

Examining the relation between biodiversity and surface temperature regimes in localized coastal upwelling zones using ECOSTRESS

Daniel Otis (PI)

Frank Muller-Karger (Co-I)

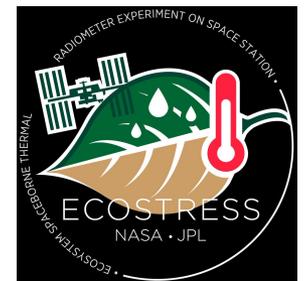
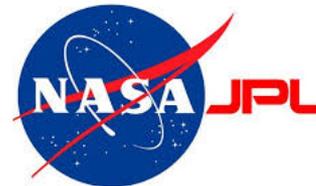
University of South Florida, College of Marine Science

Glynn Hulley (Collaborator)

NASA JPL

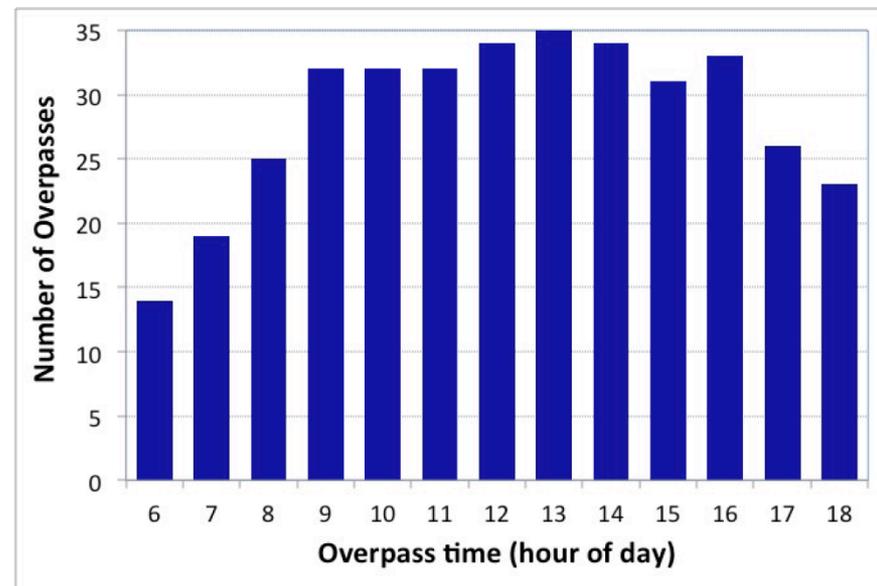


**UNIVERSITY OF
SOUTH FLORIDA**
College of **MARINE SCIENCE**



Motivation to use ECOSTRESS over water

- High spatial resolution
- Non-uniform sampling and re-visit times
- Ability to extract data up to and across the water-land interface

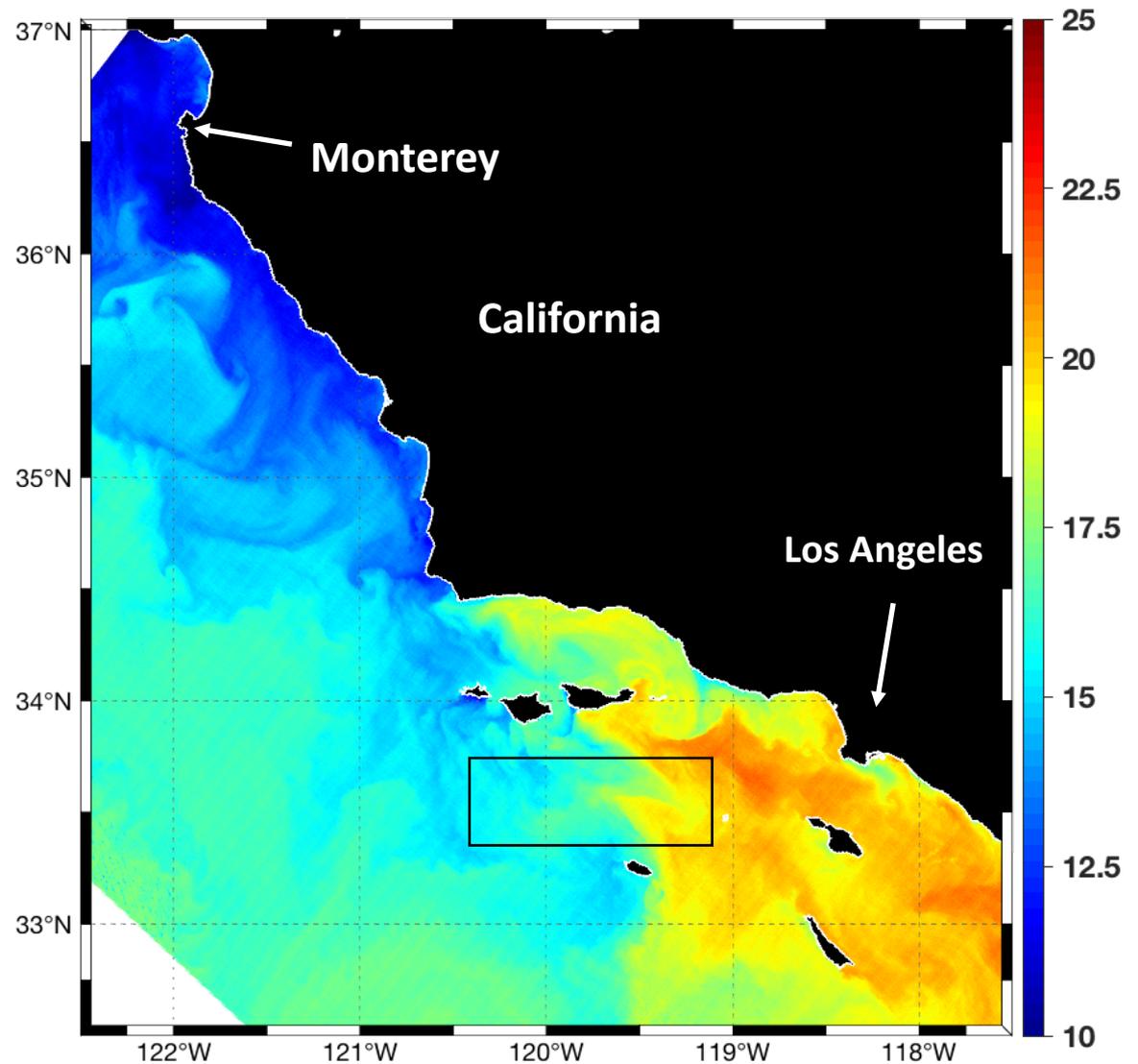


Project Goals:

1. Apply a split-window SST algorithm to ECOSTRESS L1B mapped radiance product
2. Compare S/W SST with L2 LST product and validate using data from other sensors (VIIRS, MODIS, Sentinel)
3. Develop shore temperature profiles using the LST product to investigate temperatures across the land-water interface
4. Mine biodiversity records (OBIS, GBIF) and relate to fine-scale SST patterns in upwelling areas like the CA coast and FL Keys
5. Work with MBON colleagues and the Pole to Pole network to validate ECOSTRESS beach temperatures with data from *in-situ* temperature loggers



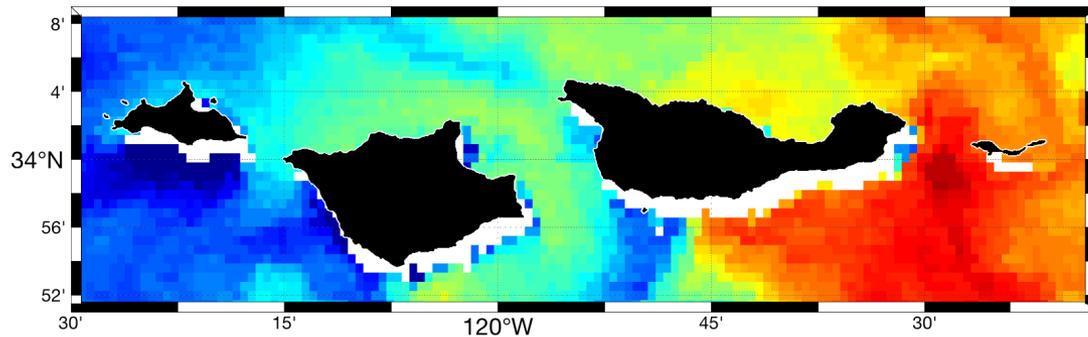
L2 ECOSTRESS LST over water



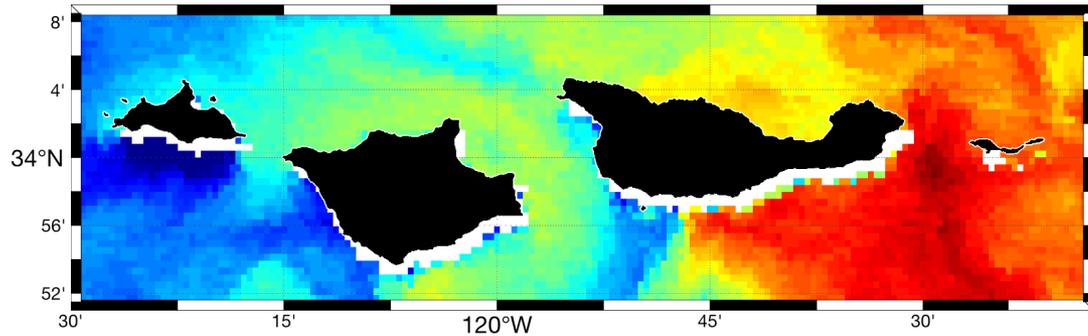
UNIVERSITY OF
SOUTH FLORIDA
College of MARINE SCIENCE

Minnett et al. 2019

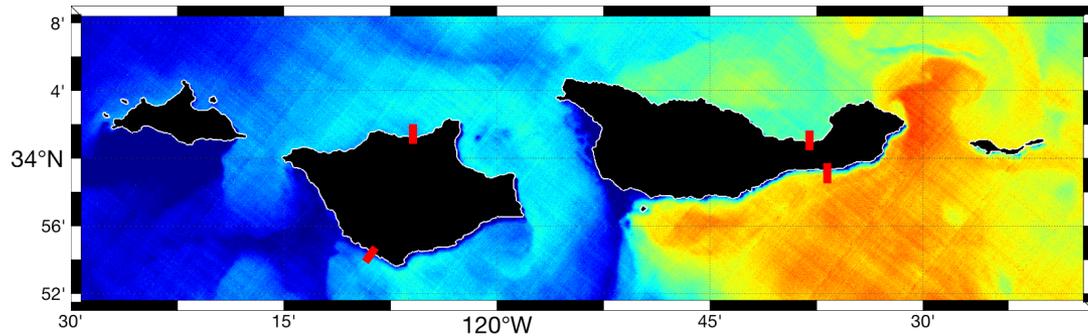
ECOSTRESS, MODIS and VIIRS (Channel Is.)



MODIS-Aqua 8/16/18 10:10 GMT
1-km pixel



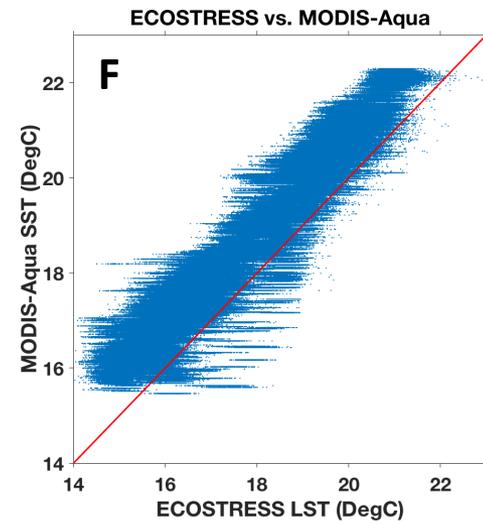
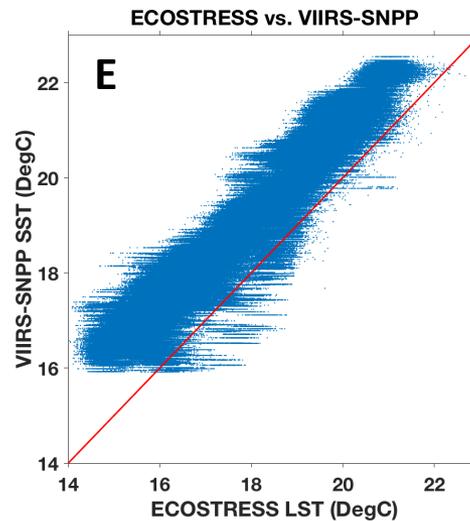
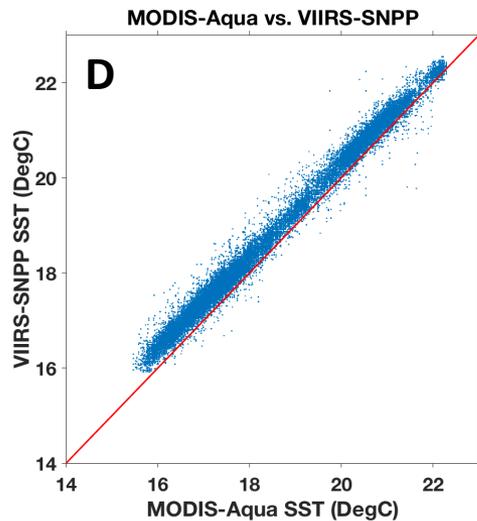
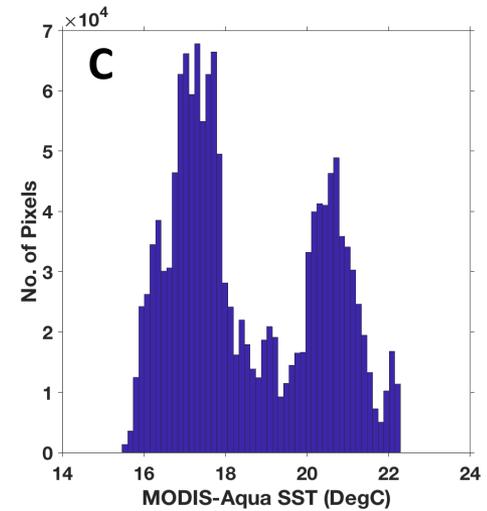
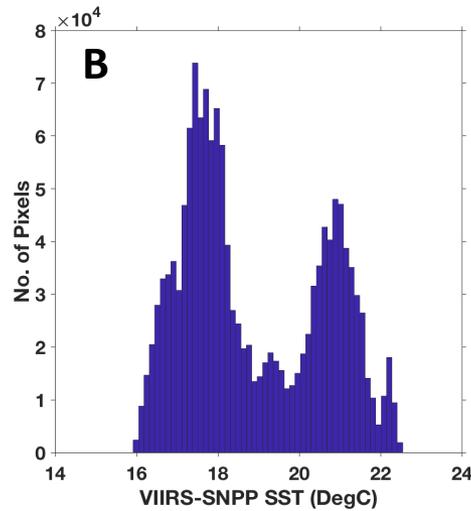
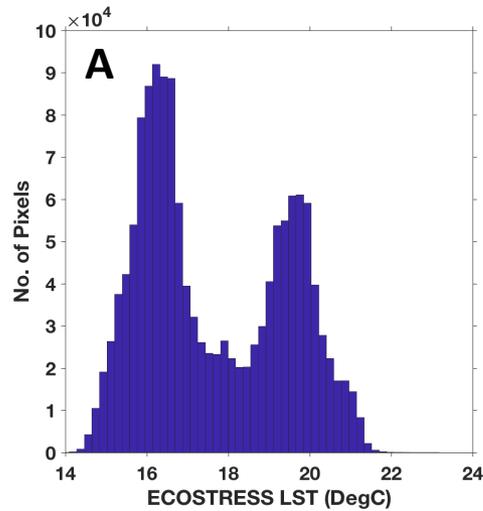
VIIRS-SNPP 8/16/18 10:00 GMT
750-m pixel



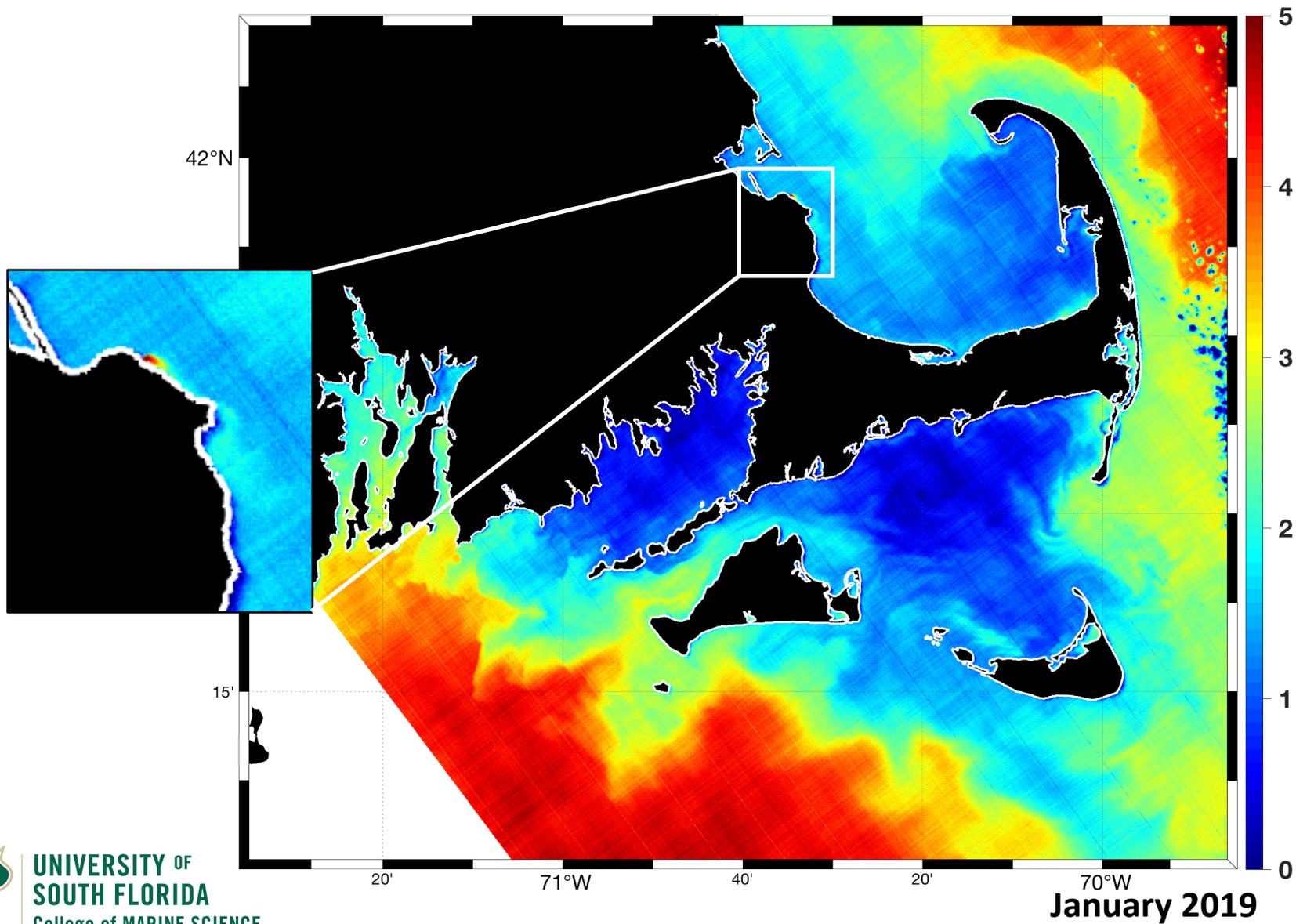
ECOSTRESS 8/16/18 13:04 GMT
70-m pixel



ECOSTRESS LST vs. MODIS and VIIRS SST

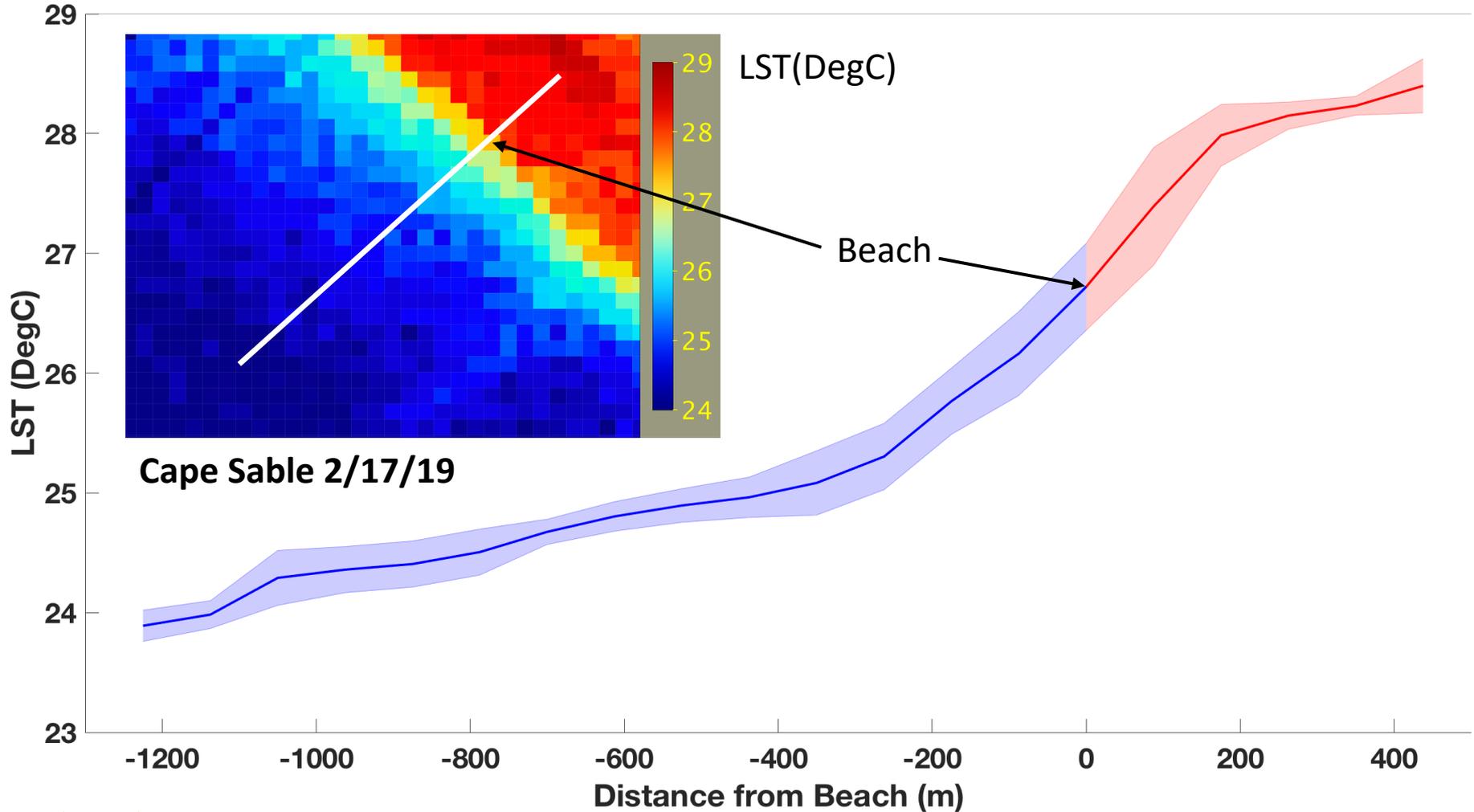


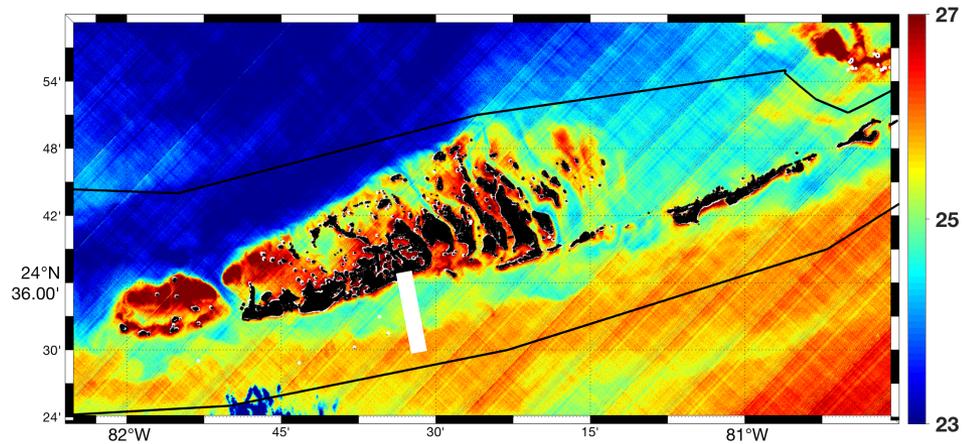
L2 ECOSTRESS LST over Cape Cod



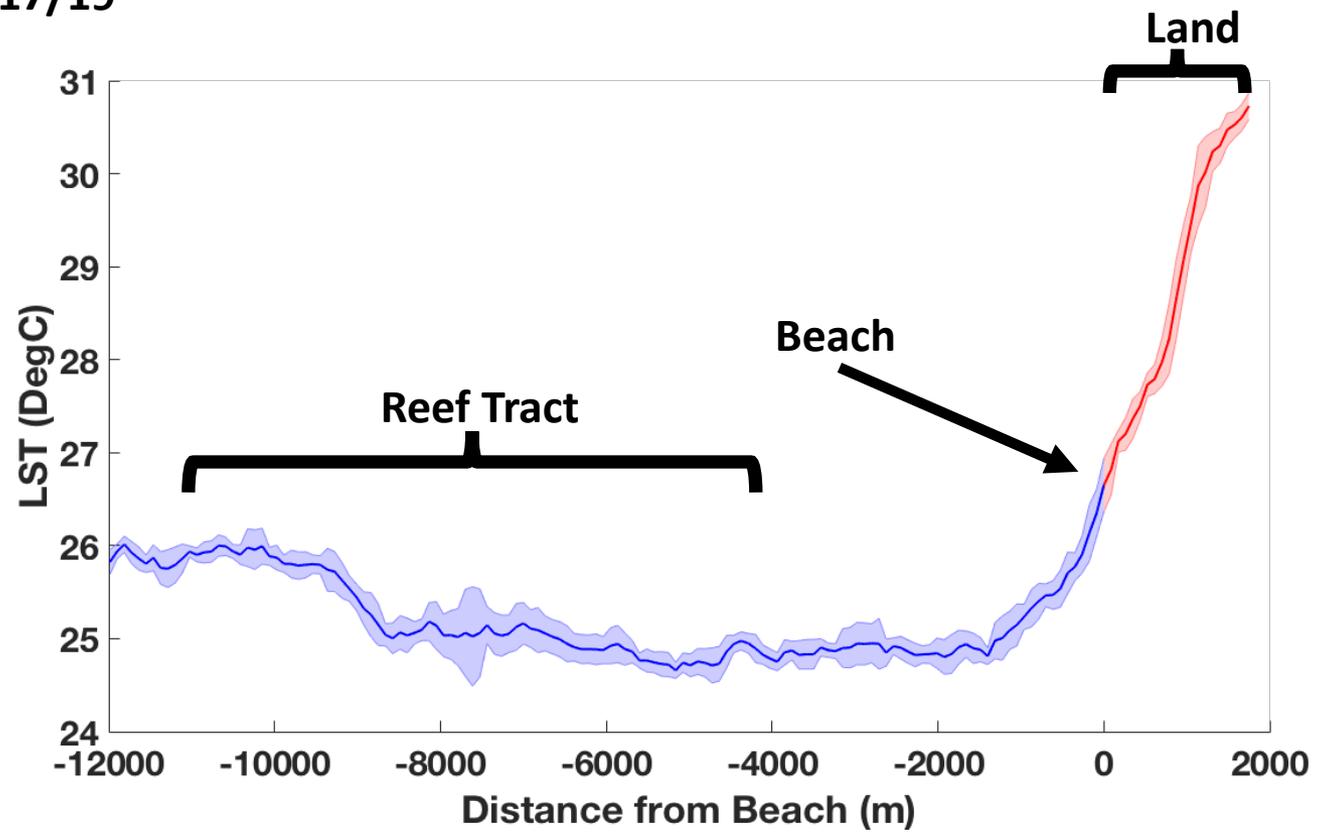
ECOSTRESS LST across the water-land interface

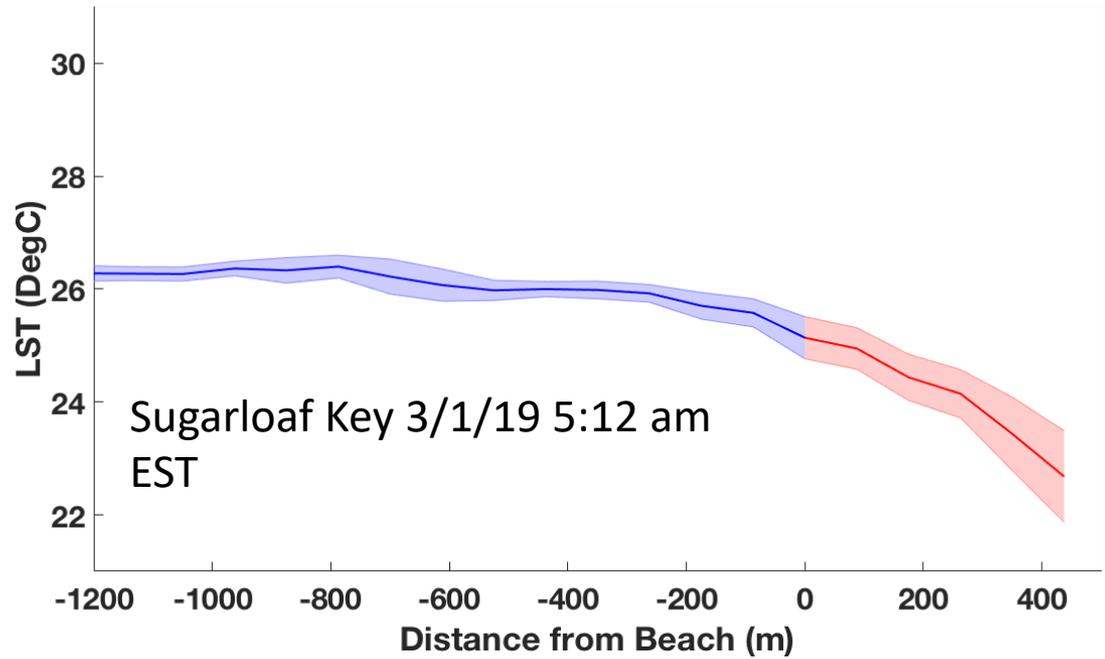
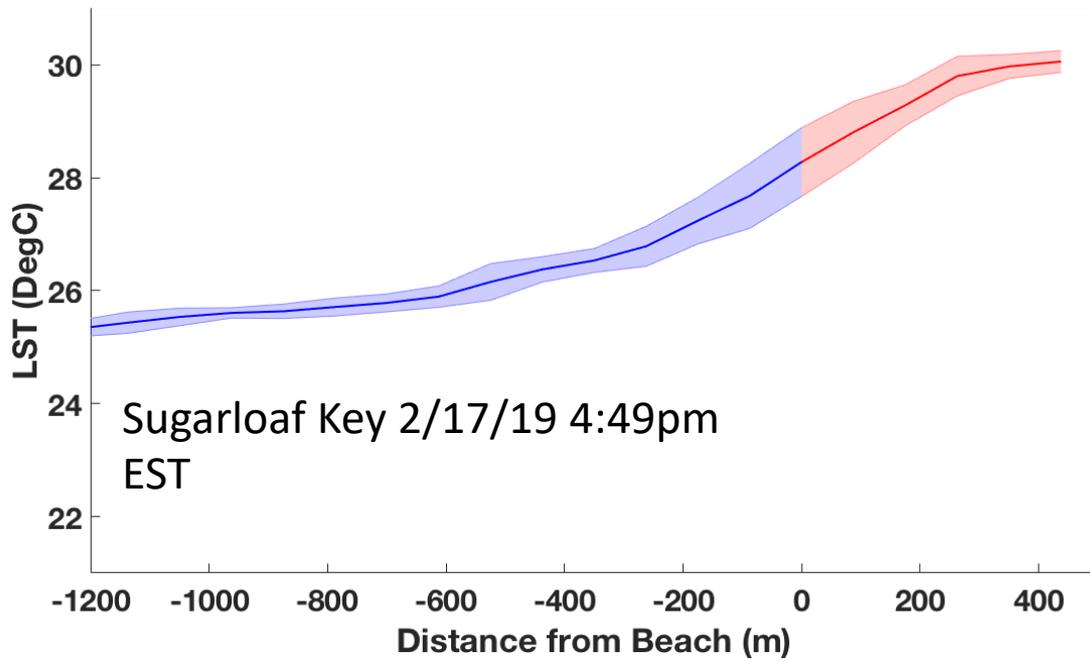
- Shore Temperature Profiles (STP)





Lower FL Keys 2/17/19





ECOSTRESS and Biodiversity

Tittensor et al., Nature (2010):

“Our findings indicate a fundamental role of temperature or kinetic energy in structuring cross-taxon marine biodiversity”

How can ECOSTRESS data at 70-m resolution best be compared with observations patterns of biodiversity?

What areas of interest and taxa are best suited for these analyses?

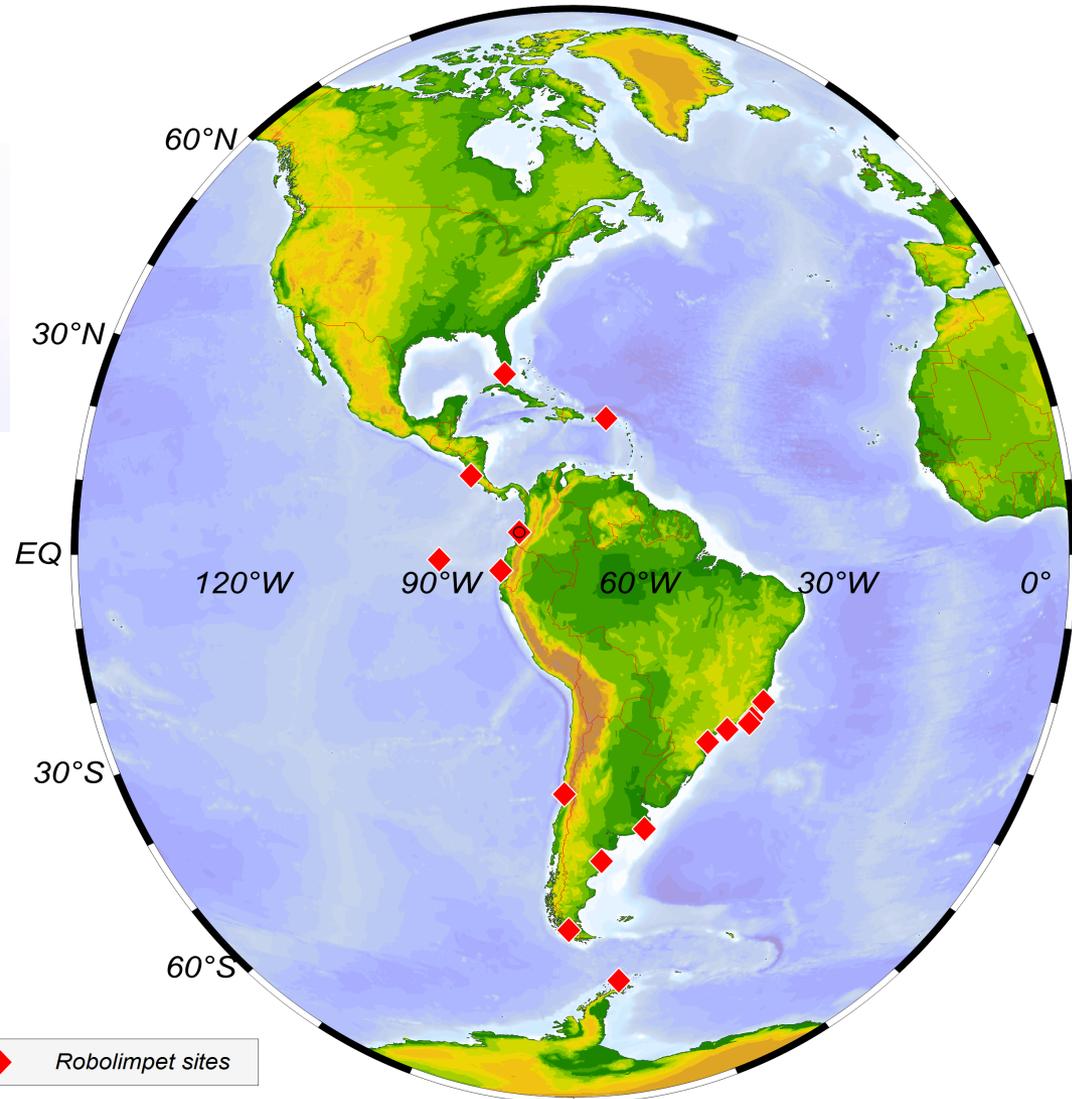
How do shore temperature profiles differ in sandy beach environments compared to rocky shores? How do they vary seasonally and diurnally?

Data records of biodiversity

- Biodiversity is difficult to monitor, particularly in marine environments
- Very few autonomous observations of biodiversity data in the ocean
- Biodiversity data records can be sparse and patchy
- Two main repositories exist: OBIS and GBIF
- MBON: Regional networks of scientists, resource managers, and end-users working to integrate data from existing long-term programs to improve our understanding of the connections between marine biodiversity and ecosystem functions.



MBON Pole to Pole Robolimpet temp. loggers



UNIVERSITY OF
SOUTH FLORIDA
College of MARINE SCIENCE