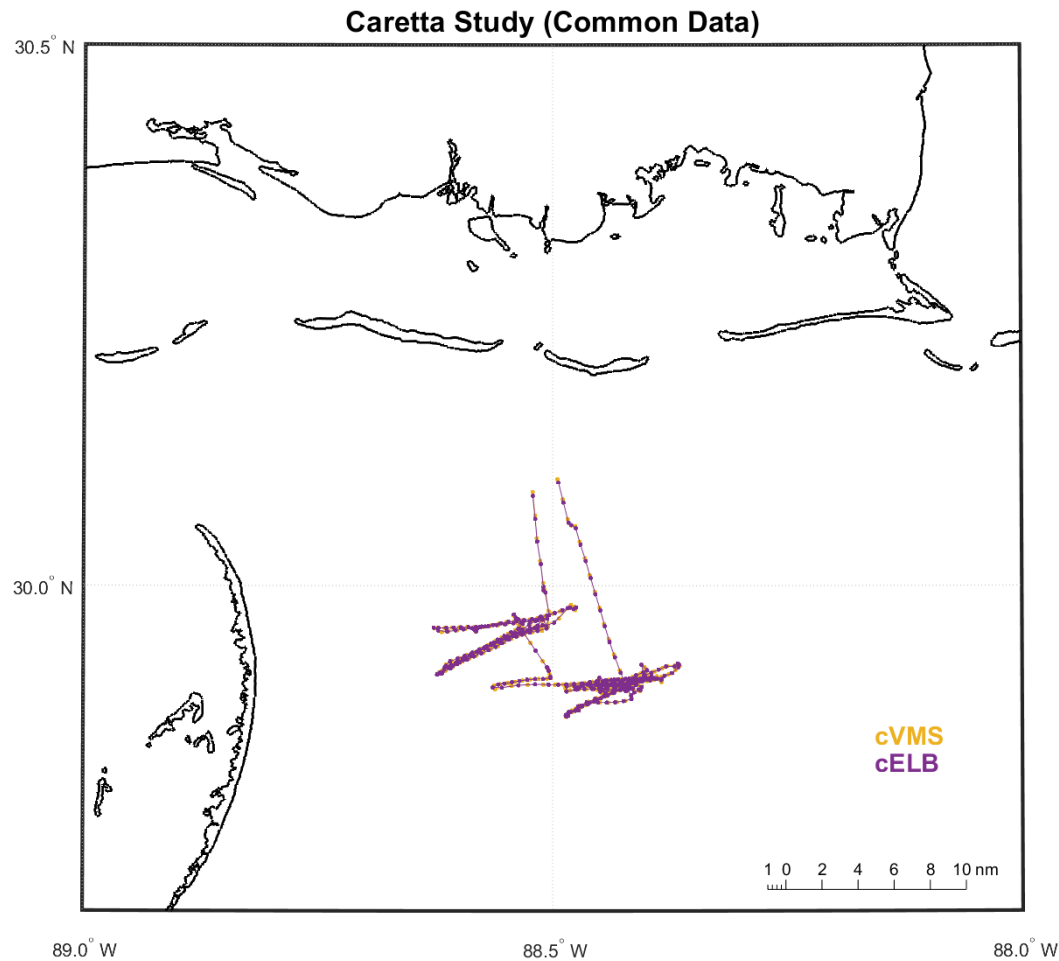


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Cleaned Caretta data

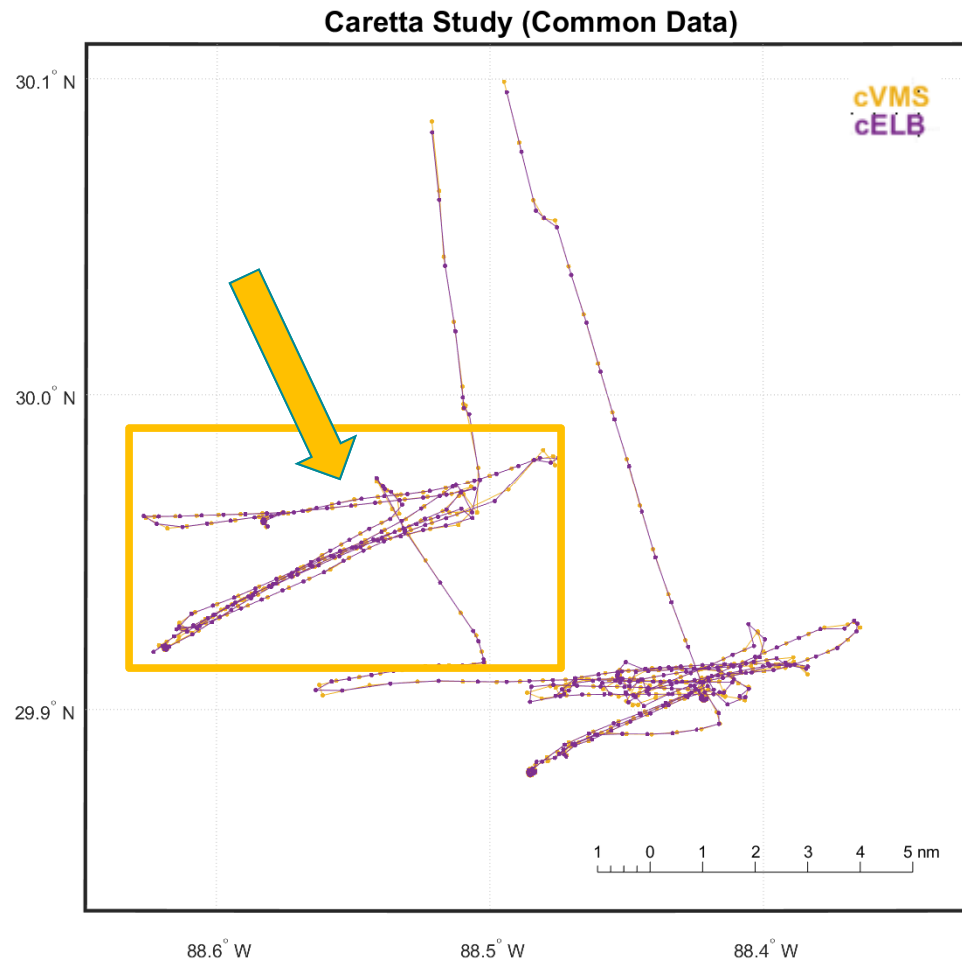
After cleaning,
only one usable
trip remained.

Each segment will
be shown in turn.



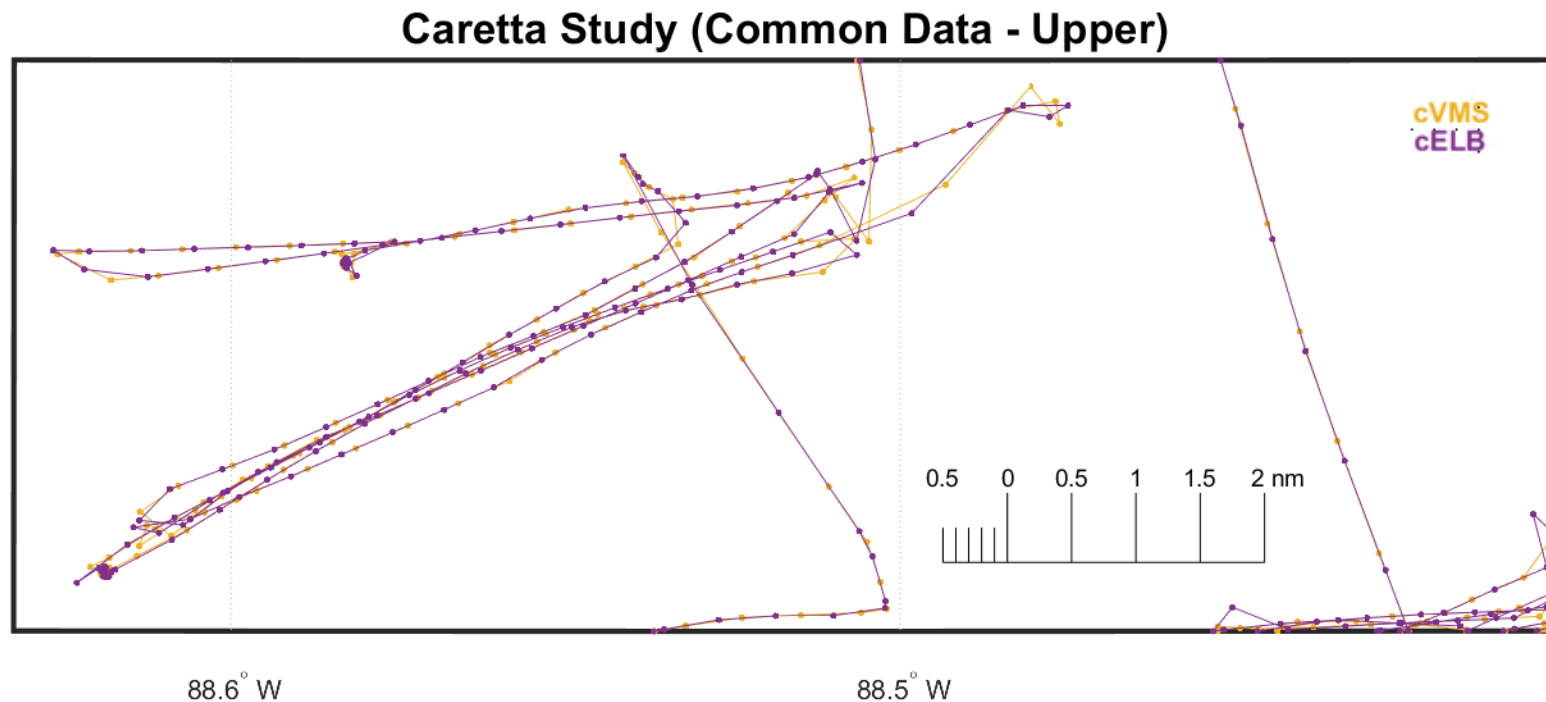
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First the UPPER segment



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Upper segment of Caretta data

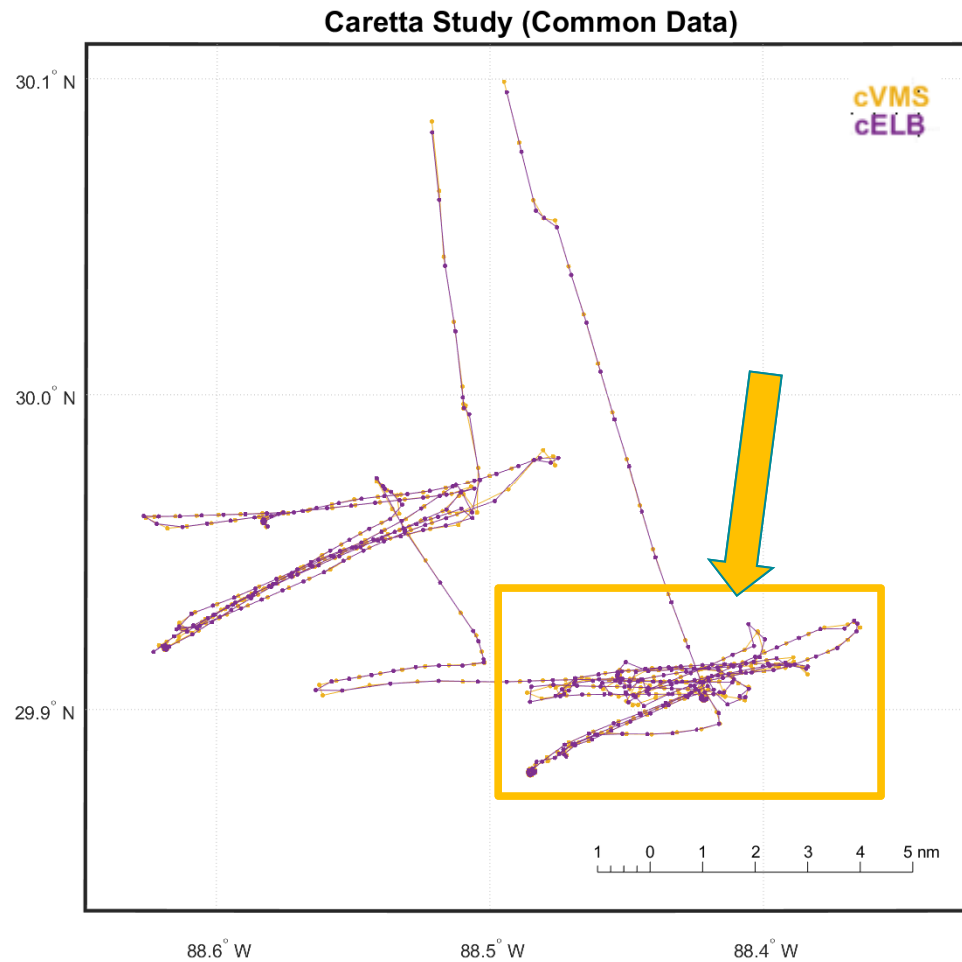


Very good overlap of cVMS and cELB data during tows. Some 'differences' due to vessel turning and ping timing.



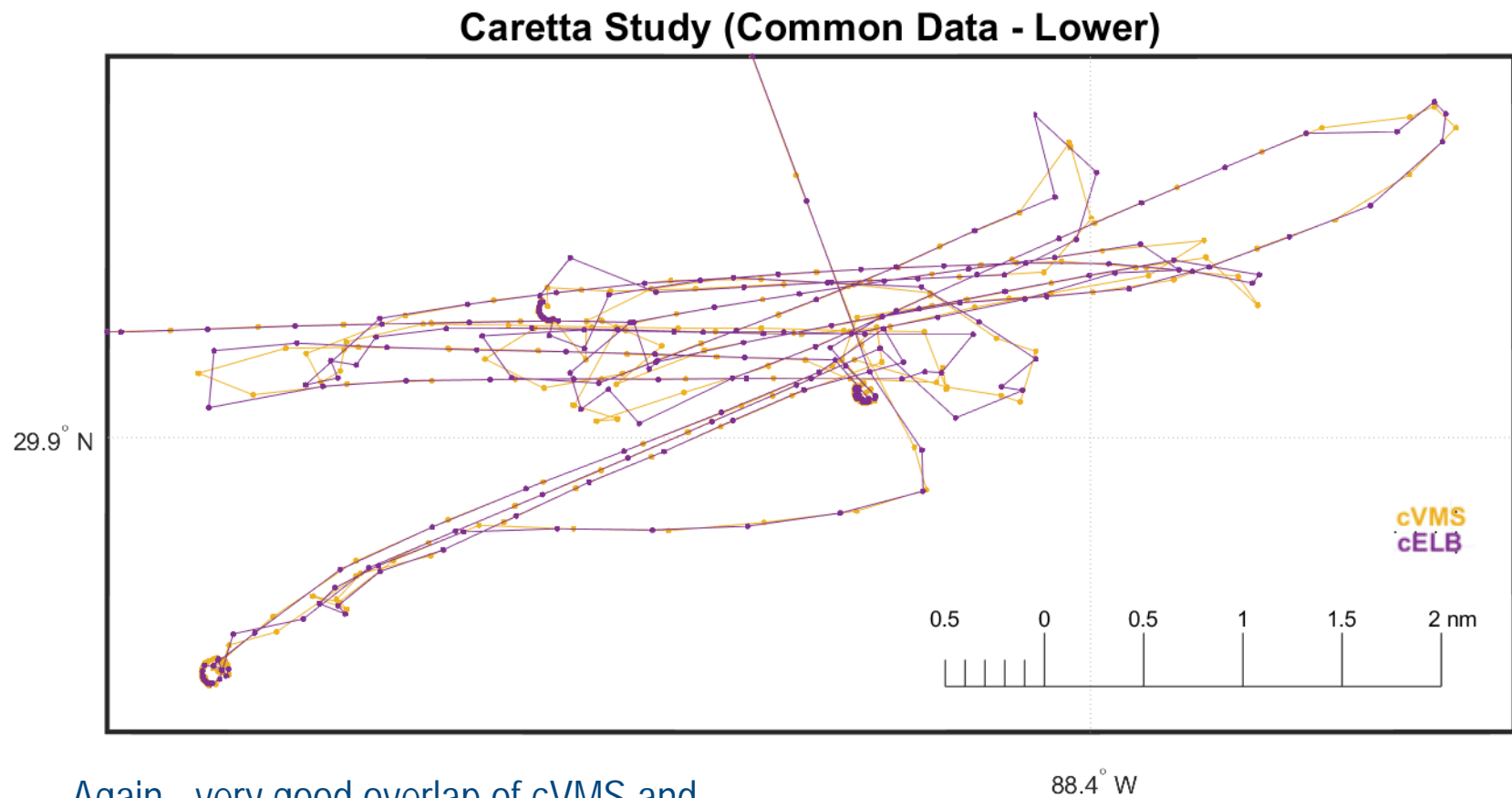
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Lower segment of Caretta data



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Lower segment of Caretta data



Again - very good overlap of cVMS and cELB data during tows. Slower vessel speed during turns reduces 'mismatch'.

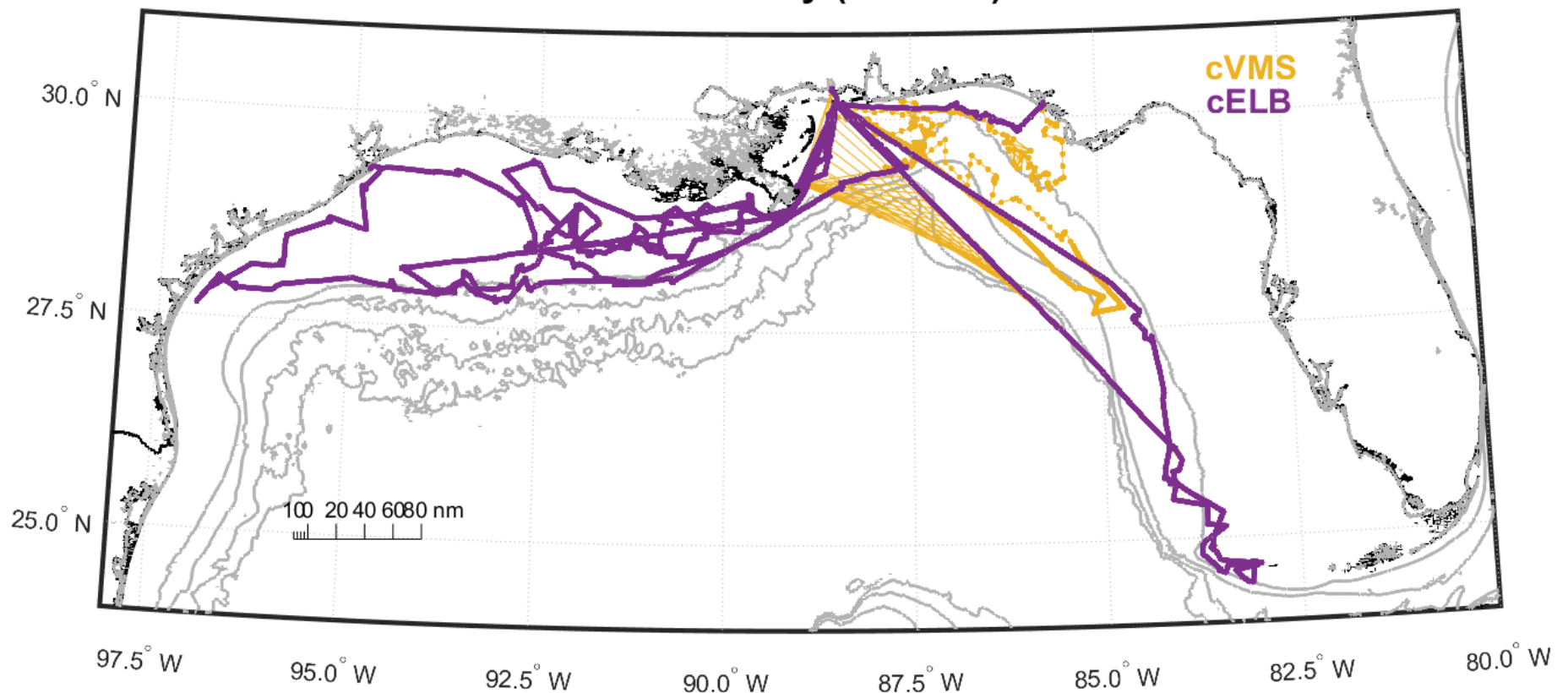


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All data available for NOAA vessel SoJo

Note: Many tracks were not covered by both sensors, or cVMS had one-hour ping rates.

SOJO Study (All Data)



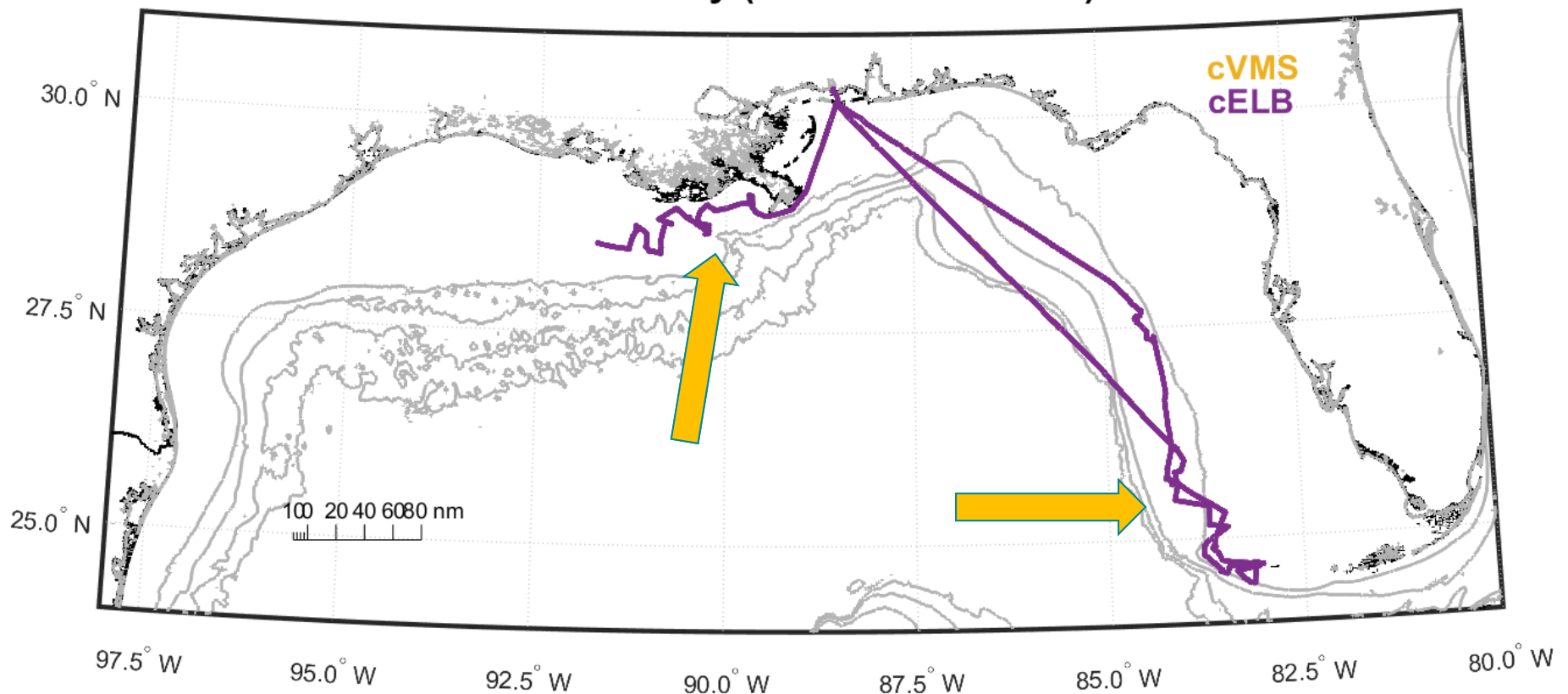
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Cleaned Southern Journey data

After cleaning, only two usable trips remained.

Each segment will be shown in turn.

SOJO Study (All Data - Cleaned)



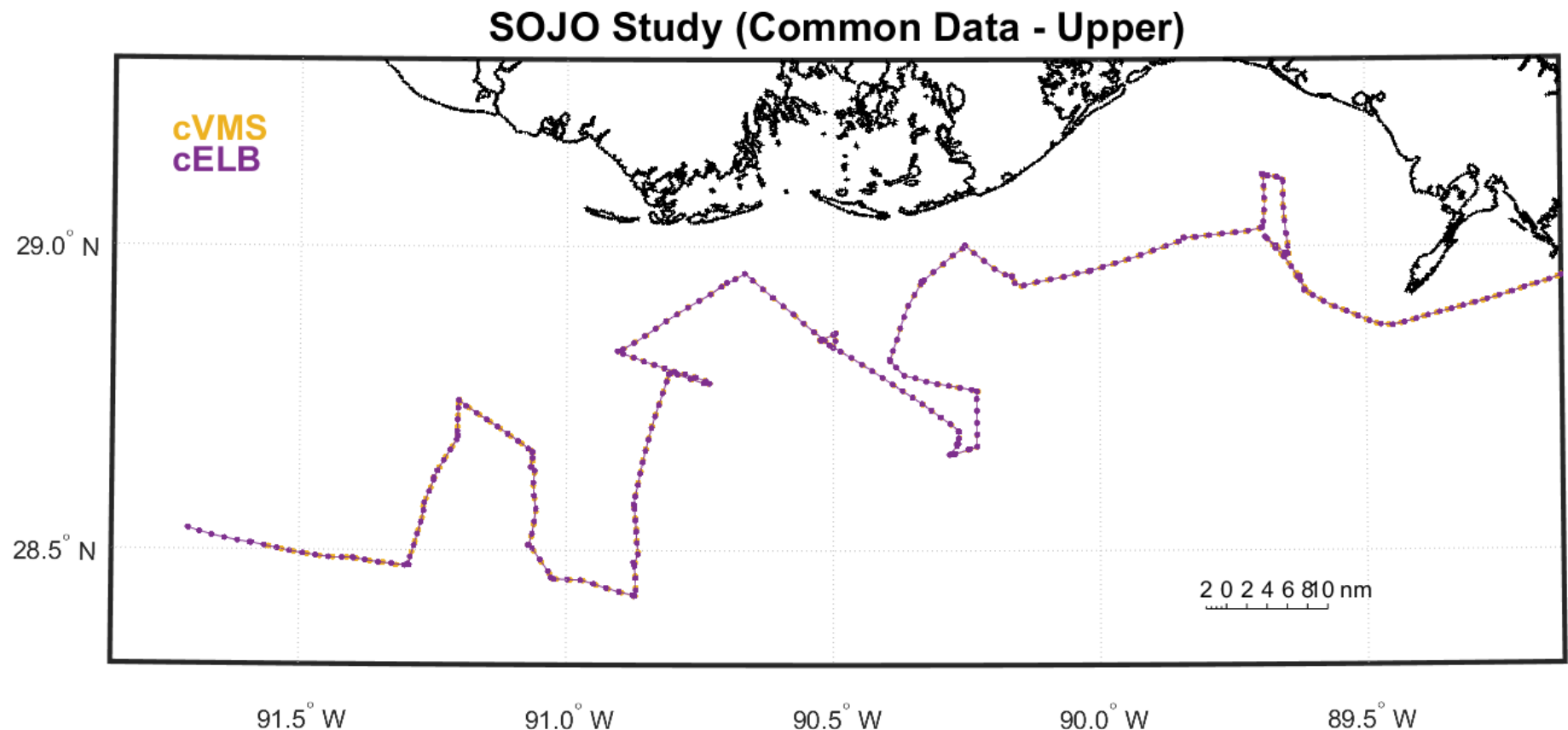
Note: These trips were to support acoustic research.



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Upper segment of Southern Journey data

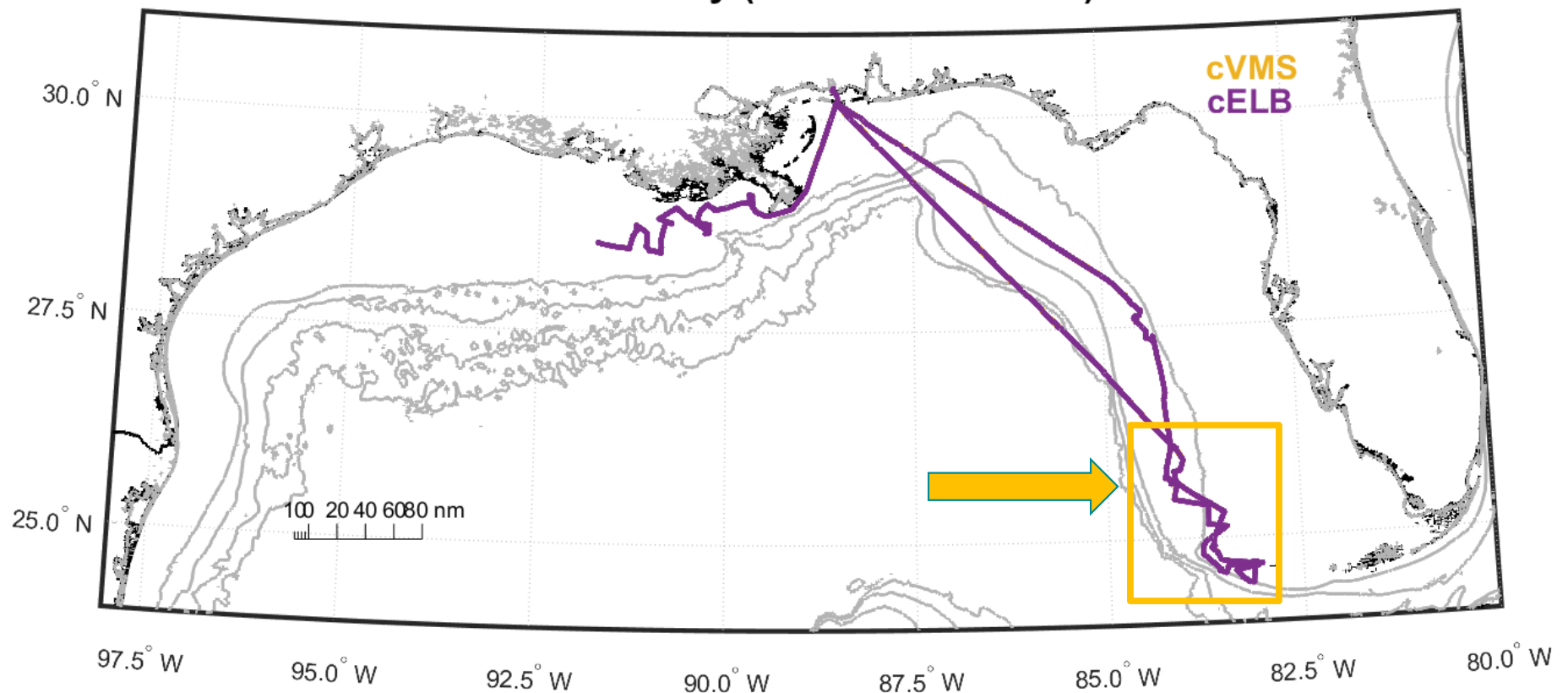
Vessel speed is slower; very good overlap of cVMS and cELB data.



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Now to lower segment of SoJo data

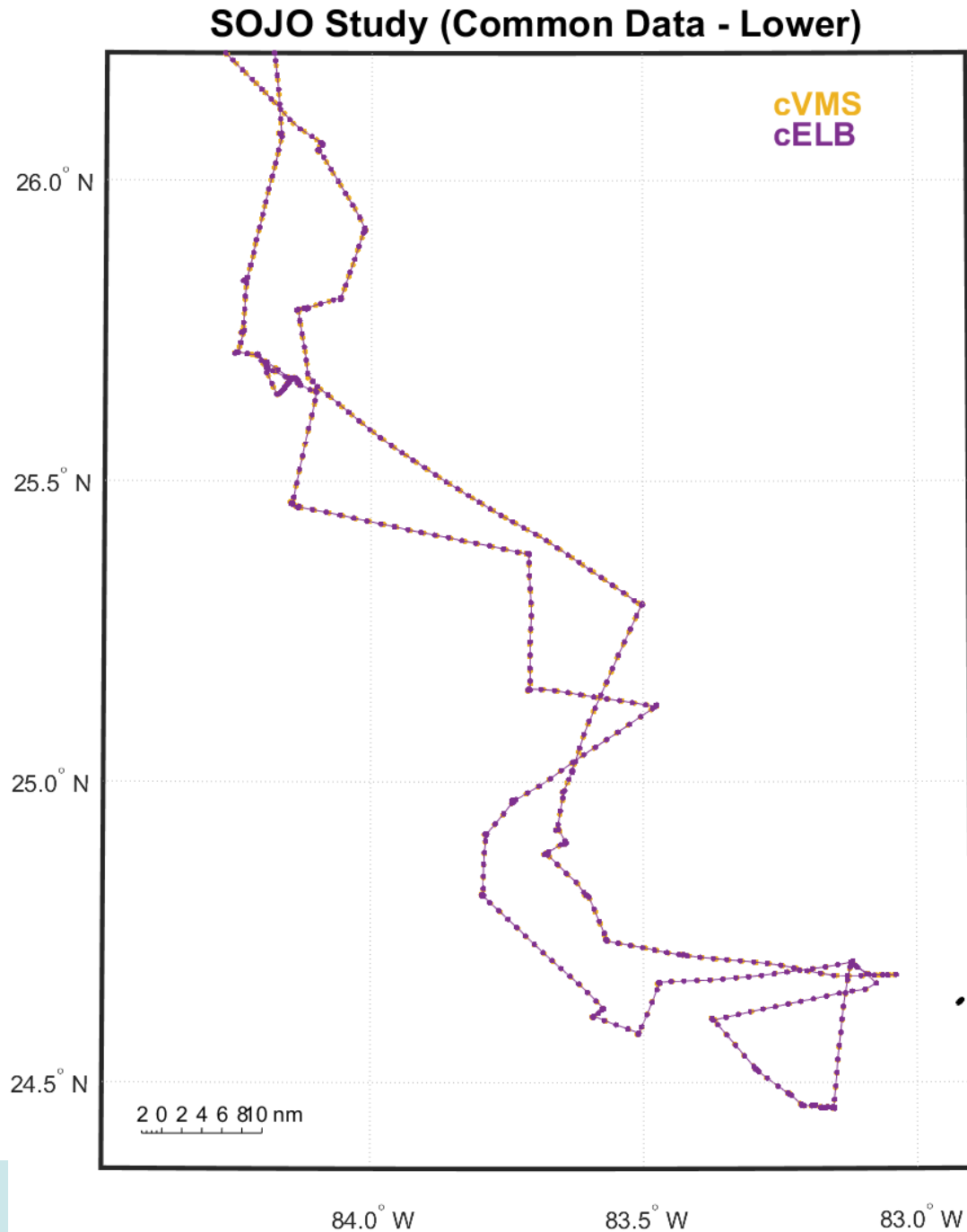
SOJO Study (All Data - Cleaned)



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Lower segment

As before - very good overlap of cVMS and cELB data. Slower vessel speed eliminates mismatch.



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Industry vessels

- The three industry vessels had no usable data as sensors weren't operating at the same time and/or there was little/no general temporal overlap.

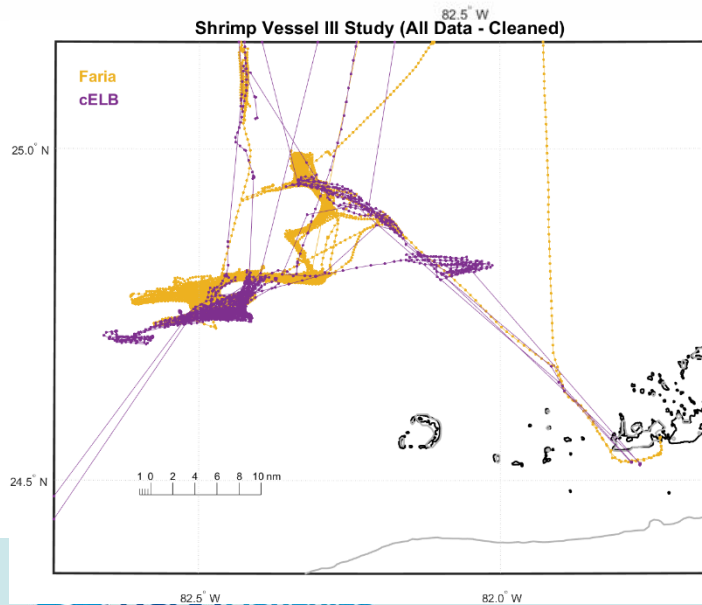
Industry vessels

Note: Data were cleaned to find general temporal overlap. Faria is gold.

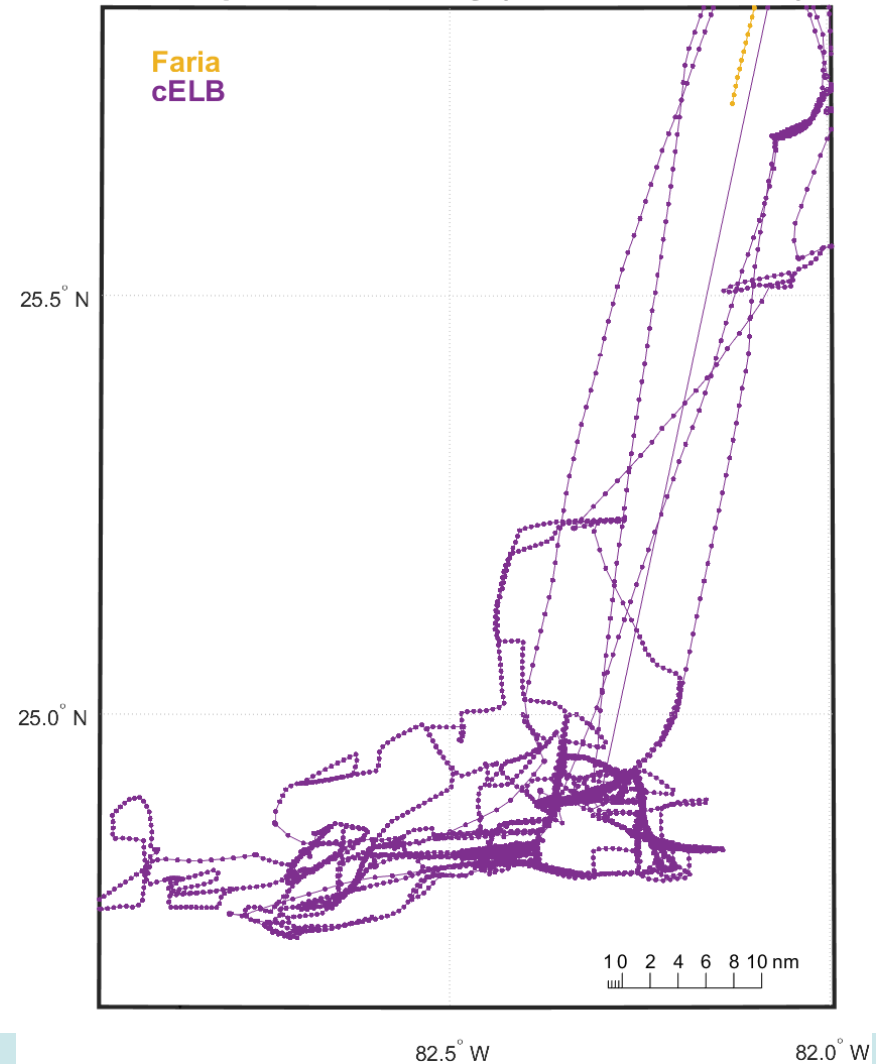
Shrimp Vessel I Study (All Data - Cleaned)



Shrimp Vessel III Study (All Data - Cleaned)



Shrimp Vessel II Study (All Data - Cleaned)



Conclusions

- Very good overlap between cVMS and cELB tracks
- 'Differences' arise due to vessel turning and different ping times for the two sensors
- Slower vessel speeds eliminate these 'differences'
- Very easy remote adjustment of ping rates for cVMS
- Clear-cut cVMS data access via Thoriumweb.com (Woods Hole Group's data website).

Thank you!

- This work was supported by Becky Smith, Jo Williams, Christian Jones, Jeff Gearhart, the crews of the Caretta, Southern Journey, and the three industry vessels