

2015 STAR JPSS Annual Science Team Meeting,
College Park, Maryland
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VIIRS SST - ACSPO Evaluation Annual Summary

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"Seasonal trends of ACSPO VIIRS SST product characterized by the differences in orbital overlaps for various waters types" - Arnone, Vandermeulen, Ignatov, Caylua

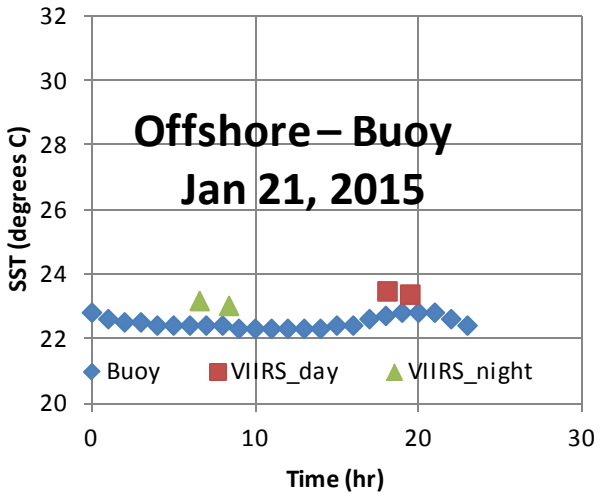
1. **Evaluation of the SST using overlaps in coastal areas**
2. **Diurnal changes in SST**
3. **Ocean model SST validation**

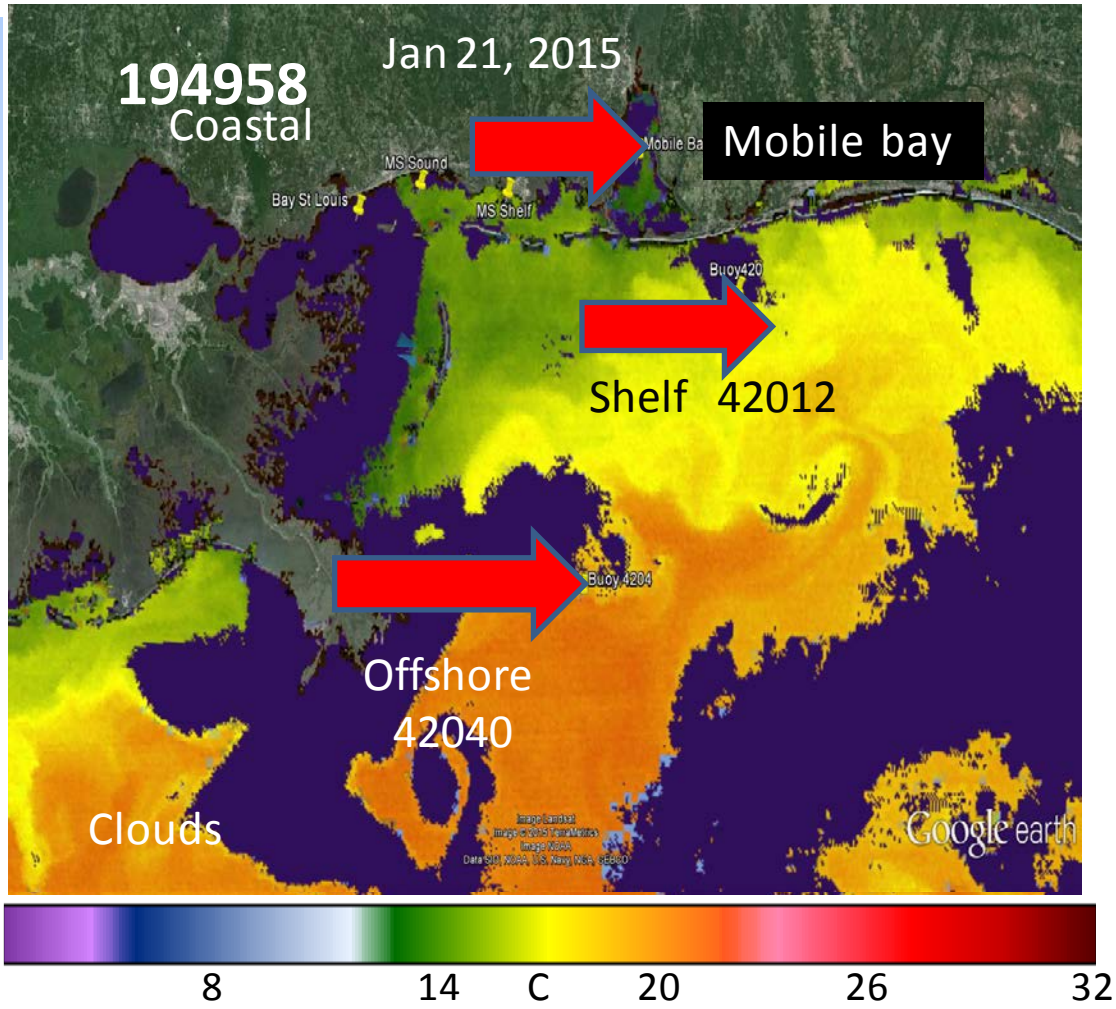
ACSPO Orbital VIIRS Overlaps

100 minute Day and Night 4 per day !

Diurnal Changes - Advection and surface heating

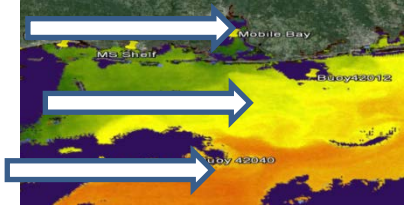
Water masses –
Coastal to Offshore
Buoy data for SST Locations off the Mississippi Delta for the Matchup

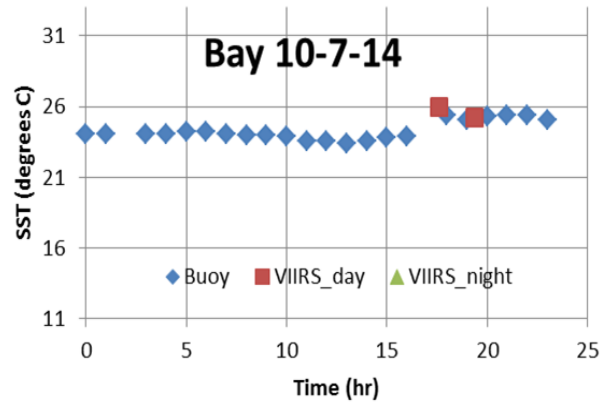


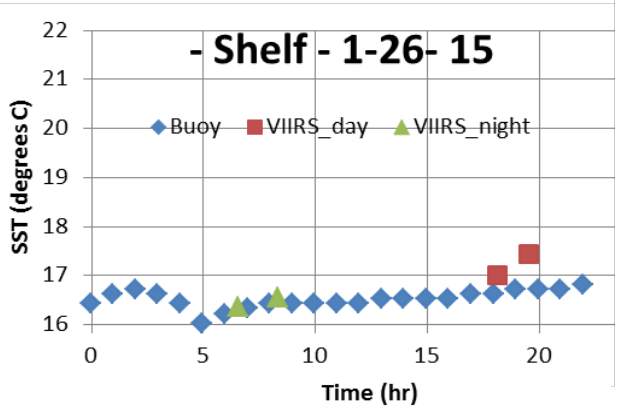


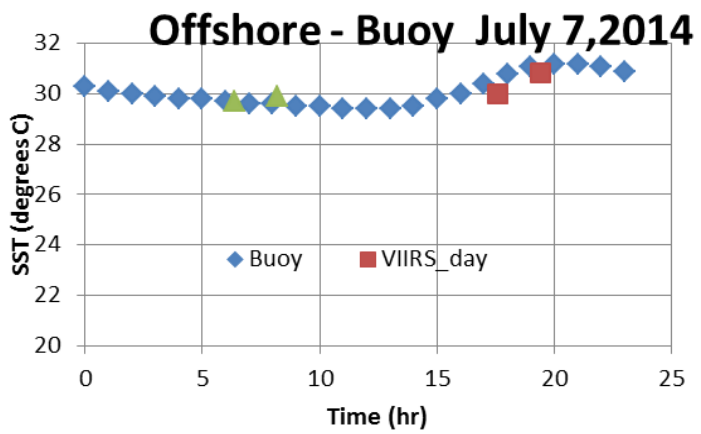
VIIRS ACSPO

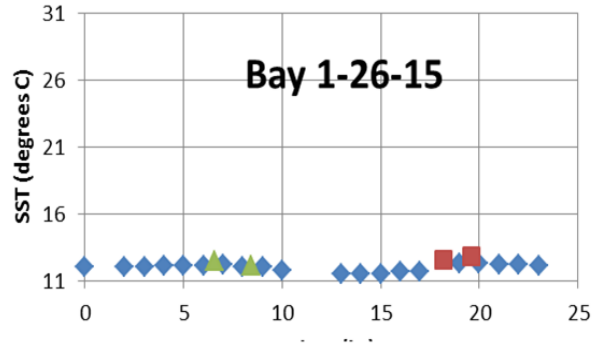
1. Captured the Diurnal Variability with overlaps !!
2. What can cause the temperature change?

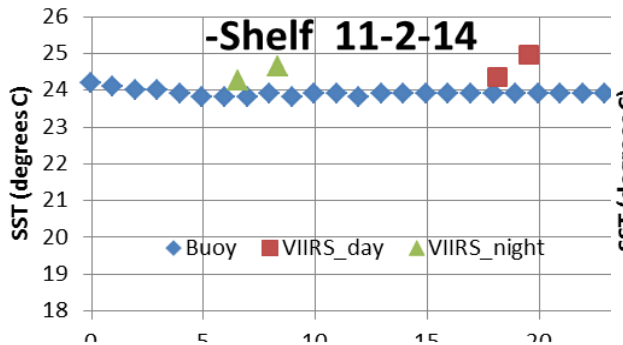


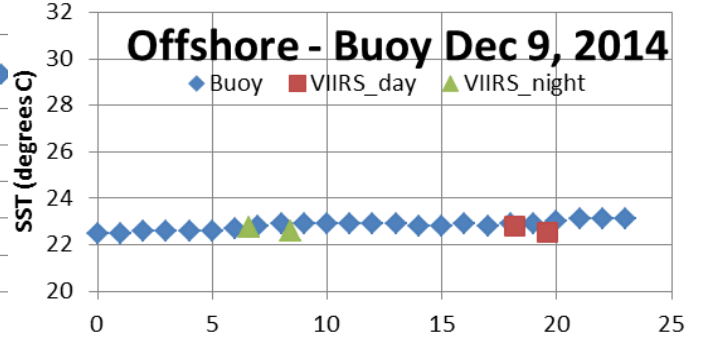


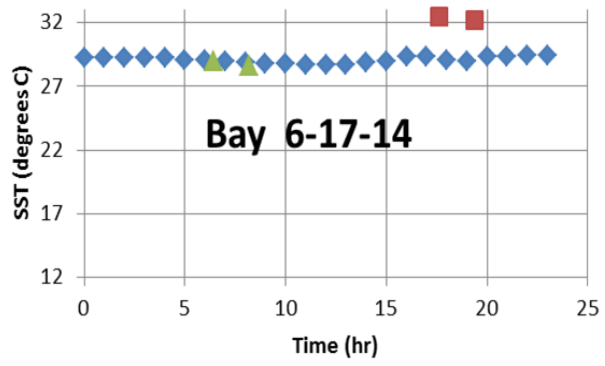


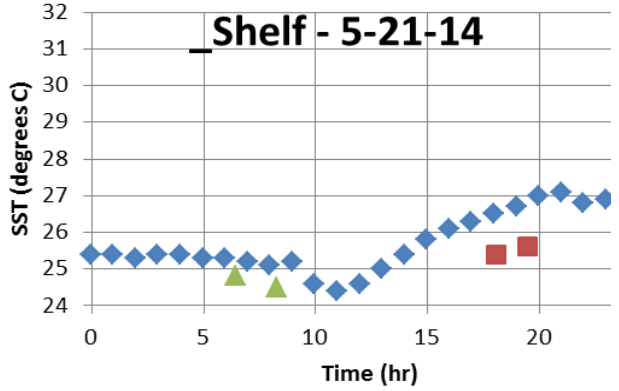


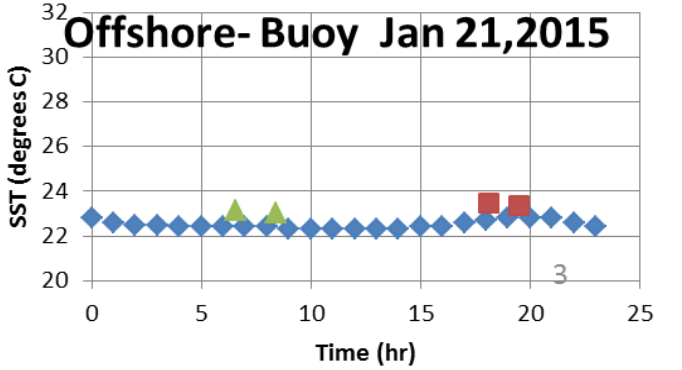




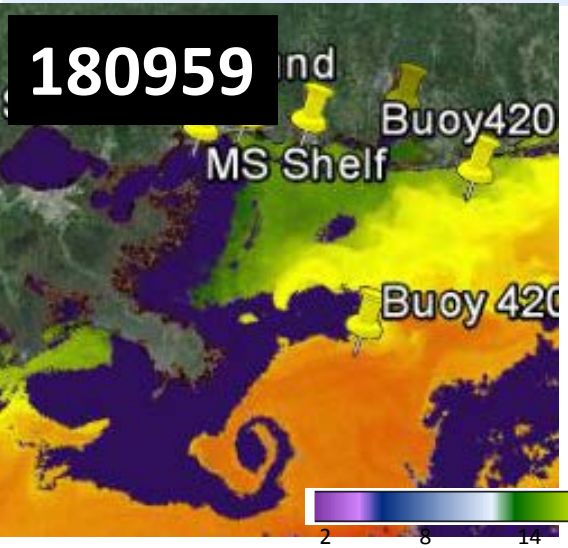


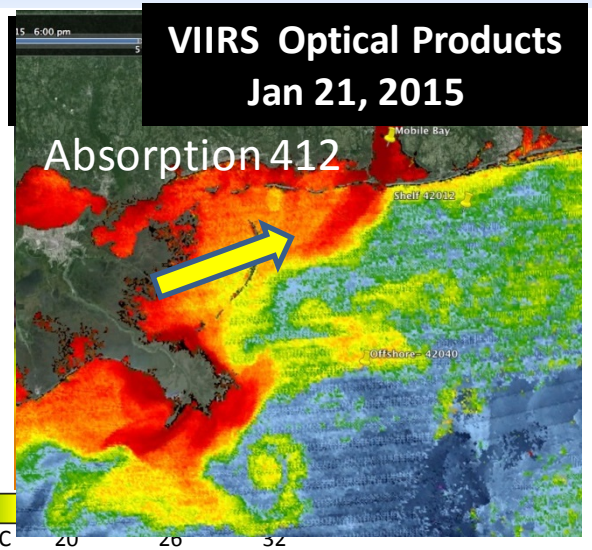


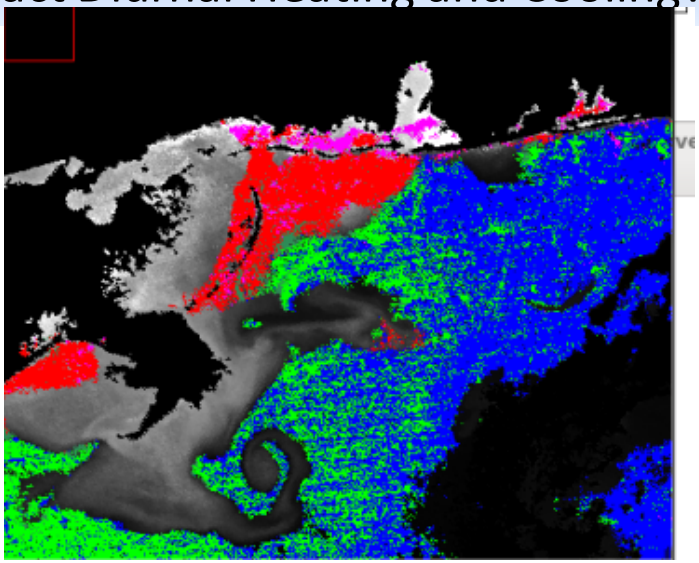


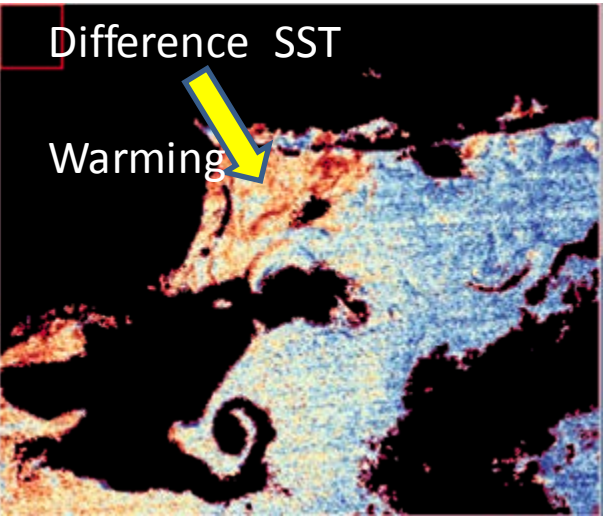


Does the Water Optics (Turbidity or absorption) Impact Diurnal Heating and Cooling?

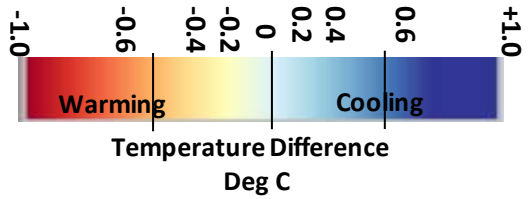




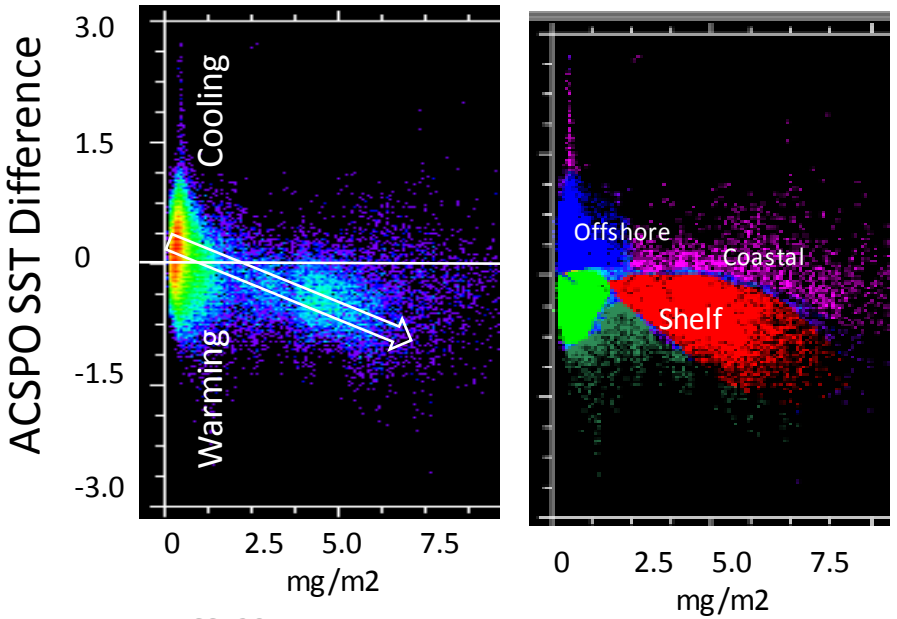




Orbit 1 minus 2



ACSPO First orbit minus Second orbit



Average Chlorophyll Absorption

Water Mass Classification

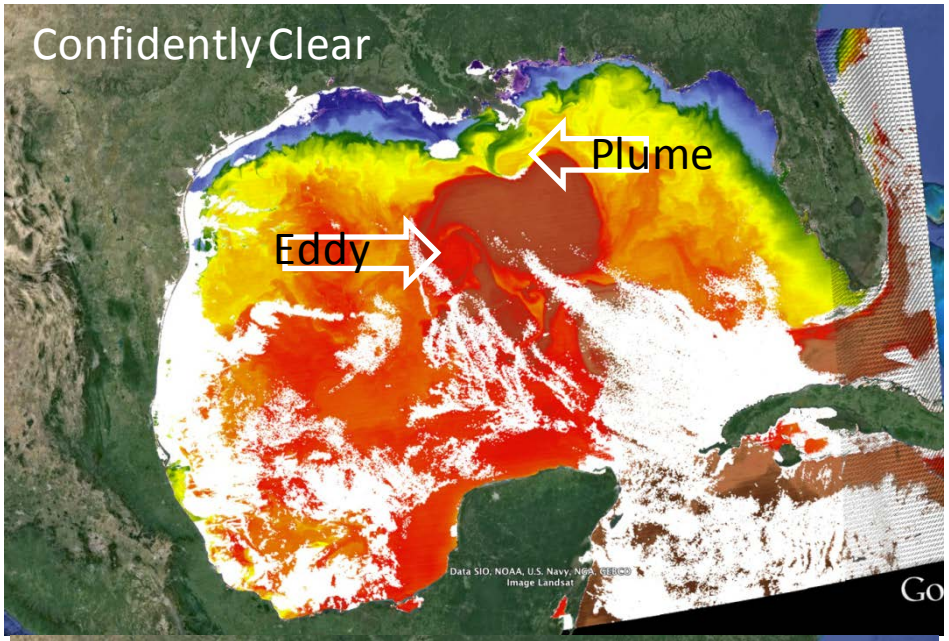
Cooling occurs from First to Second orbit in Clear waters.

Warming occurs in high Absorption waters.

Jan 28, 2015 ACSPO _Confidently Clear

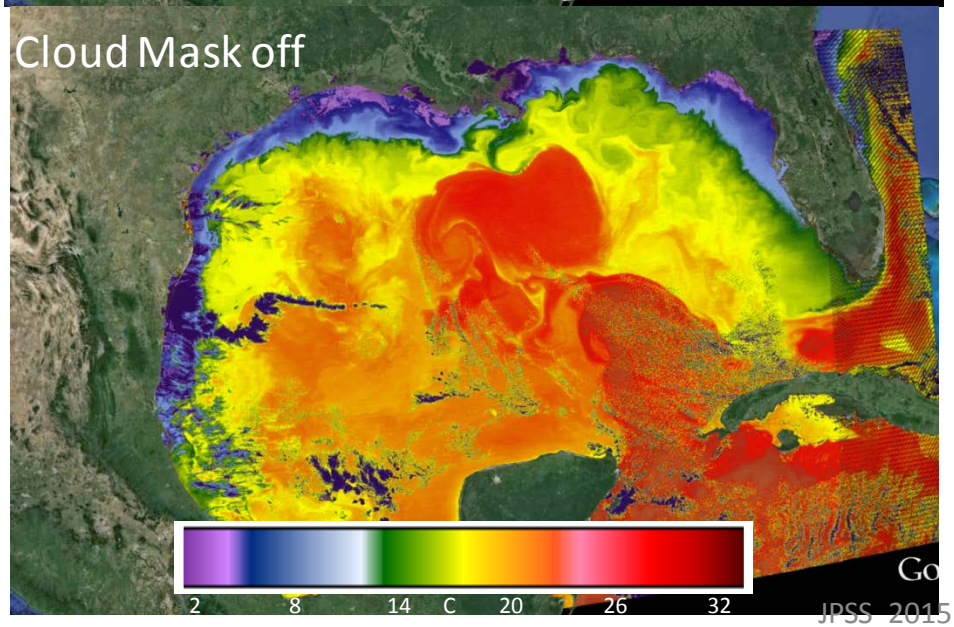
Example of ACSPO

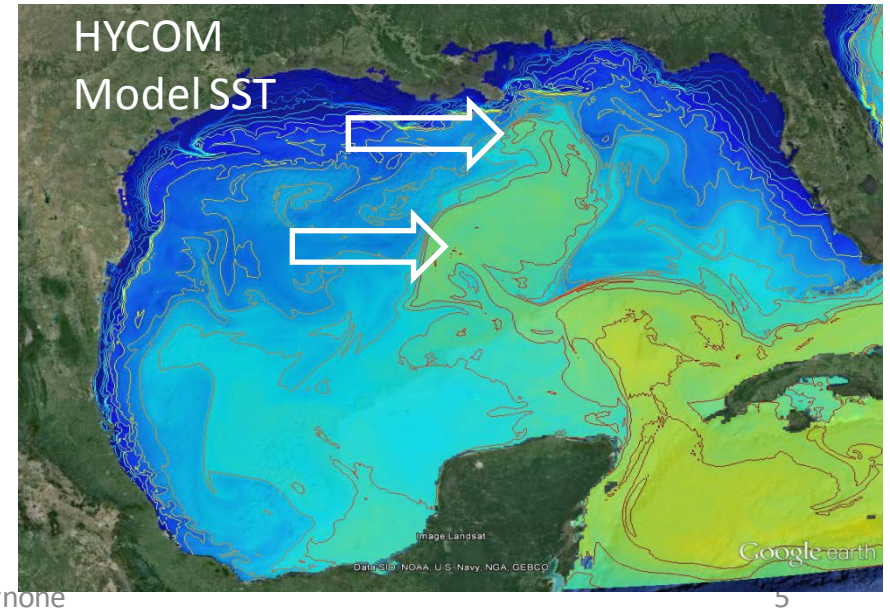
Cloud Cover – some cases is aggressive.



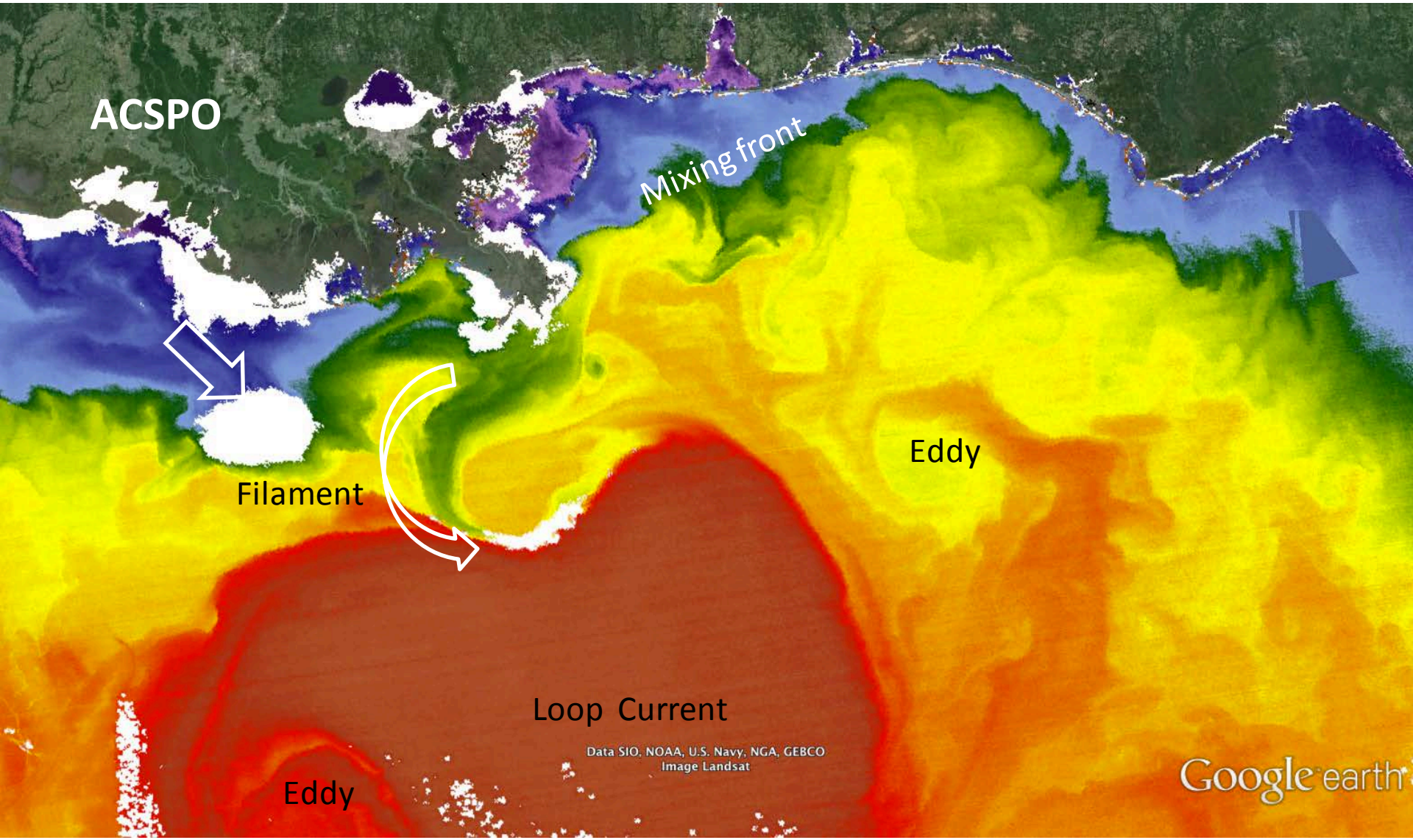
SST ACSPO and Model showing different features (scales are different) .

HYCOM model – VIIRS SST data Assimilated
VIIRS SST can validate model feature "Coastal Plumes"





VIIRS SST can be used for Identifying Coastal Circulation Features

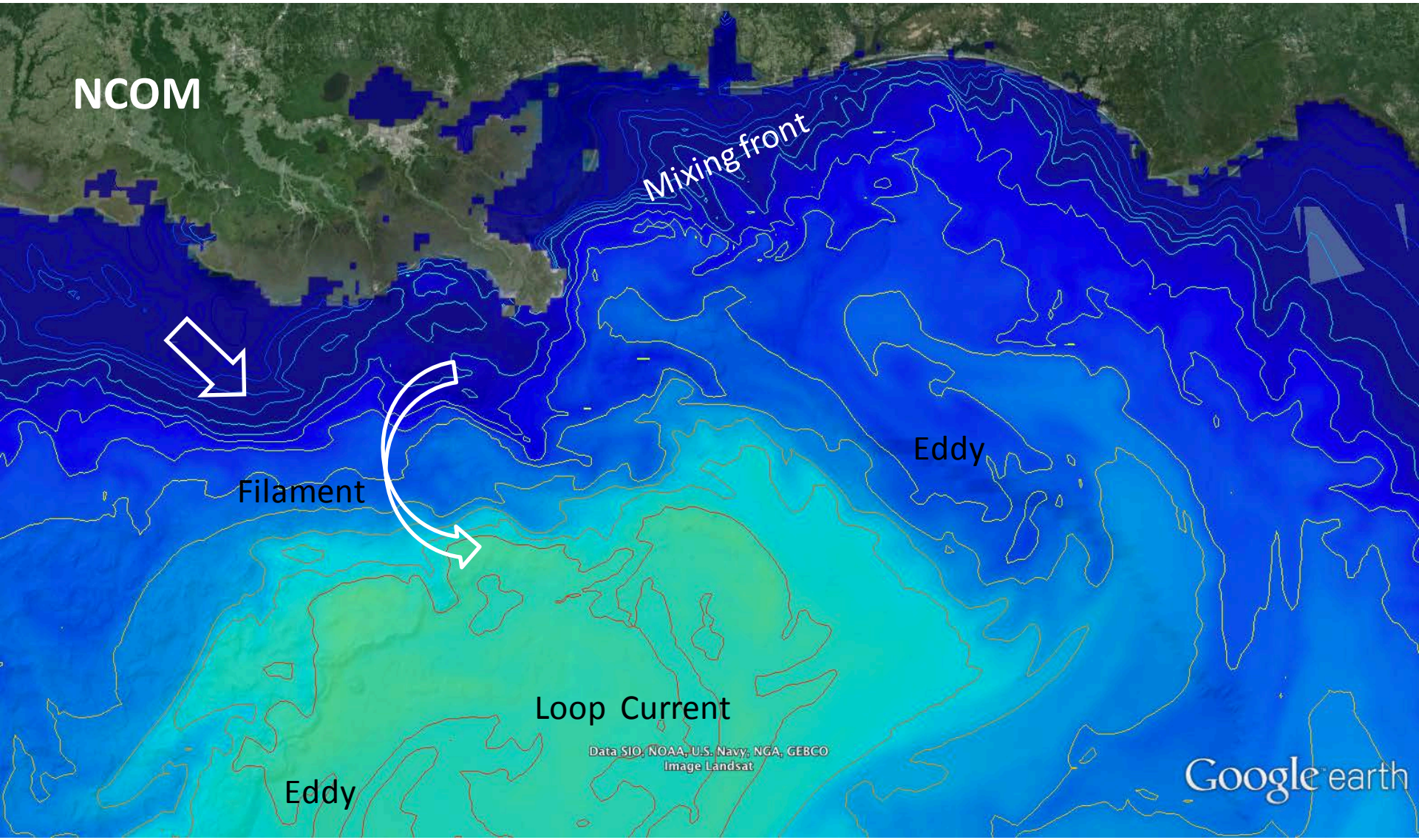


2 8 14 C 20 26 32

Location of ocean features
Coastal flagging of Clouds

How do these SST features compare Model (HYCOM / NCOM)?

VIIRS ACSPO SST can be used for Validation of Circulation Models



Missing the Coastal Filament. Other areas are Validated

Difference in NCOM and HYCOM Model, No Plume was identified in the SST

ACSPO VIIRS SST products evaluation Seasonal trends SST difference in Overlaps Validation in Coastal waters and diurnal heating

Summary:

See Poster !

1. VIIRS 100 minute Orbital overlap used to evaluate the ACSPO SST in coastal waters
2. ACSPO SST matchup with buoys in coastal , shelf and offshore waters was excellent!
3. Minimal trends of the overlaps SST difference suggests the stability of the product.
4. The diurnal signal in SST was validated in ACSPO SST !!
   - Products accuracy must account for short temporal changes.
   - Influence of water optics on surface heating and heat flux !

5. ACSPO cloud mask may be aggressive with some coastal features
6. VIIRS SST used for Validation of Circulation Models.
   Integrated into Ocean Weather Lab. .

7. Plans
   - SST for defining the Gulf Stream front in upcoming cruises.
   - Evaluate ACSPO SST and coastal dynamics and river plumes.
   - Validation of circulation model's SST

Publications

Arnone, R., Vandermeulen, R. Ignatov, A. Cayula , J.-F. (2015) "Seasonal trends of ACSPO VIIRS SST product characterized by the differences in orbital overlaps for various waters types", 2015 SPIE *Proc. SPIE* Ocean Sensing and Monitoring VII, 9459 (June2015), Baltimore Ocean Sensing and Monitoring VII Proc of SPIE Vol 9495)OT-1 – OT-7 edited by W. Hou and R. Arnone editors.

Cayula ,J,F, Arnone, R. Vandermeulen ,R. "(2015) Comparison of VIIRS SST fields obtained from differing SST equations applied to a region covering the northern Gulf of Mexico and western North Atlantic", 2015 SPIE *Proc. SPIE* Ocean Sensing and Monitoring VII, 9459 (June2015), Baltimore Ocean Sensing and Monitoring VII Proc of SPIE Vol 9495OS-1 – OS-11 edited by W. Hou and R. Arnone editors doi:10.1117/12.2053435