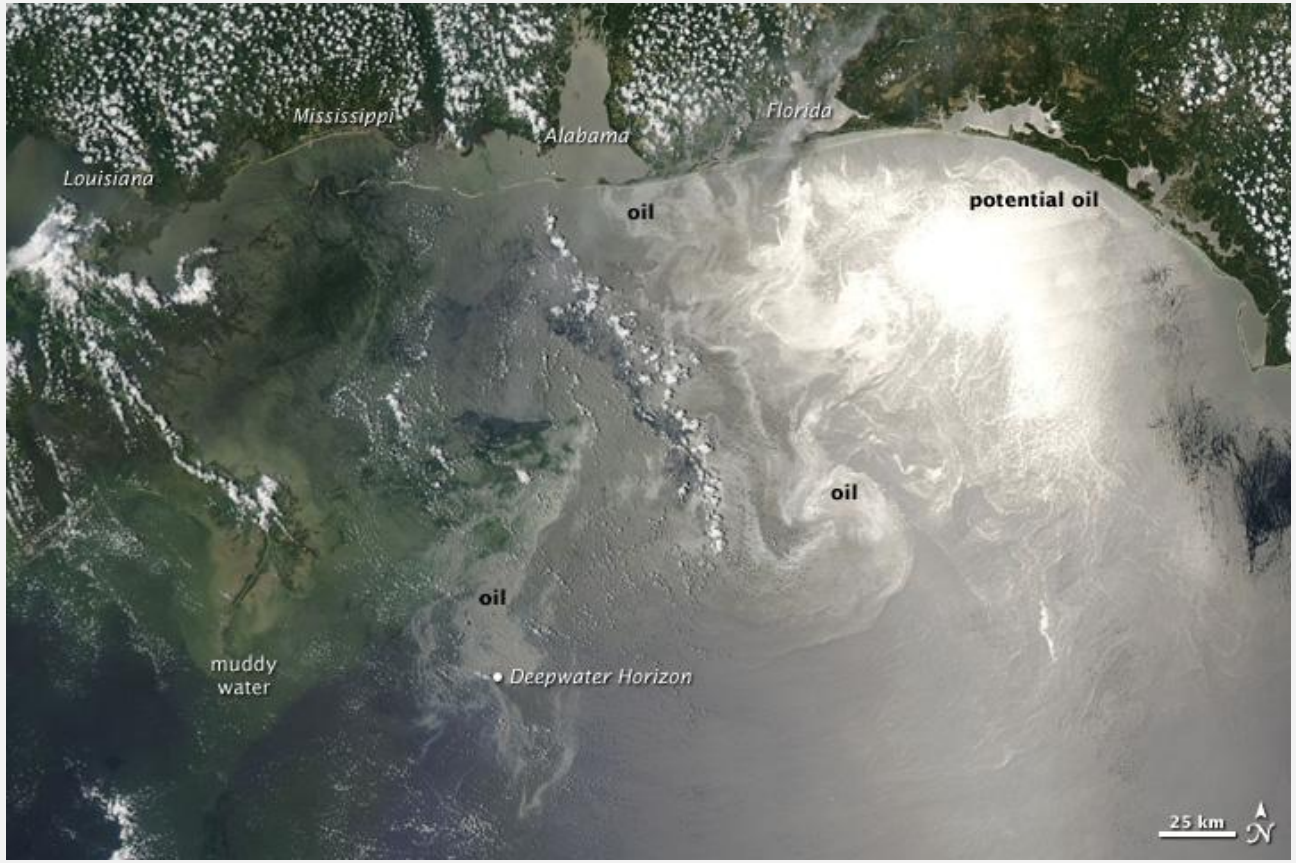
Detecting Oil Spills With Modis – Bryan Storie

- Pros
  - Images cover more area
  - More visits in a period of time
  - Lots of bands to work with
  - Can use IR bands to somewhat mitigate cloud cover
- Cons
  - Lower spatial resolution
  - Reflected wavelengths of oil may vary based on conditions

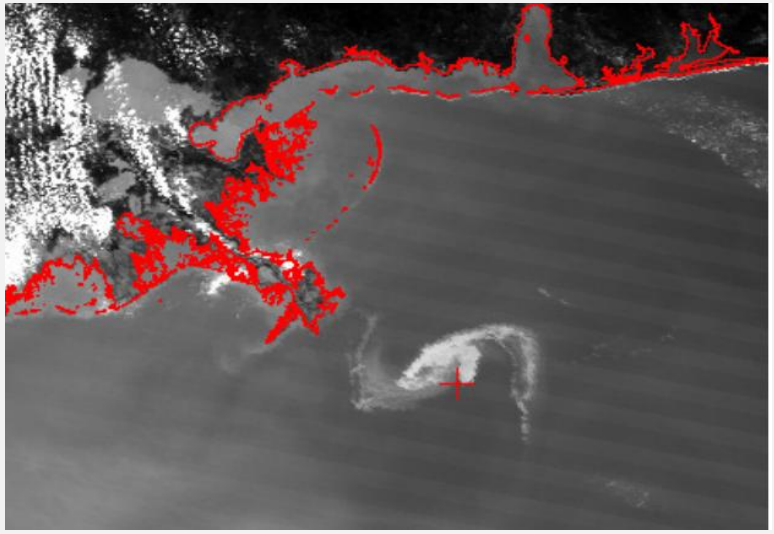


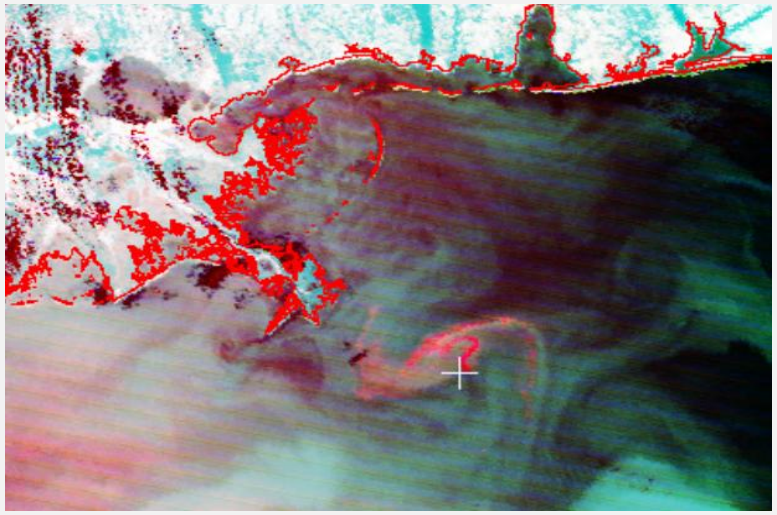
2010, Gulf of Mexico Spill, www.universetoday.com, NASA imagery

Detection of Spills

- Testing MODIS for mapping oil slicks
- Oil emits thermal energy from 8-14 micrometers
- Index developed using blue and

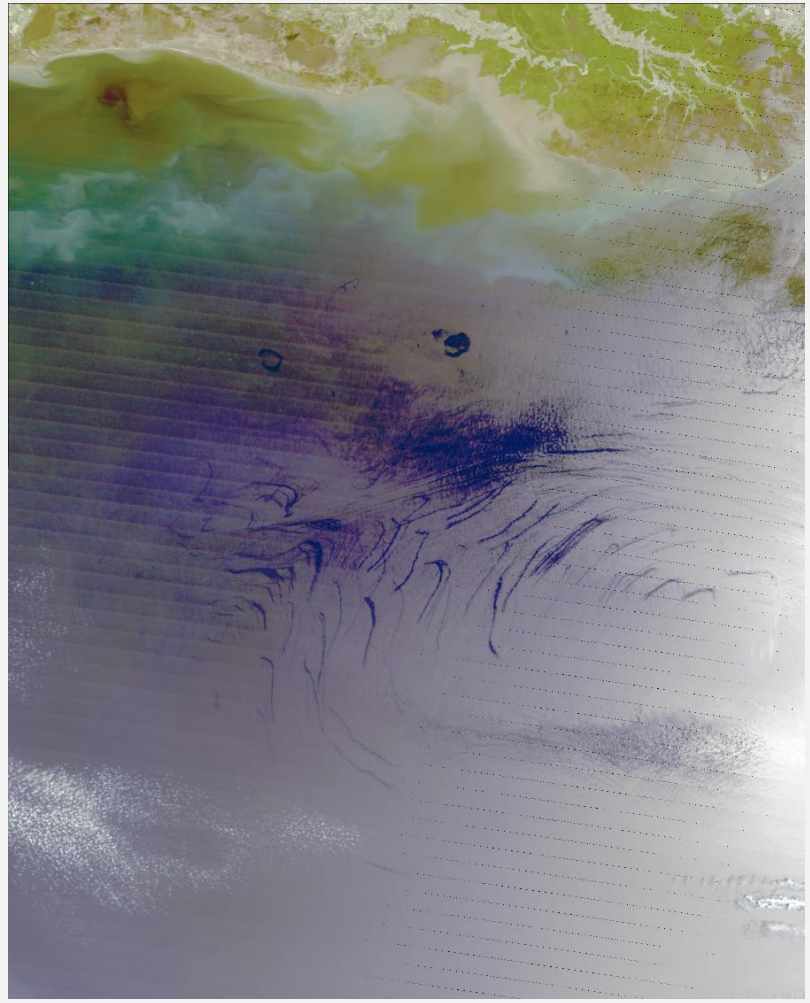
  (1 – thermal) wavelengths
- Also created a composite using bands 23, 31, 29 which brings out the oil
- (See [1])





Comparison to SAR

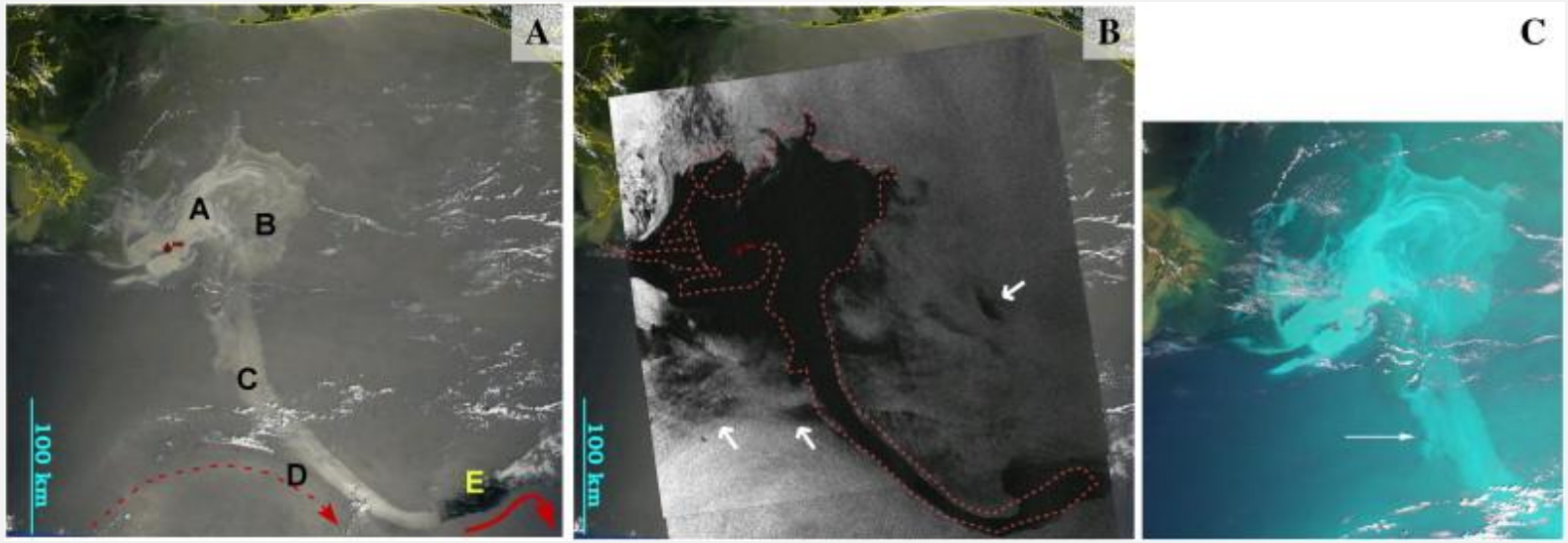
- Comparing oil slick detection using SAR and MODIS
- Used 250m resolution bands and some SWIR, B, and G
- Used thresholding as well as visual inspection with sun glint
- Found that MODIS overestimated slick size by around 30% compared to SAR but allows for more visits and coverage
- (see [2])



Conclusions

- Slick detection with MODIS primarily done using sun glint and the thermal bands
- Gain the ability to look at more of the slick more frequently but may miss smaller parts
- Tendency to overestimate size(A: MODIS, B: SAR, C:MISR)

[3]



Sources:

[1] Gianinetto, M., et al. "Evaluation of MODIS data for mapping oil slicks—the Deepwater Horizon oil spill case." *Geogr Technol applied to Mar Spat Plan and Integr Coast Zone Manag. Universidade Dos Açores* (2010).

[2] Hu, Chuanmin, et al. "Detection of natural oil slicks in the NW Gulf of Mexico using MODIS imagery." *Geophysical Research Letters* 36.1 (2009).

[3] Leifer, Ira, et al. "State of the art satellite and airborne marine oil spill remote sensing: Application to the BP Deepwater Horizon oil spill." *Remote Sensing of Environment* 124 (2012): 185-209.