



Thermal stress in South Florida estuaries: A multi-sensor assessment



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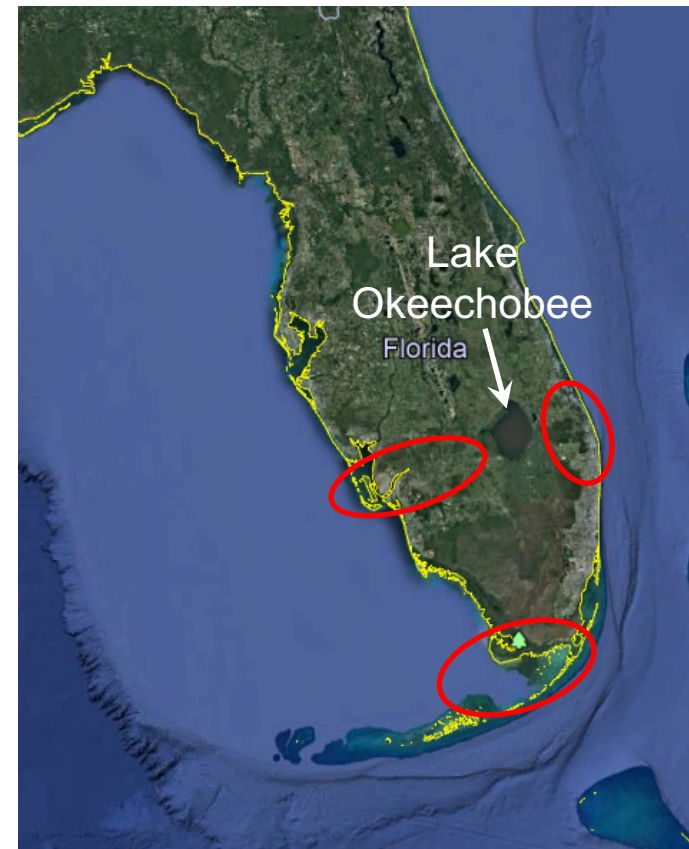


What's the problem?

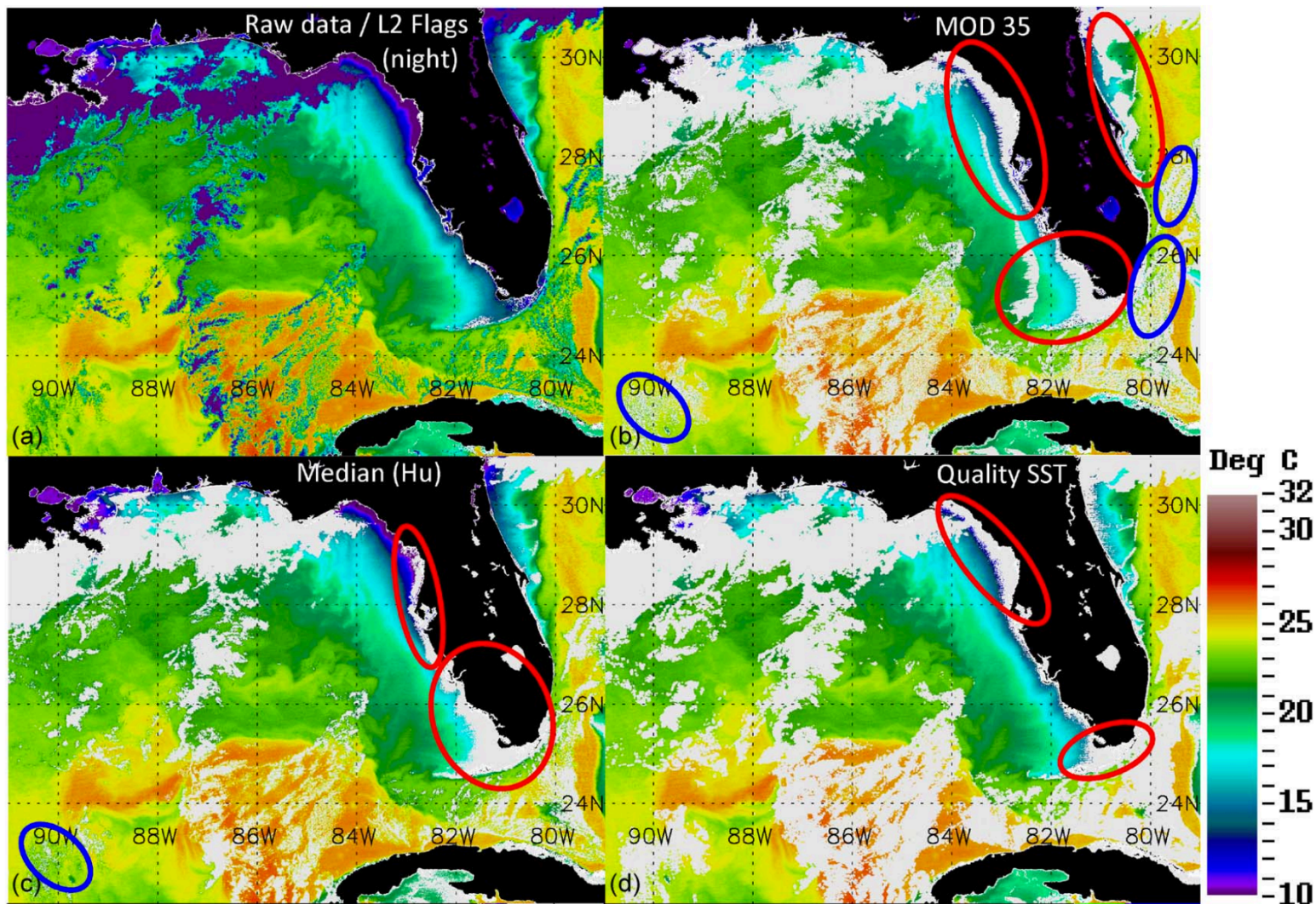


SF estuaries faced environmental stress

- Harmful algae blooms
- Seagrass dieoffs



Some previous works - cloudmasking and validation

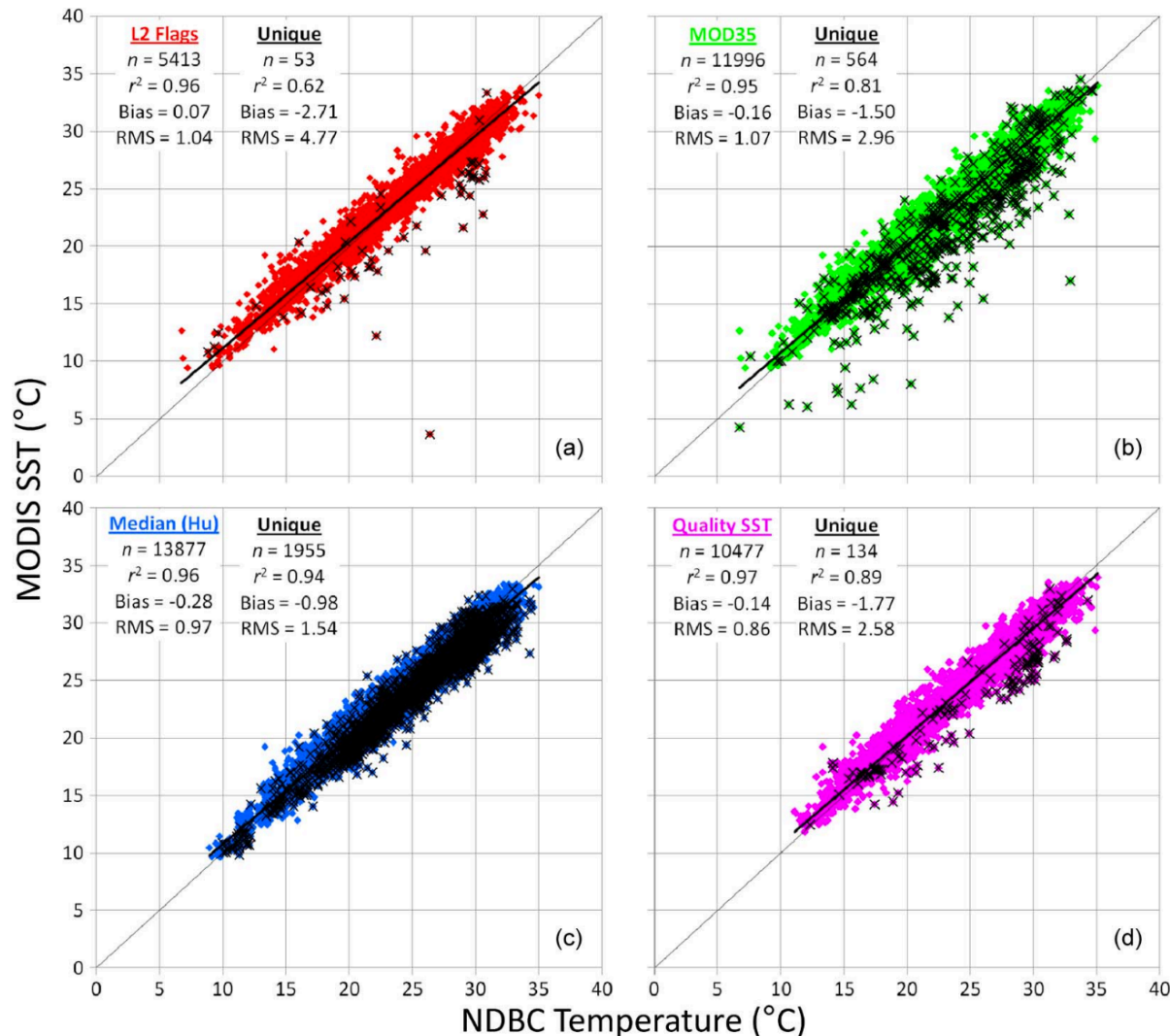




Thermal stress – how?



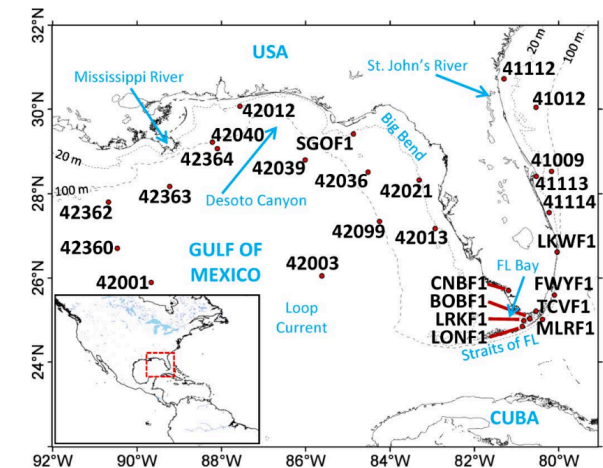
Some previous works - cloudmasking and validation



Hu et al. (2009, TGRS)

Barnes et al. (2011, GRSL)

Barnes and Hu (2013, TGRS)



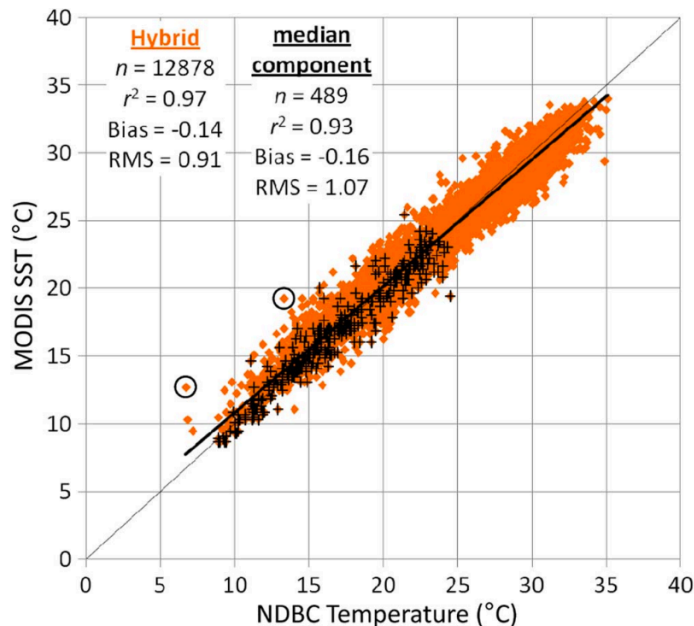


Thermal stress – how?



Some previous works - cloudmasking and validation

Cloudmask Algorithm	Matching Pairs	Images	Matchups per Image	r^2	Linear Regression		Bias (°C)	RMS (°C)	Min (°C)	Max (°C)
					Slope	Intercept				
Median (Hu)	13877	2125	6.53	0.96	0.93	1.52	-0.28	0.97	8.9	35
L2 Flags	5413	1074	5.04	0.96	0.92	1.93	0.07	1.04	6.7	35
MOD35	11996	2125	5.65	0.95	0.94	1.43	-0.16	1.07	6.7	35.1
Quality SST	10477	2125	4.93	0.97	0.94	1.45	-0.14	0.86	11.1	35.1
Hybrid	12878	2125	6.06	0.97	0.94	1.45	-0.14	0.91	6.7	35.1



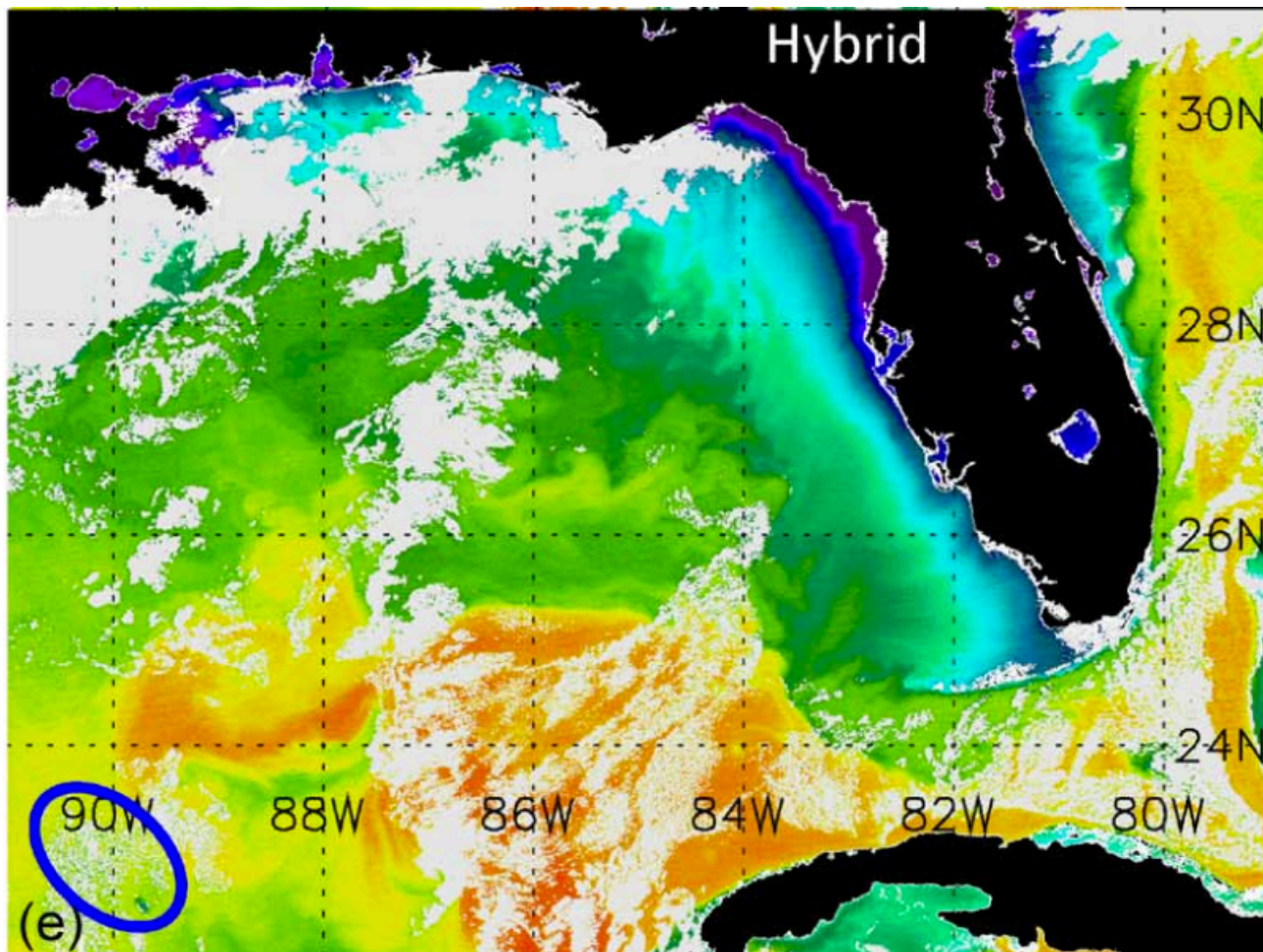
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Thermal stress – how?



Some previous works - cloudmasking and validation





Thermal stress – how?

High-res thermal images



Landsat series: uncertainties unknown

ECOSTRESS: better quality, but uncertainties for estuaries still need to be quantified

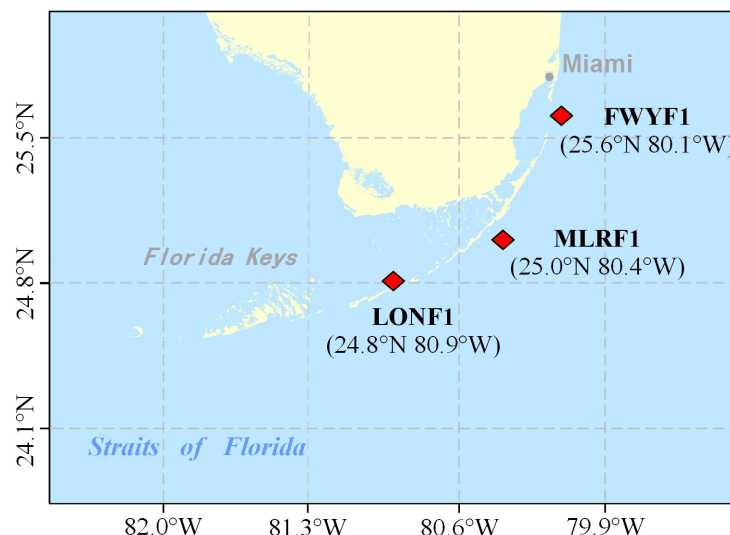
July 2018 – December 2019:

204 ECOSTRESS L2 scenes

2 Landsat-8 scenes

SST data from 3 NDBC stations

“Standard” matchup criteria (+- 3 hours, 3x3 heterogeneity check)



Buoy station	Ecostress scenes	Usable scenes
FWYF1	44	28
LONF1	21	14
MLRF1	20	15

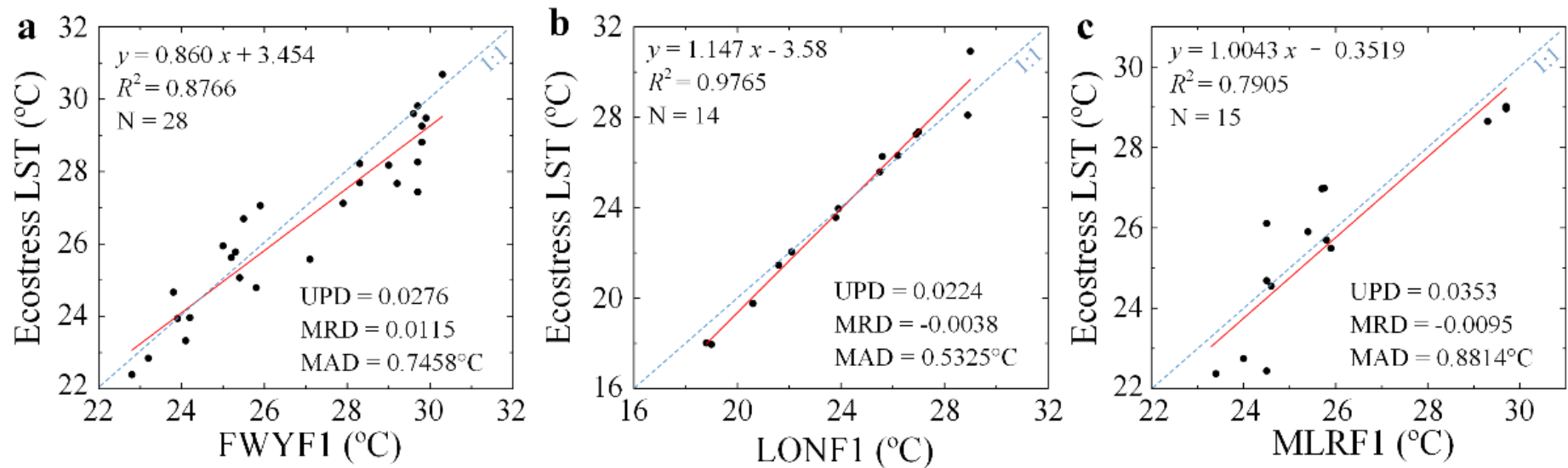


Thermal stress – how?

High-res thermal images



Statistics of ECOSTRESS-NDBC comparisons





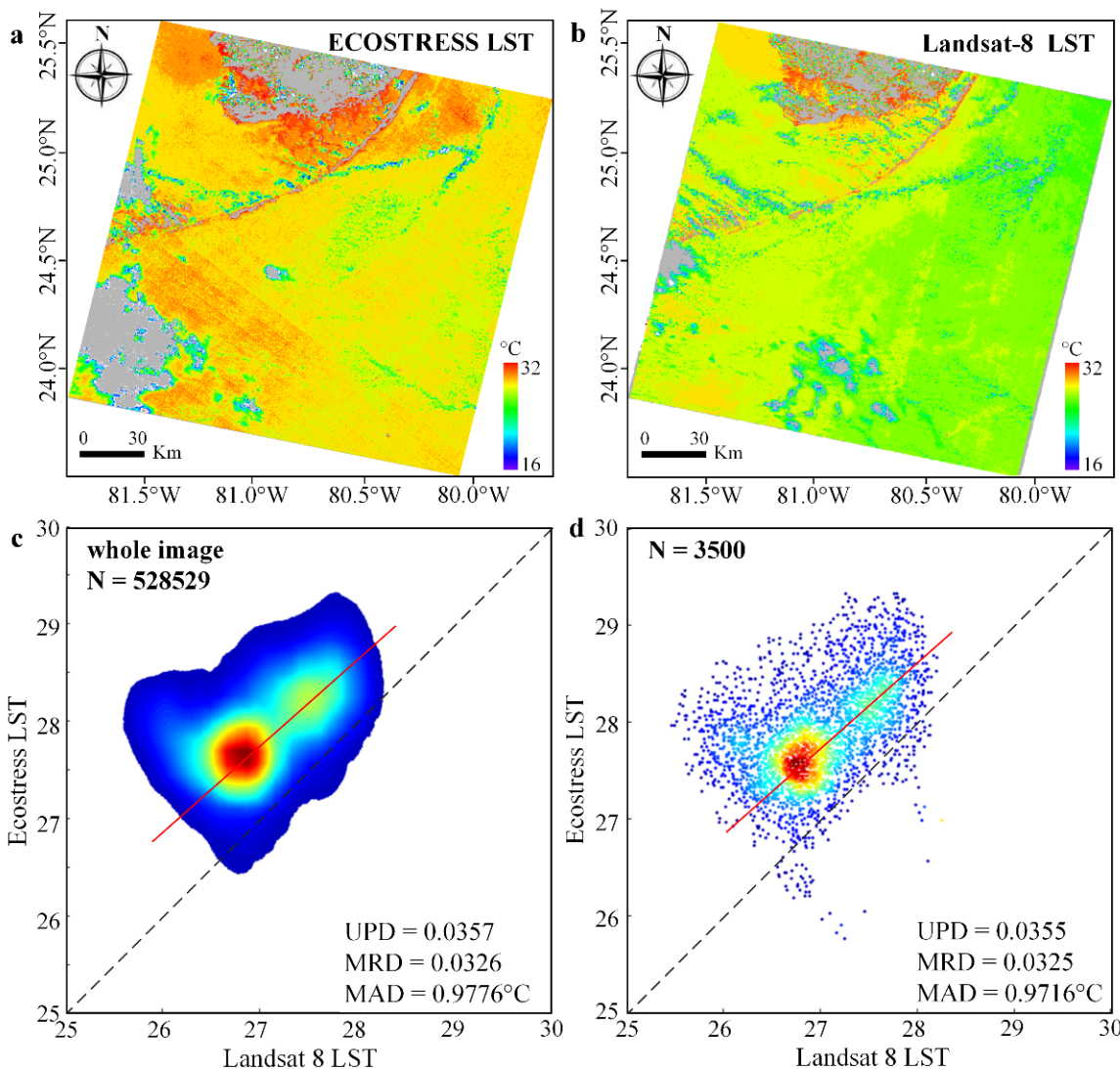
Thermal stress – how?

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Statistics of ECOSTRESS-Landsat-8 comparisons

August 9, 2018



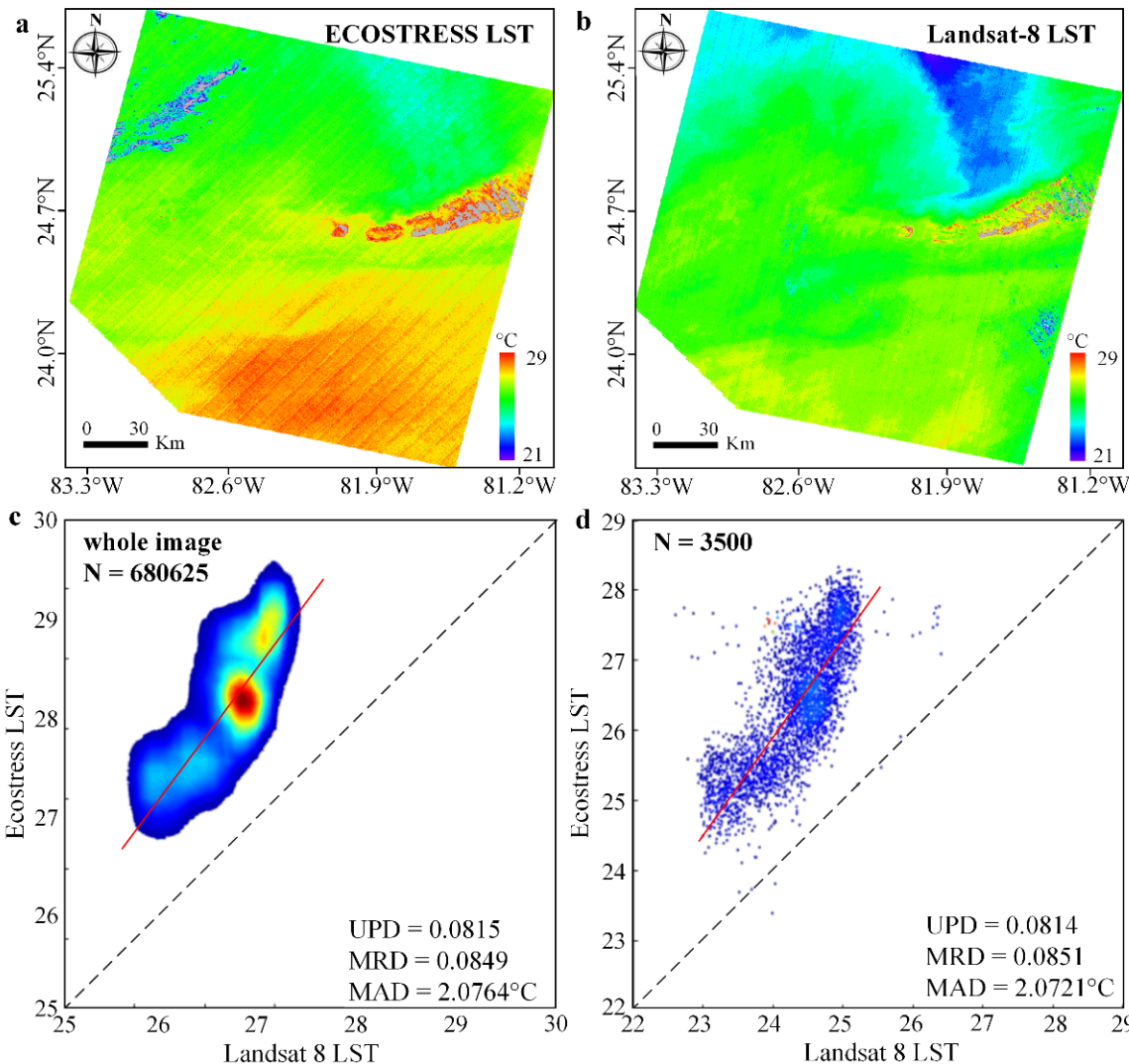


Thermal stress – how?

High-res thermal images



Statistics of ECOSTRESS-Landsat-8 comparisons



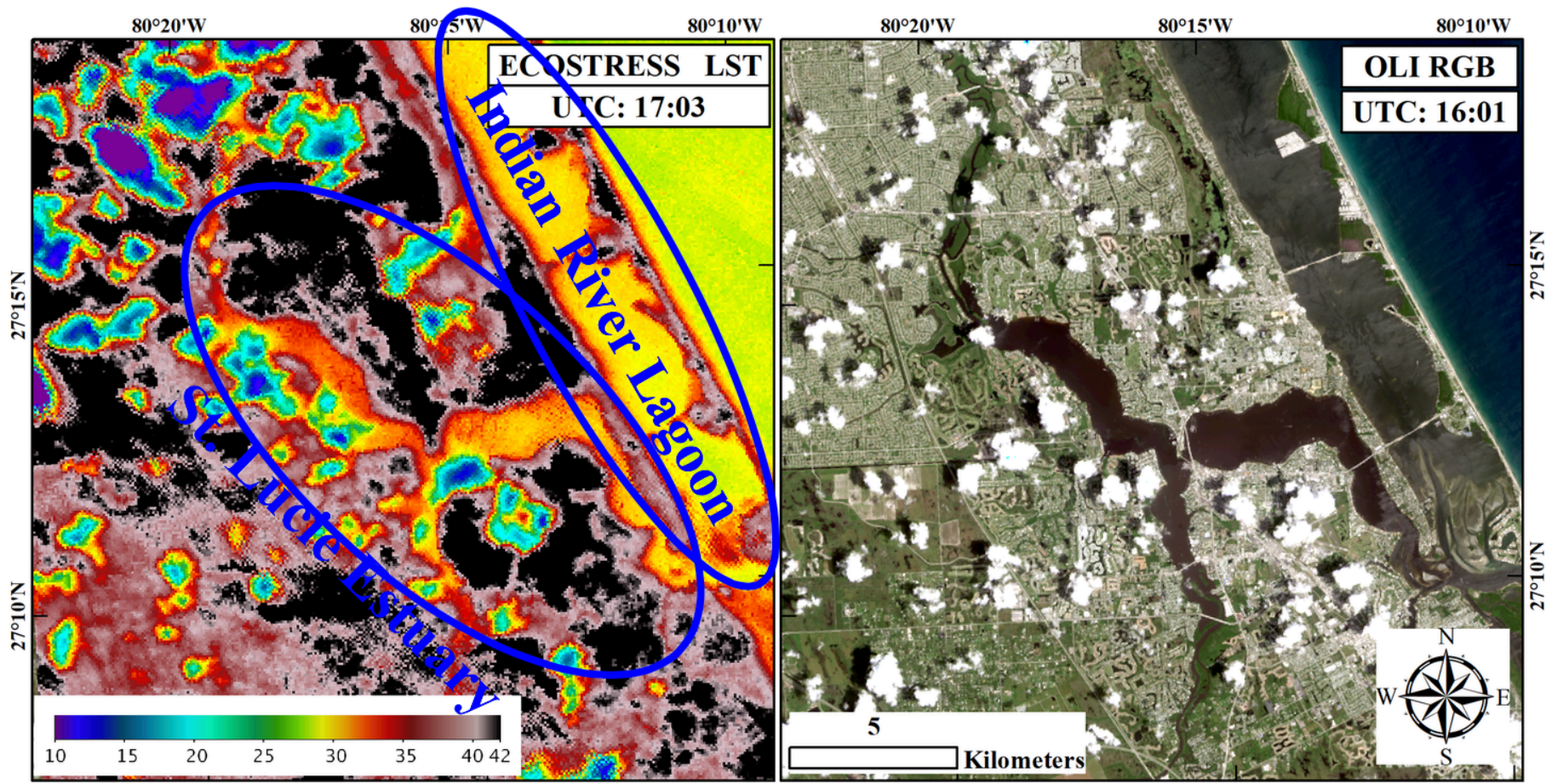
Feb 24, 2019



What's next?



Data mining and more evaluation

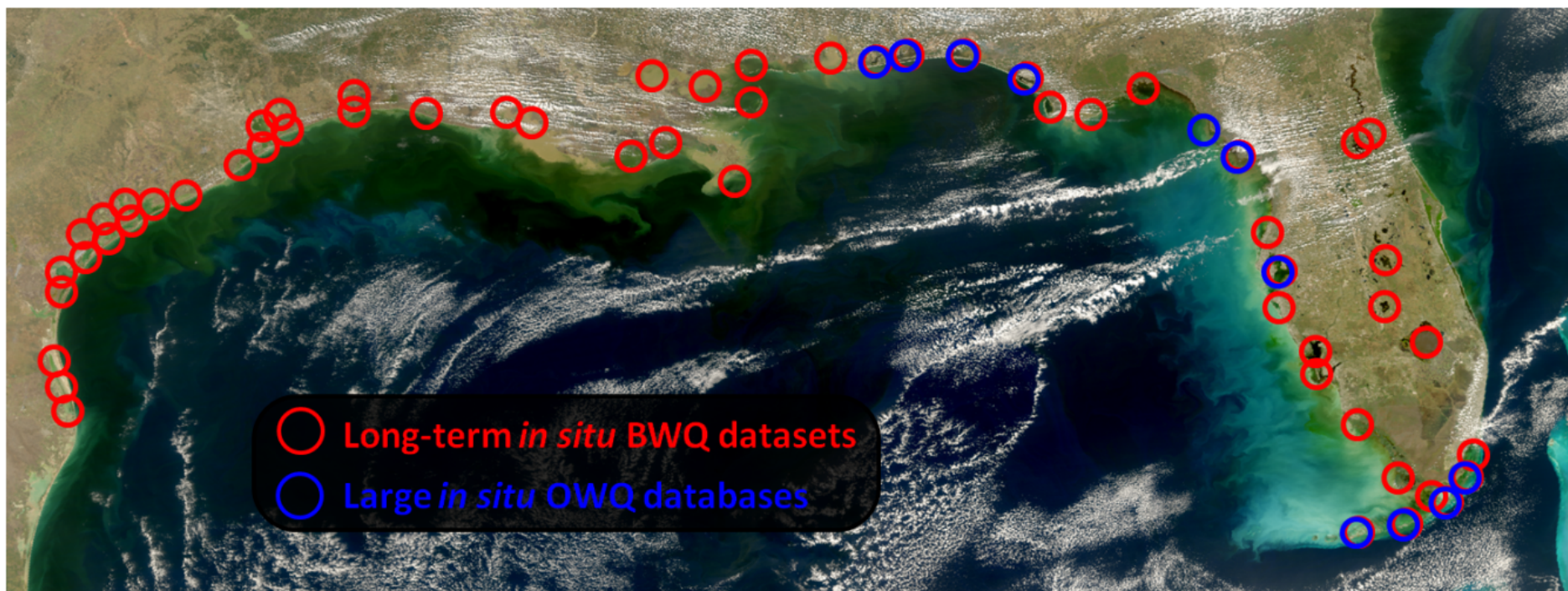




What's next?



Data mining and more evaluation





What's next?



More evaluations of ECOSTRESS LST over water

Calibrate Landsat series

- ECOSTRESS => Landsat-8 => Earlier Landsat sensors

Long-term SST assessment

Integrate with other environmental data

Share information with SFWMD and other agencies