Texas and Louisiana Coastline Sensitivity and Oil Dispersion

– Kristen Thyng, et al.

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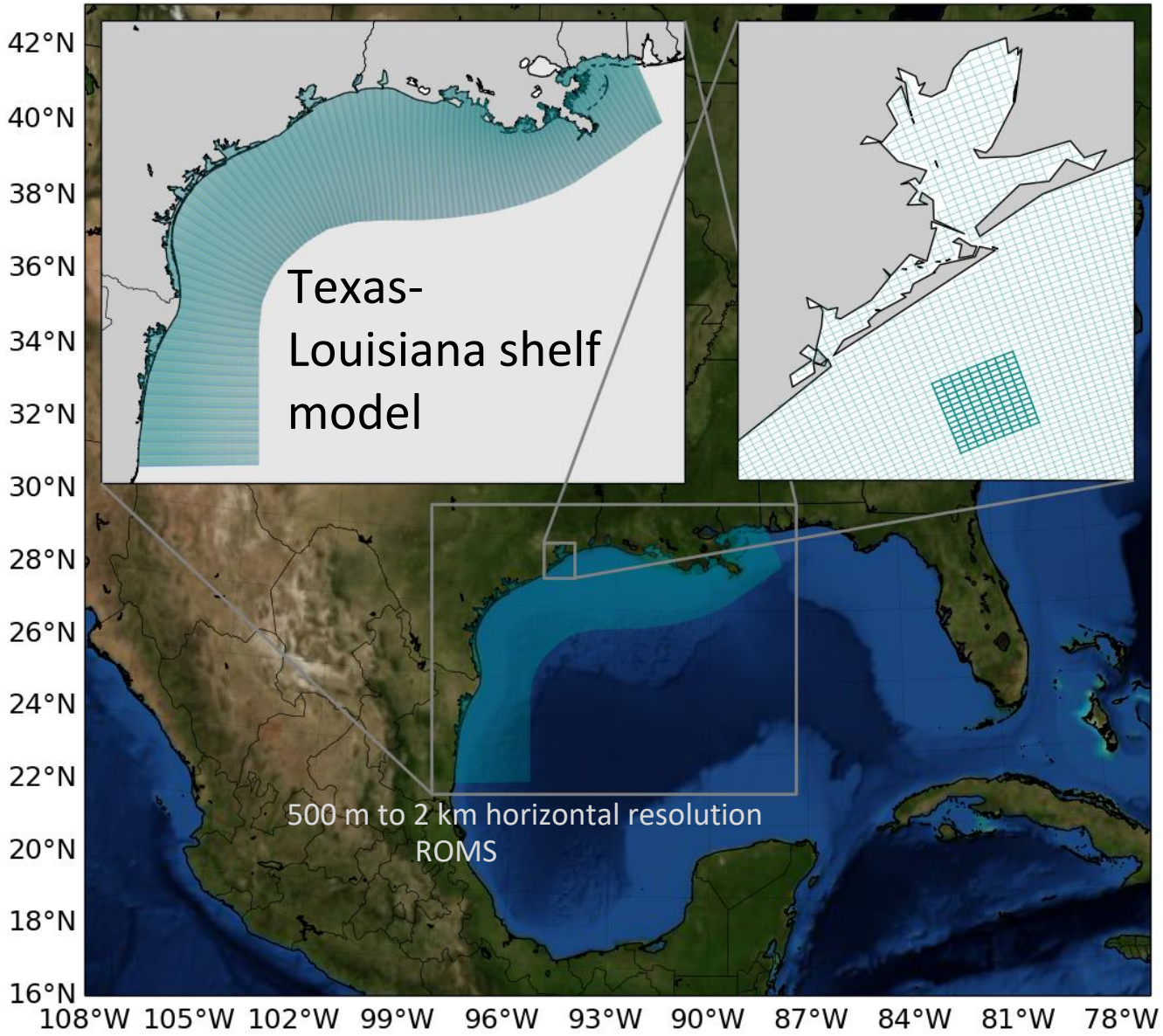
Department of Oceanography, Texas A&M University



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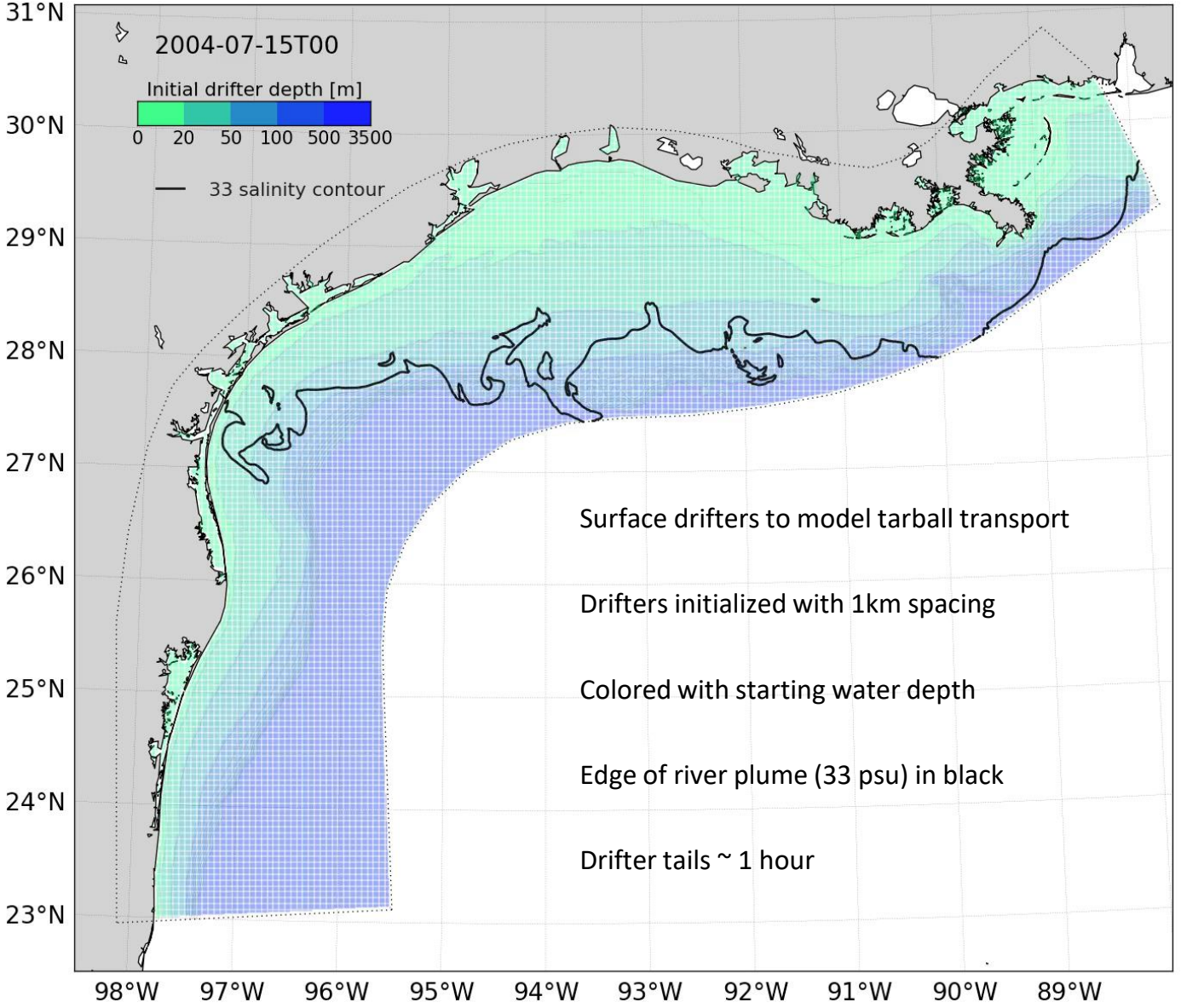

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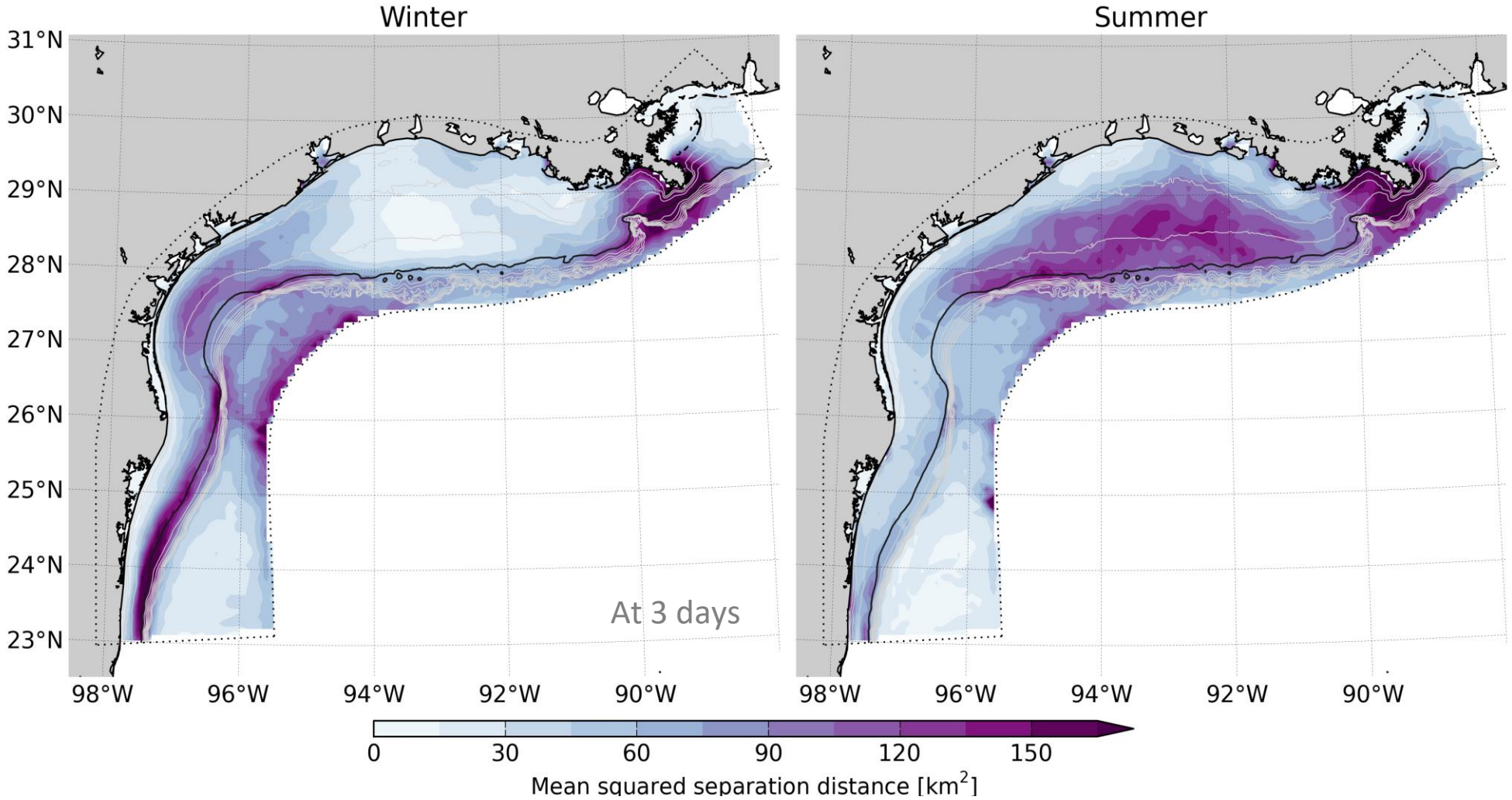
Mean squared separation distance



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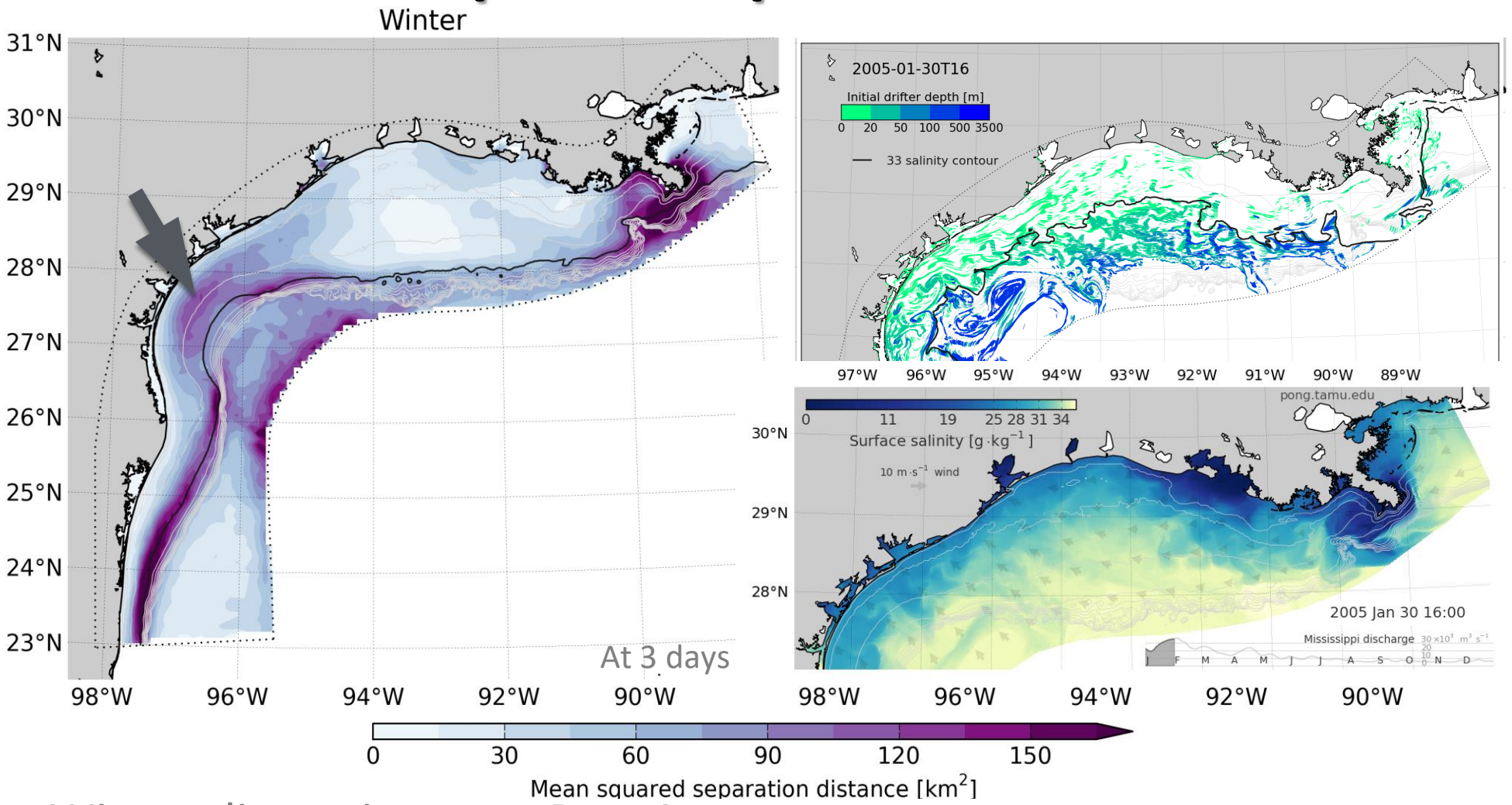

Winter dispersion near Port Aransas

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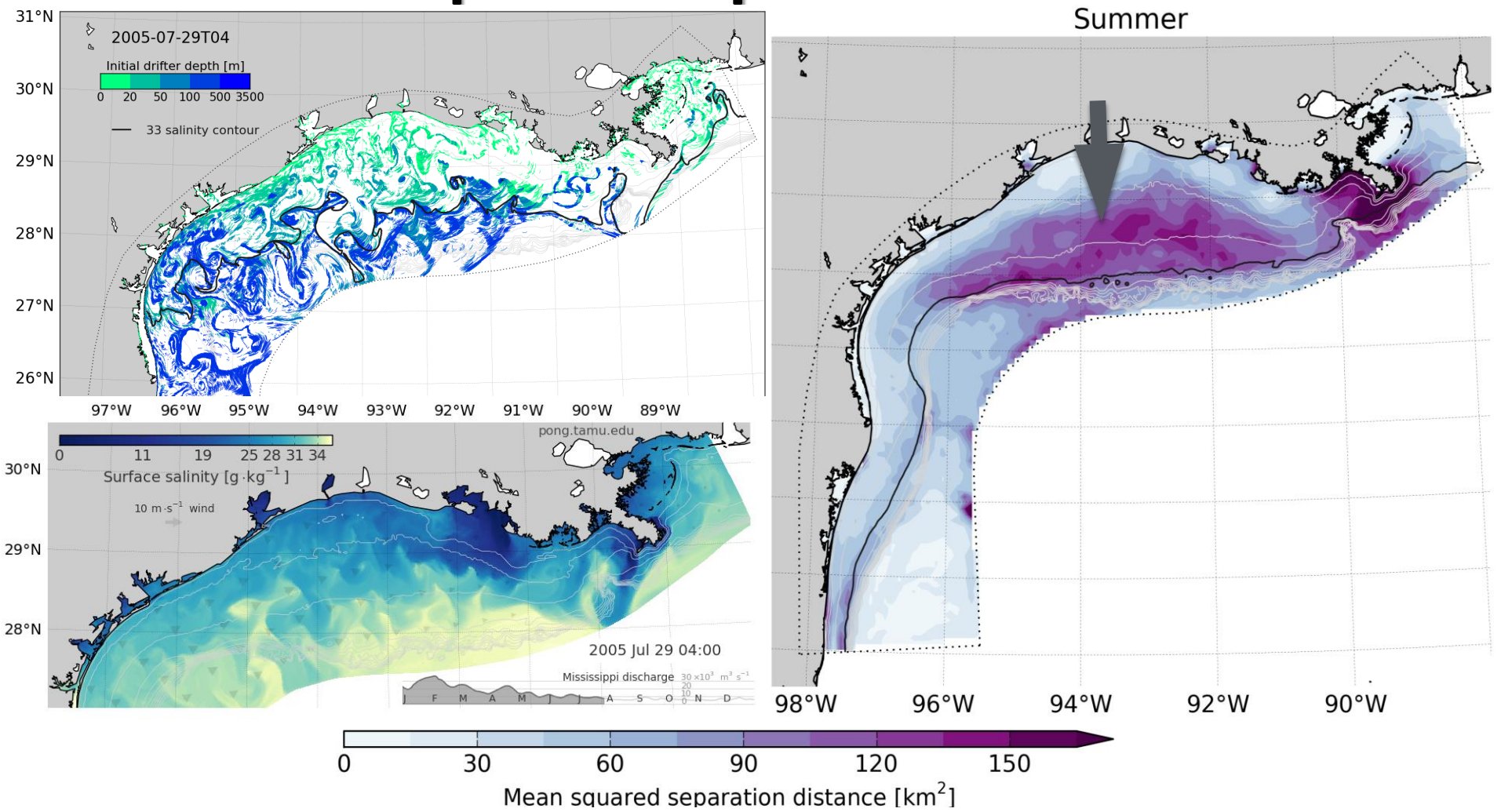
Mean squared separation distance



Summer dispersion across broad shelf region

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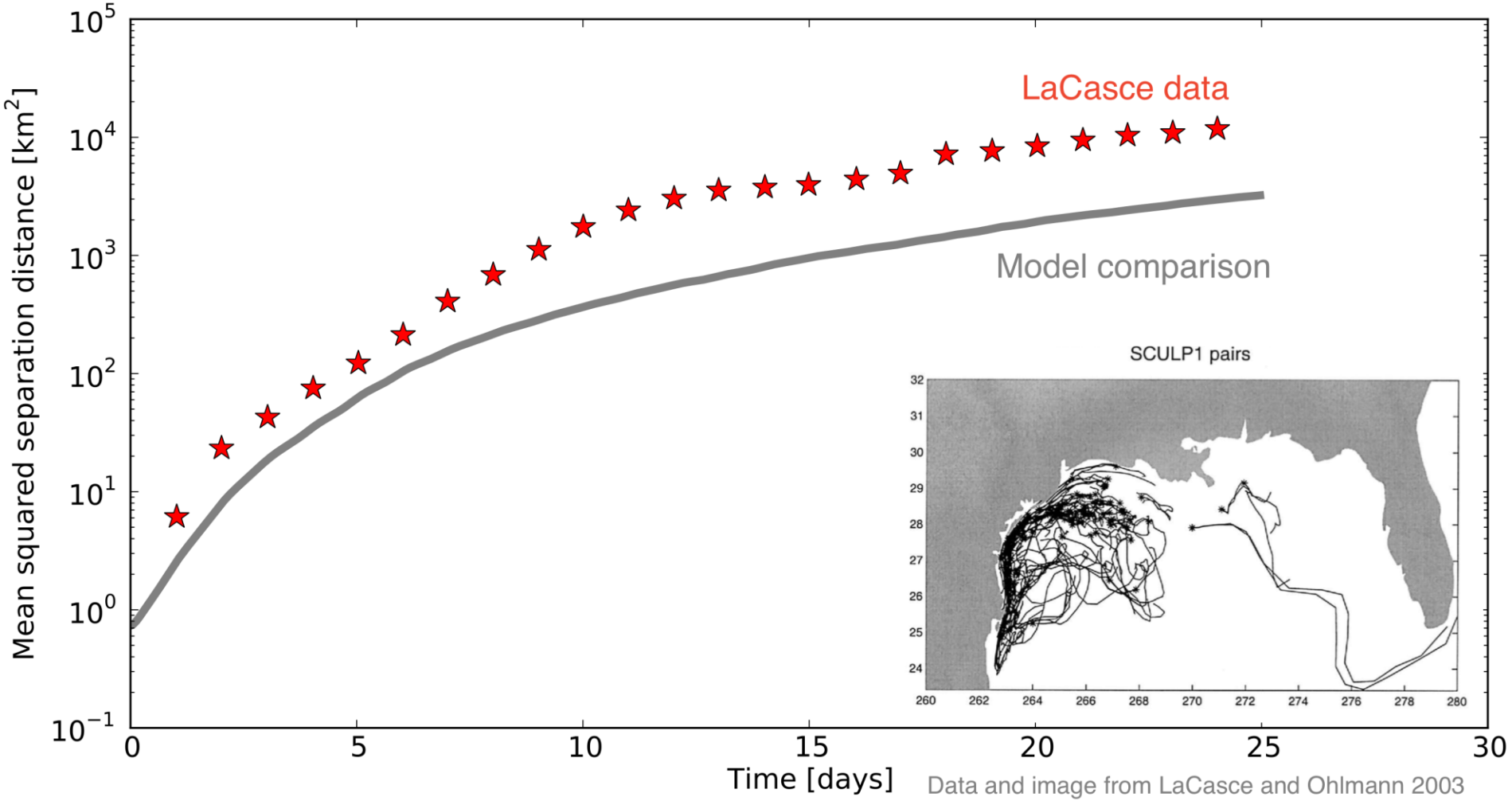
Dispersion: Model-data comparison



Data and image from LaCasce and Ohlmann 2003

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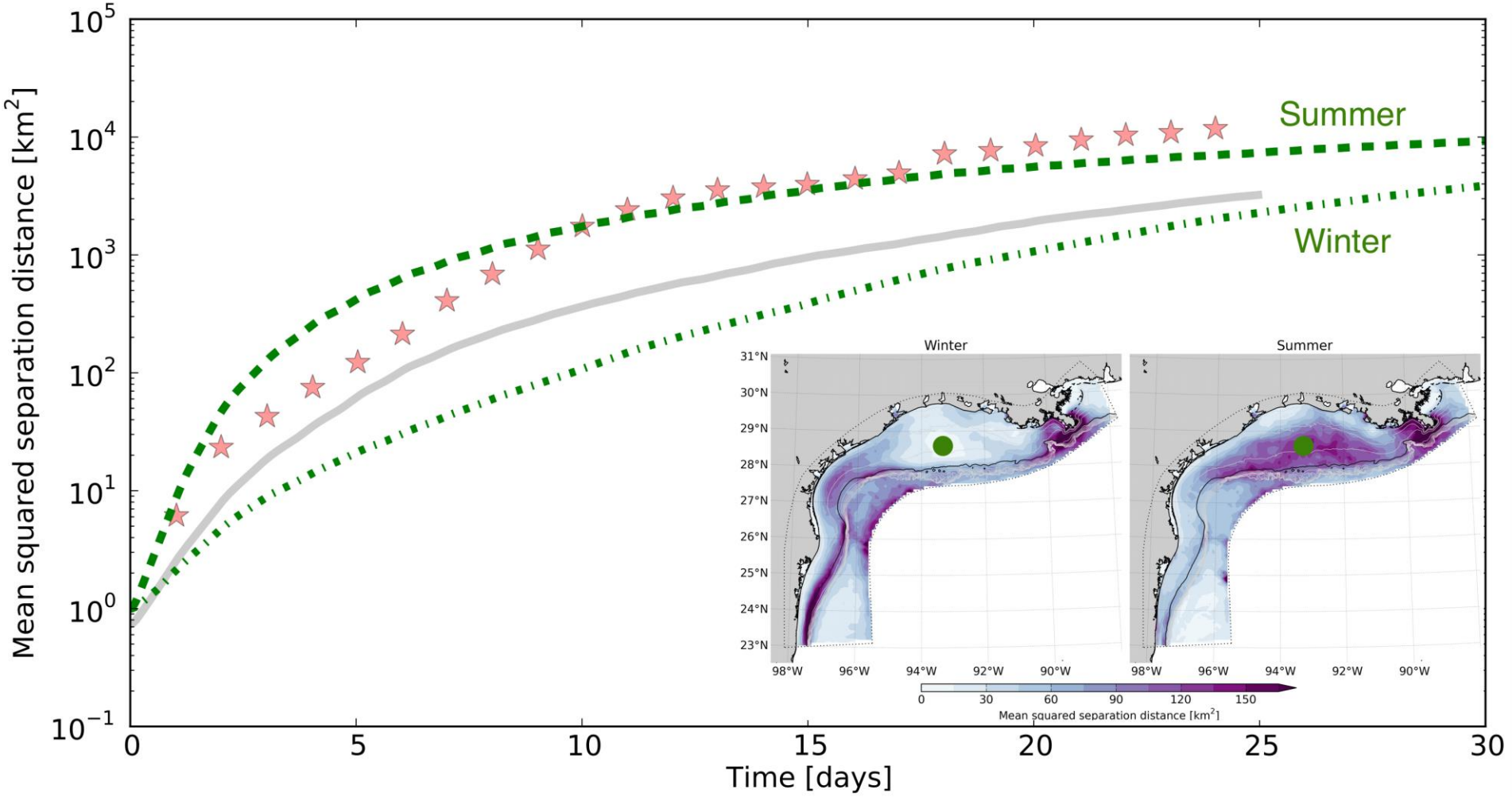
Dispersion: Seasonal comparison



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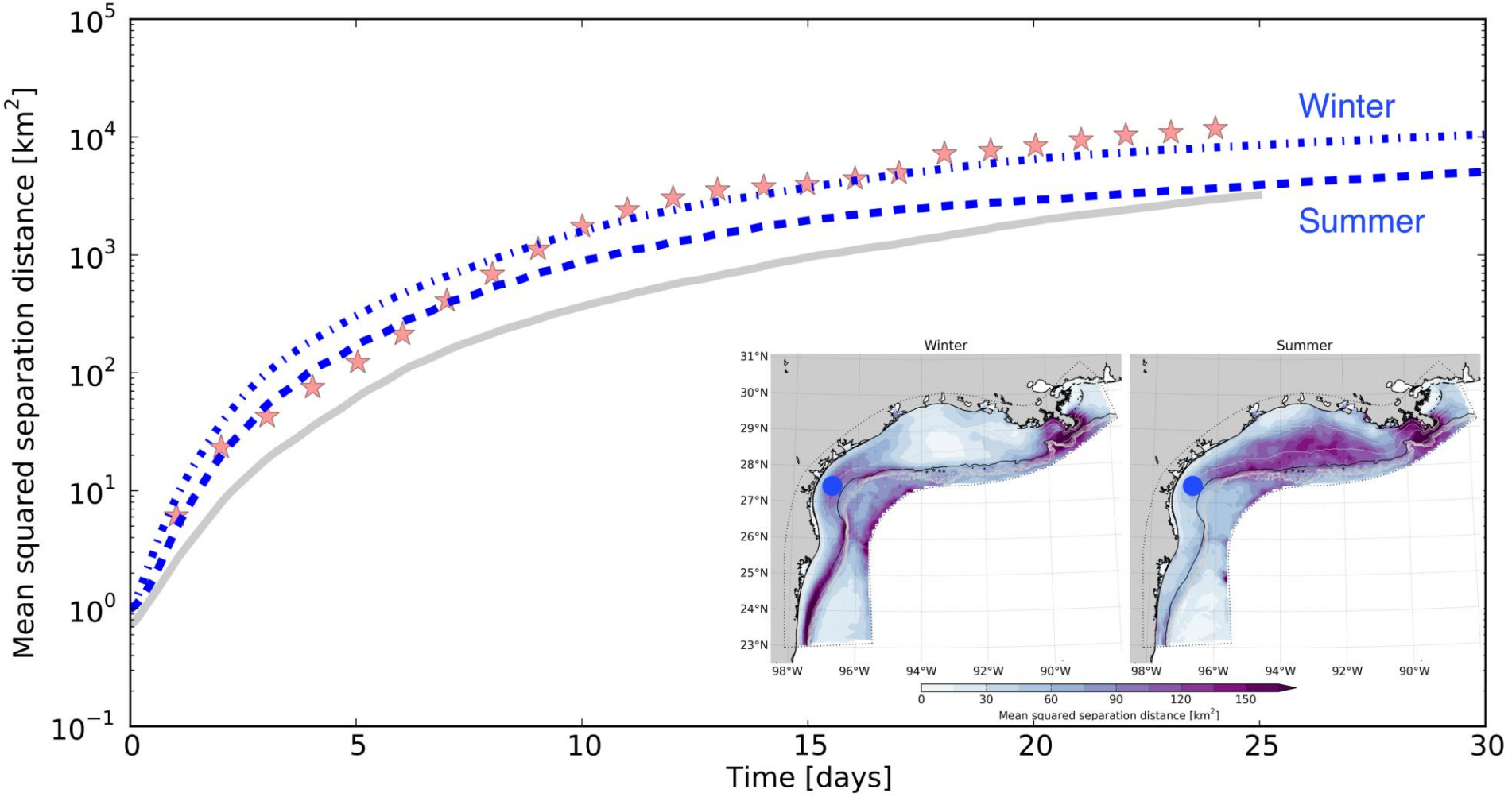
Dispersion: Seasonal comparison



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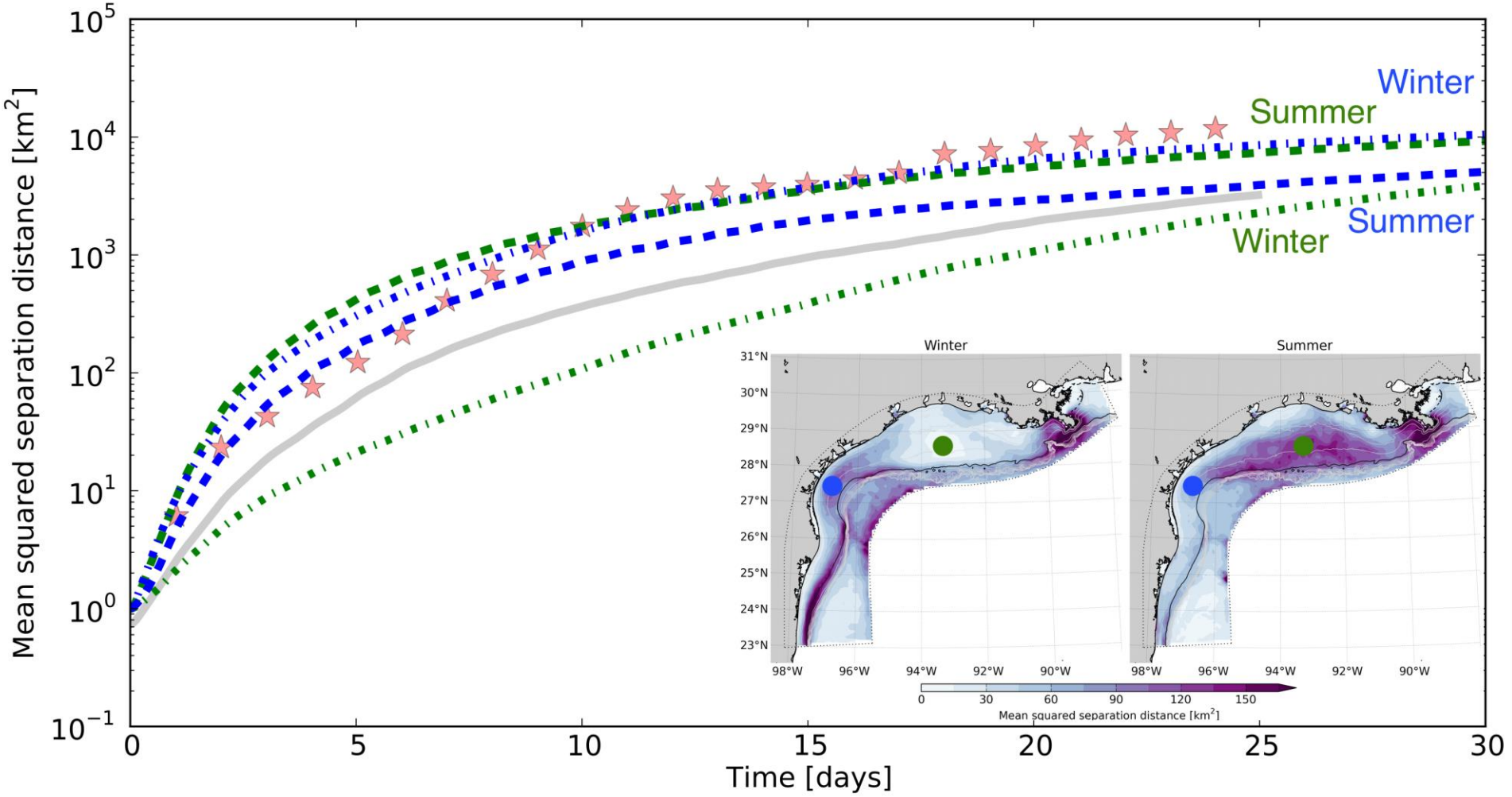
Dispersion: Seasonal comparison



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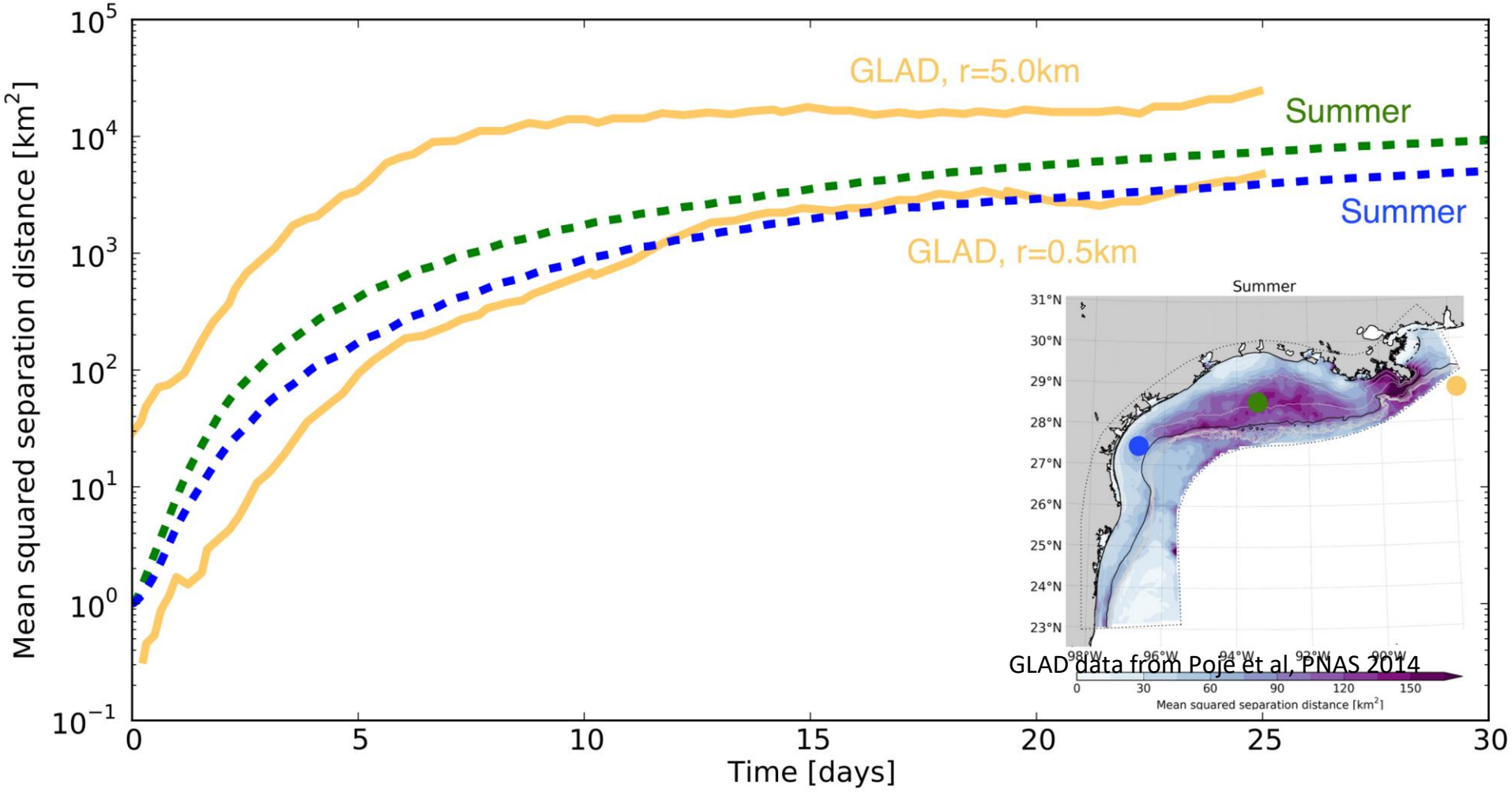
Dispersion: GLAD comparison



GLAD data from Poje et al, PNAS 2014

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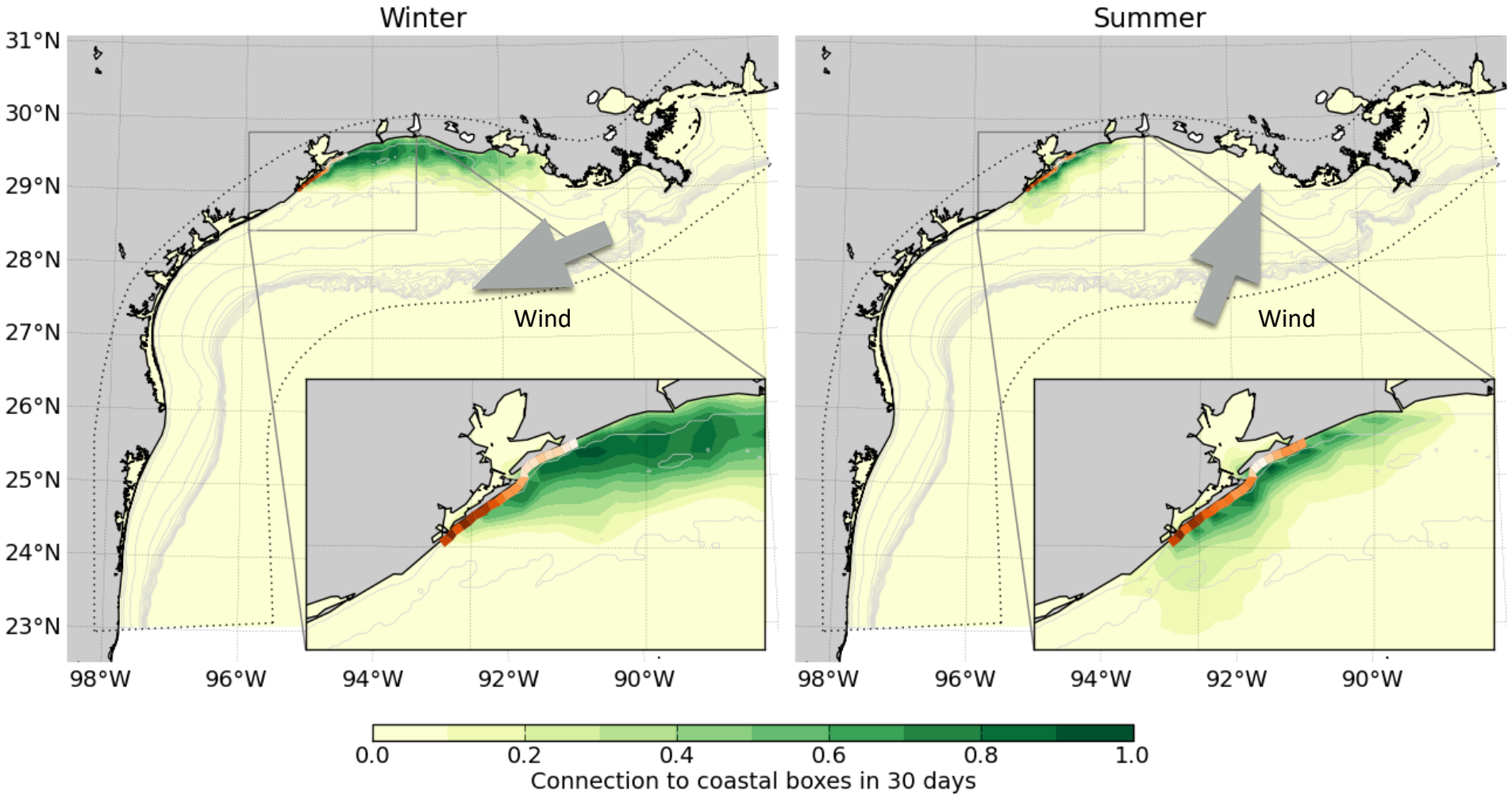
Strength of Coastal Connection to Galveston



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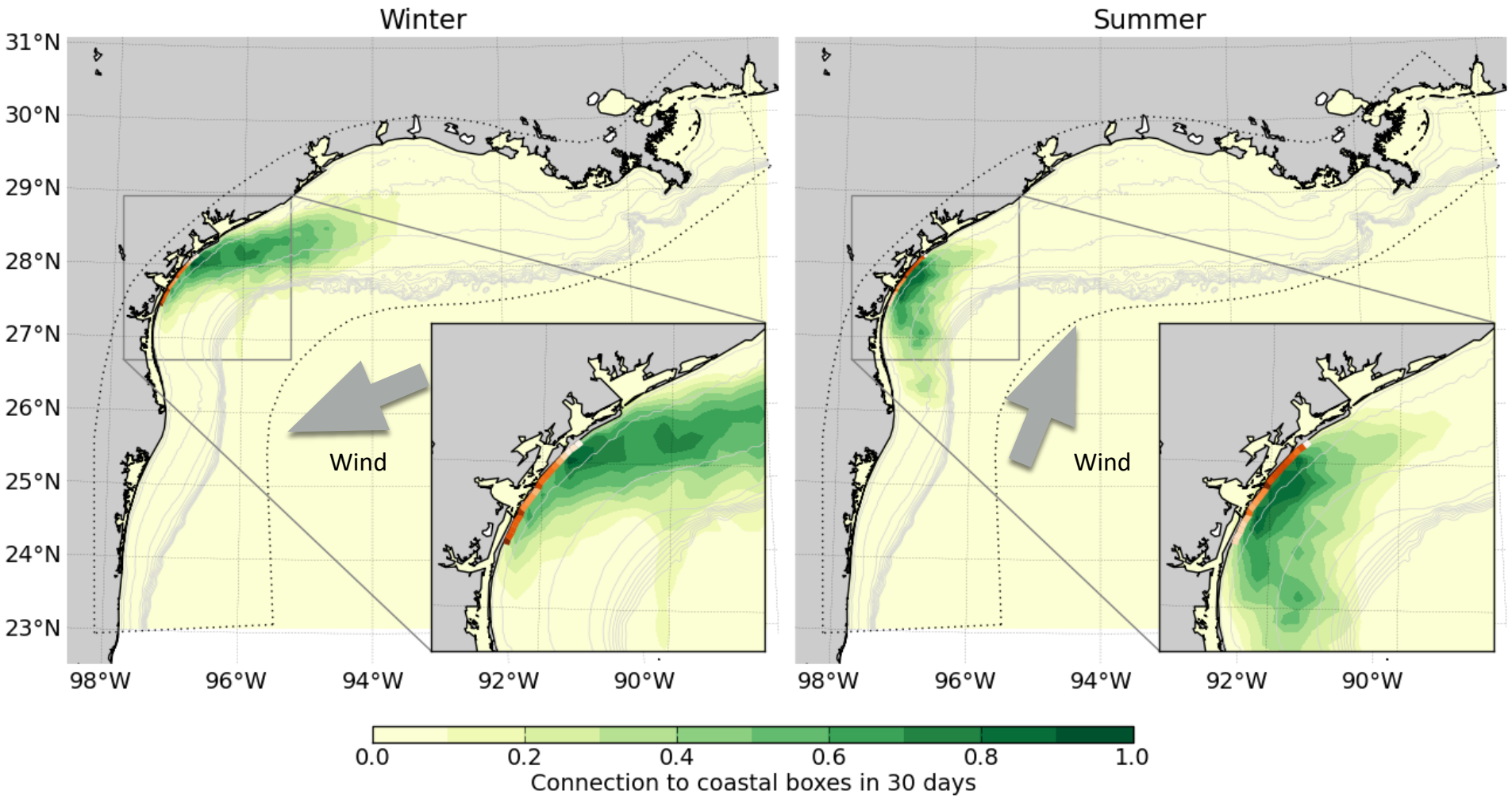
Strength of Coastal Connection to Port Aransas



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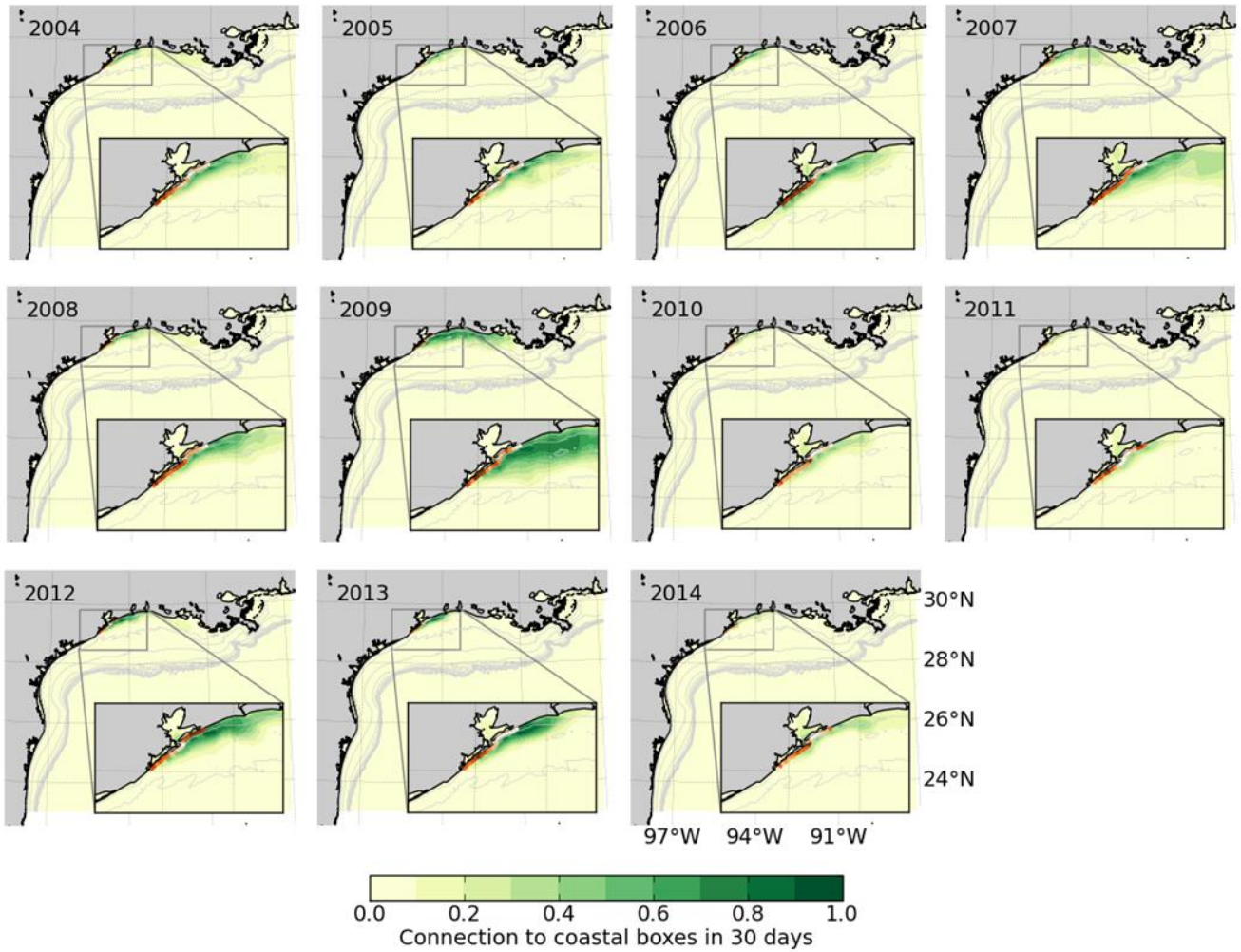
Winter connection to Galveston



Coincident winds: r^2=0.76

+fall river discharge: r^2=0.94

- Wind more to north, more impact to coast
- More sensitivity to coincident wind direction than Port Aransas
- More fall river discharge, less impact

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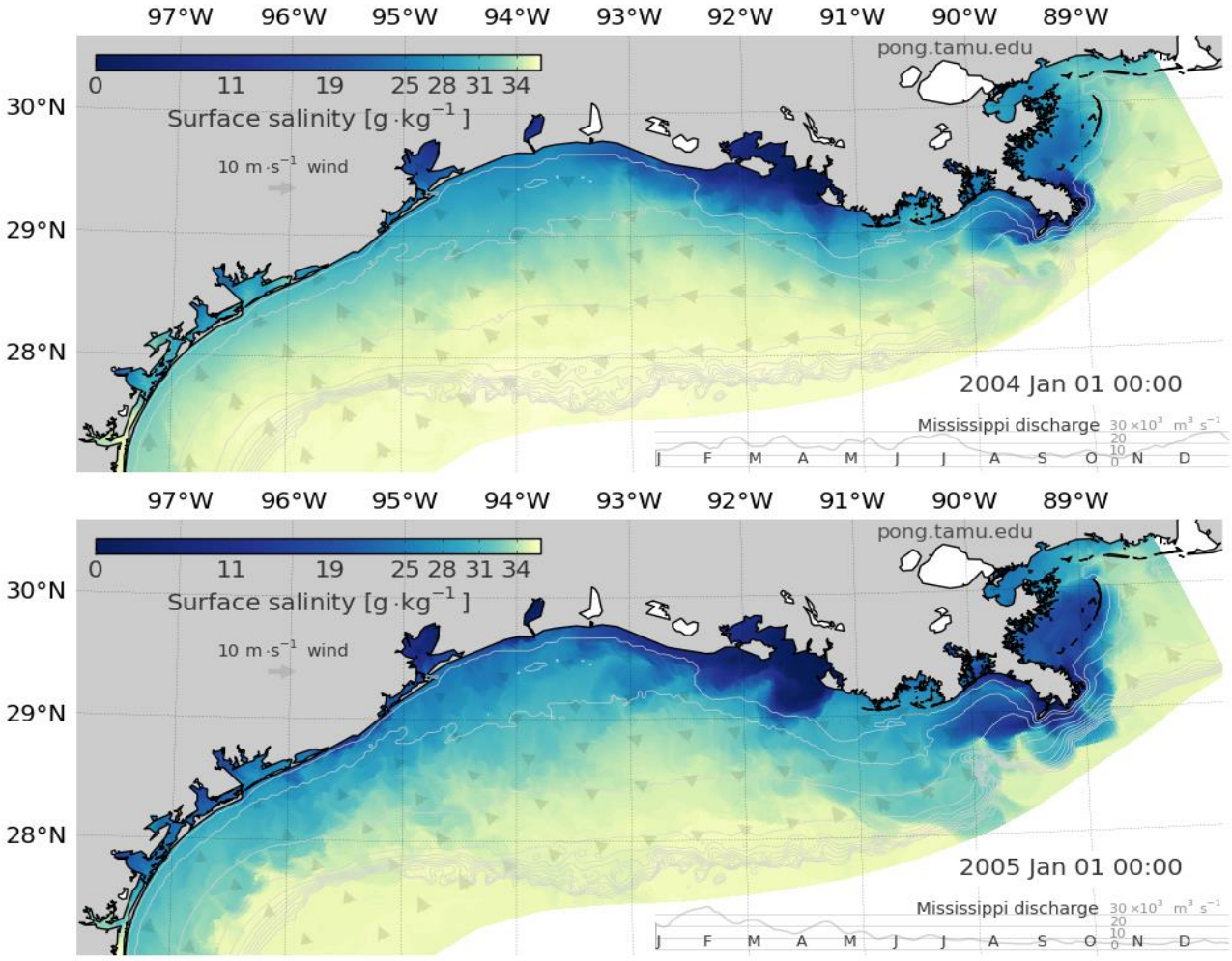
Winter connection to Galveston



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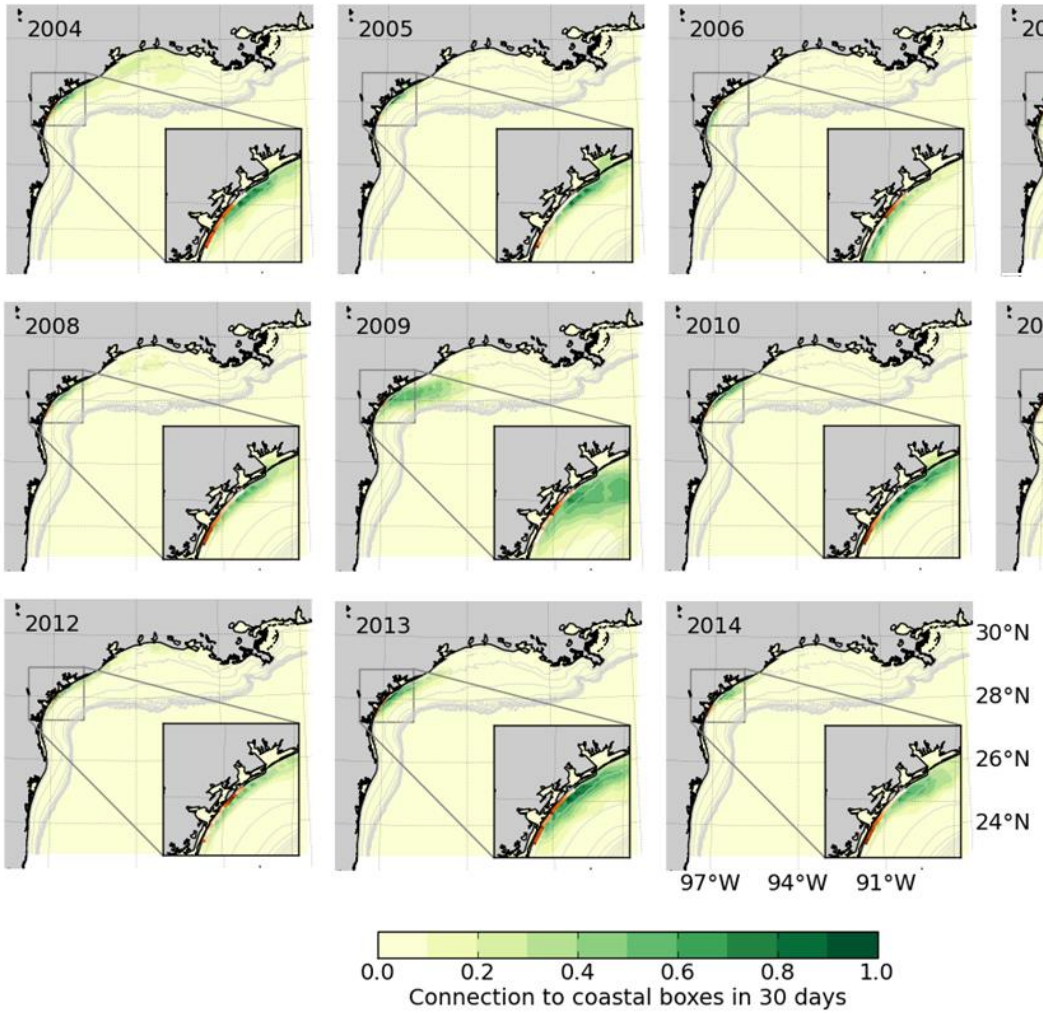
Winter connection to Port Aransas



Coincident winds: r^2=0.40

+fall river discharge and fall wind speed: r^2=0.83

- Wind more to north, more impact to coast
- Less sensitivity to coincident wind direction than Galveston
- More fall river discharge and stronger fall wind, less impact

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Summary

- Shelf flow features strongly impact dispersion.
- Shelf model reasonably captures behavior of dispersion spatially and in time.
- Detailed study of coastal regions can lead to quantitative understanding of processes responsible for spill impact and related forcing mechanisms.

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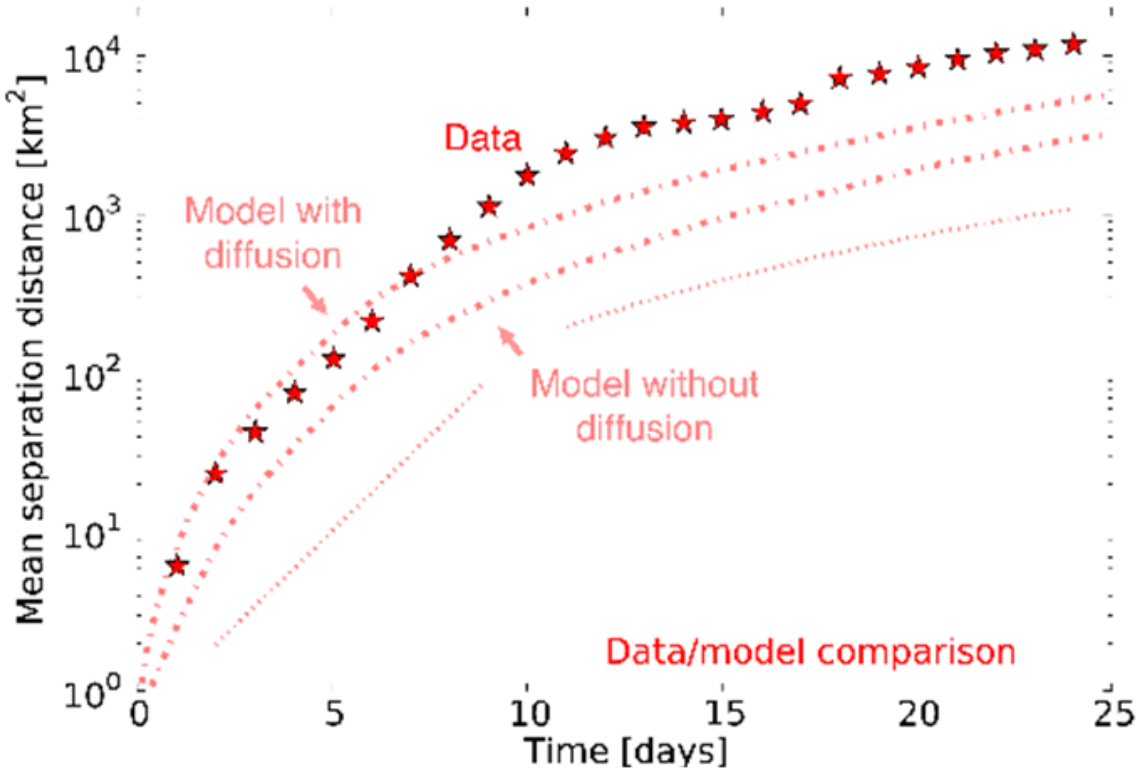

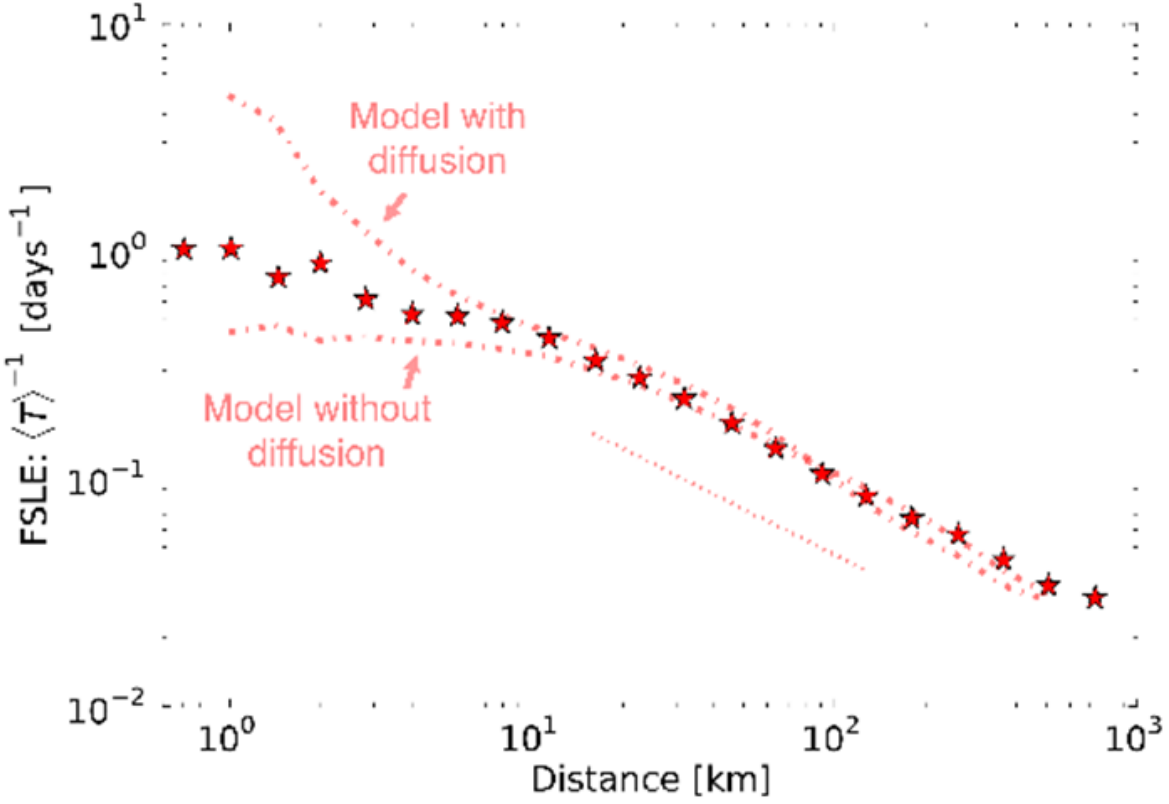

Data from LaCasce & Ohlmannn (2003), Journal of Marine Research