Remote detection and quantification of oil spills

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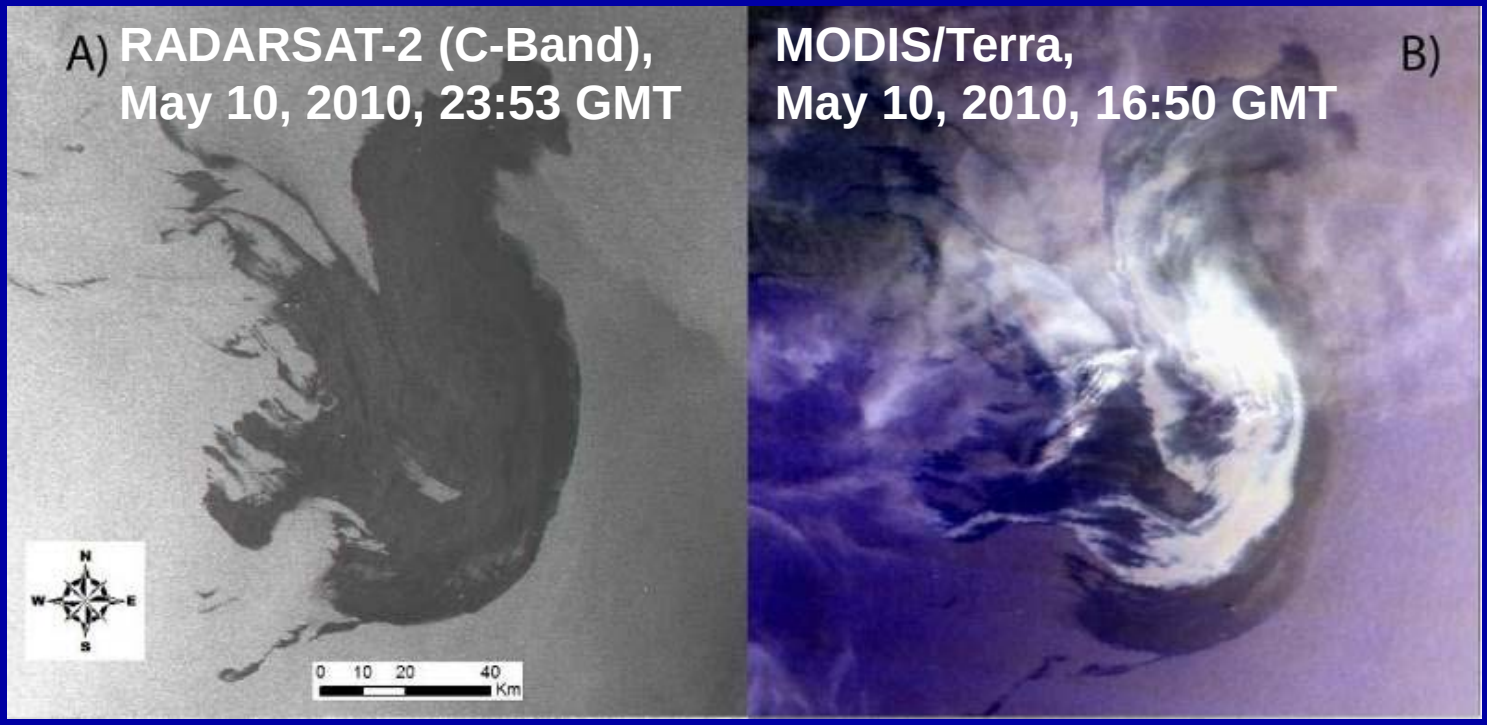
USF

IMAGE-II

NASA

Remote Sensing of Surface Oil

SAR (many satellites)	Optical (many satellites)
High res (m's to 10s of m's)	Low res (10s – 100s of m's)
Small footprint (10s – 100s of km)	Large footprint (100s – 1000s of km)
Cloud free	Cloud opaque
Often high cost	Low to no cost

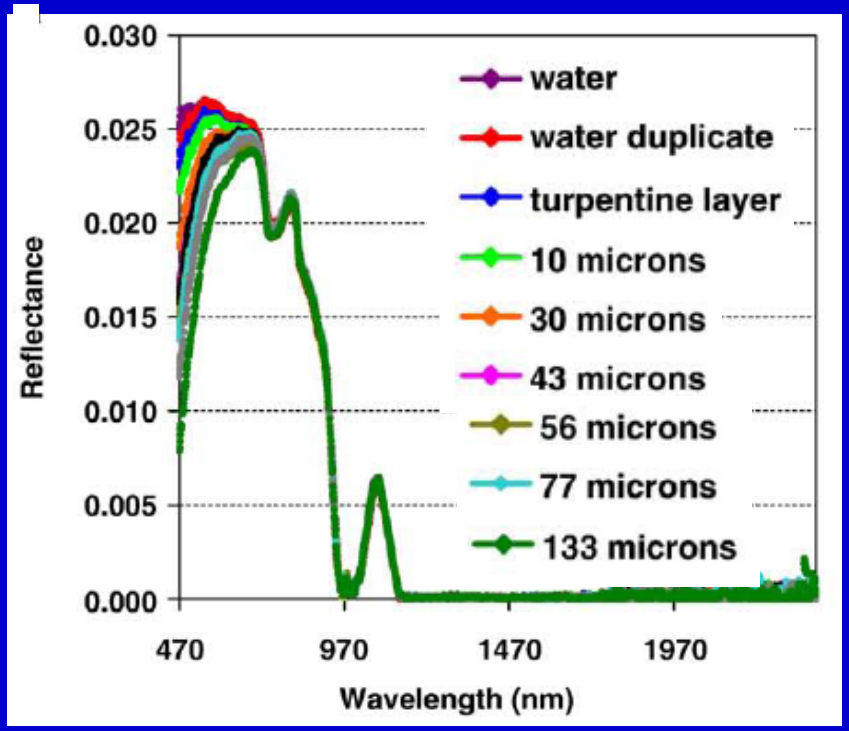


From Garcia-Pineda et al. (2013)

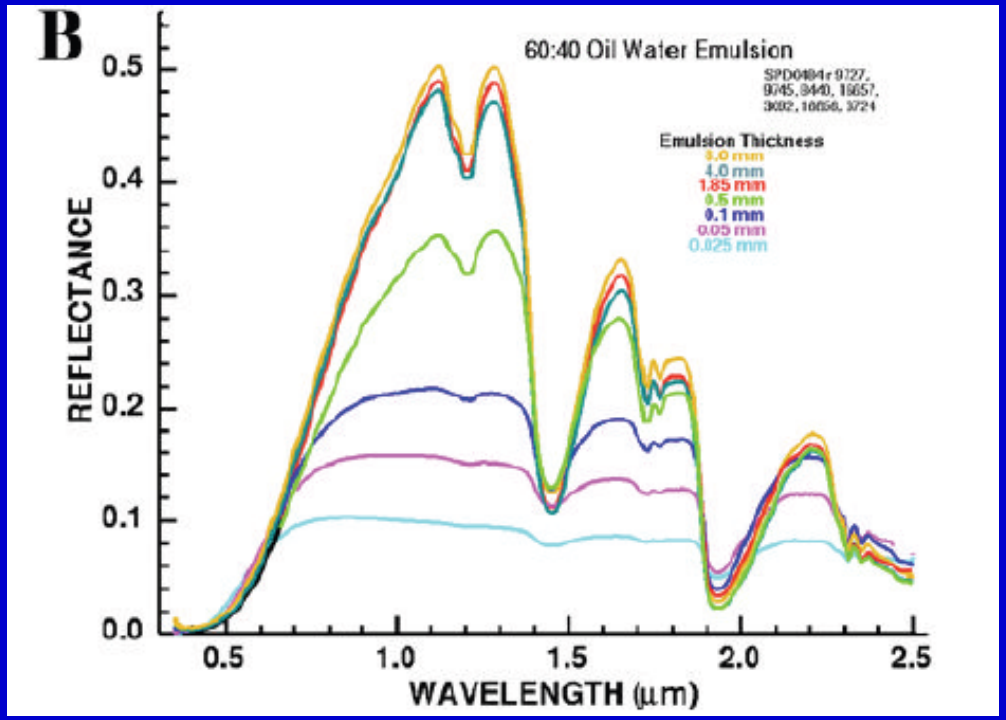
Laboratory Measurements

Surface reflectance of oil of different thicknesses

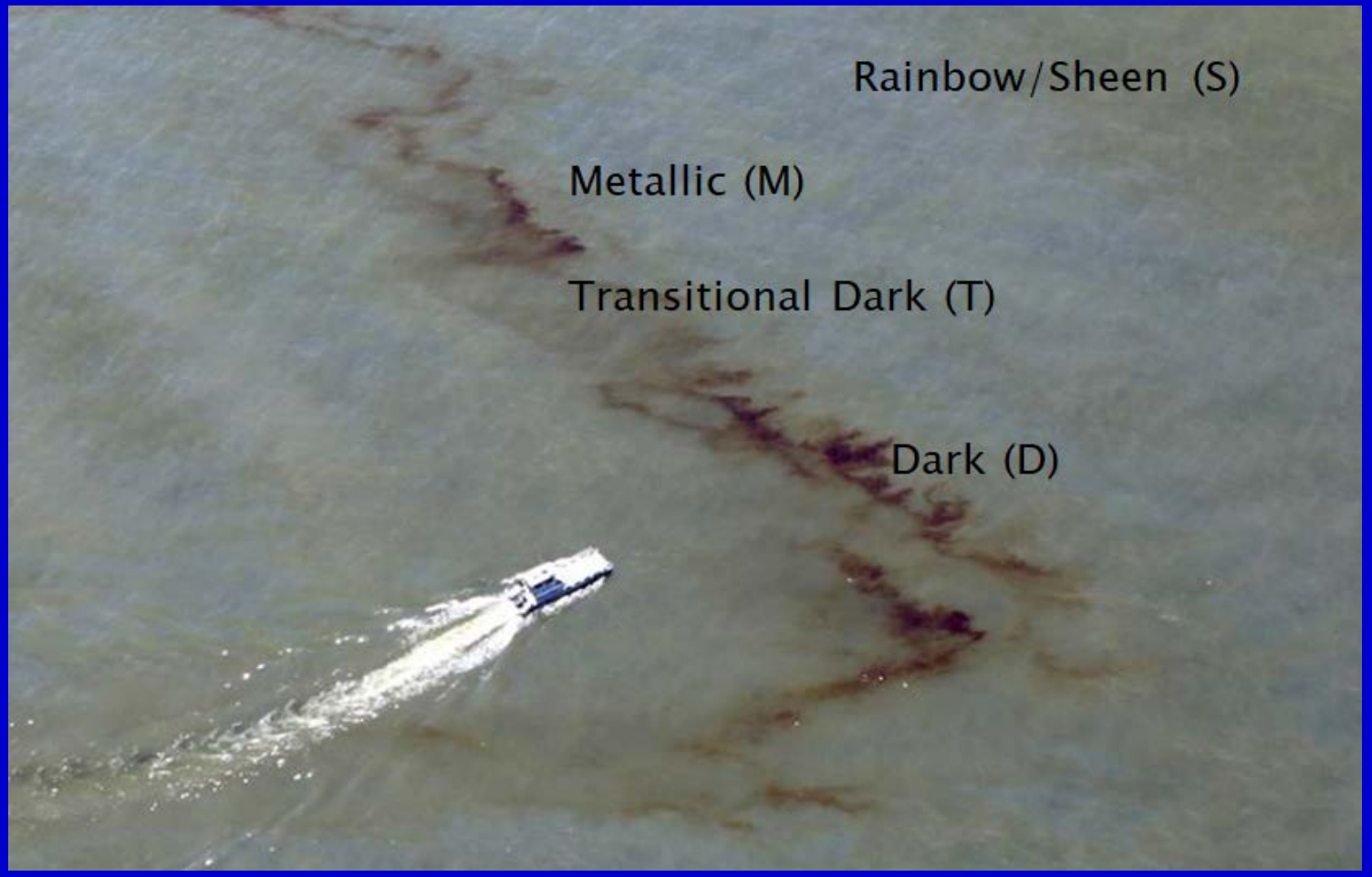
Wettle et al. (2009)



Clark et al. (2010)



Understanding Optical Contrasts

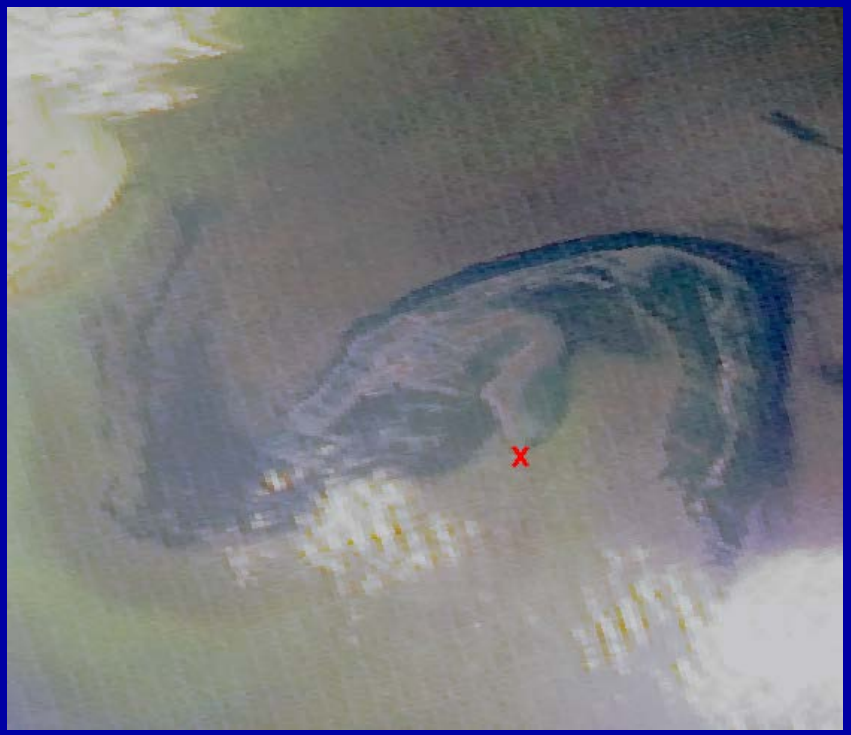


Aerial photo of the MC20 oil spill collected by Bonny Shumaker on May 8th, 2016 during a GOMRI research cruise.

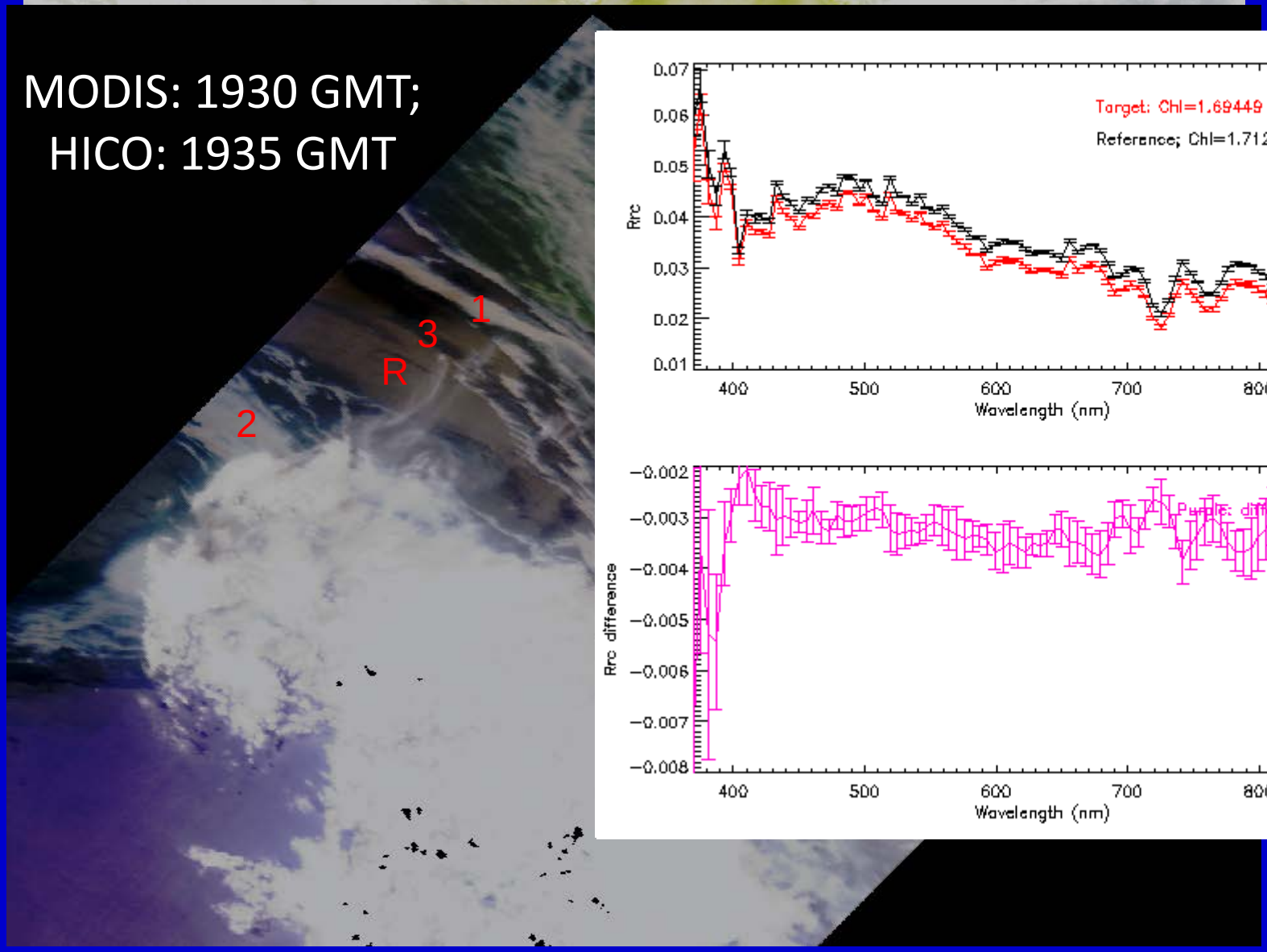
Understanding Optical Contrasts

When oil is thicker, its optical properties also play a role, and the contrasts become more complicated…

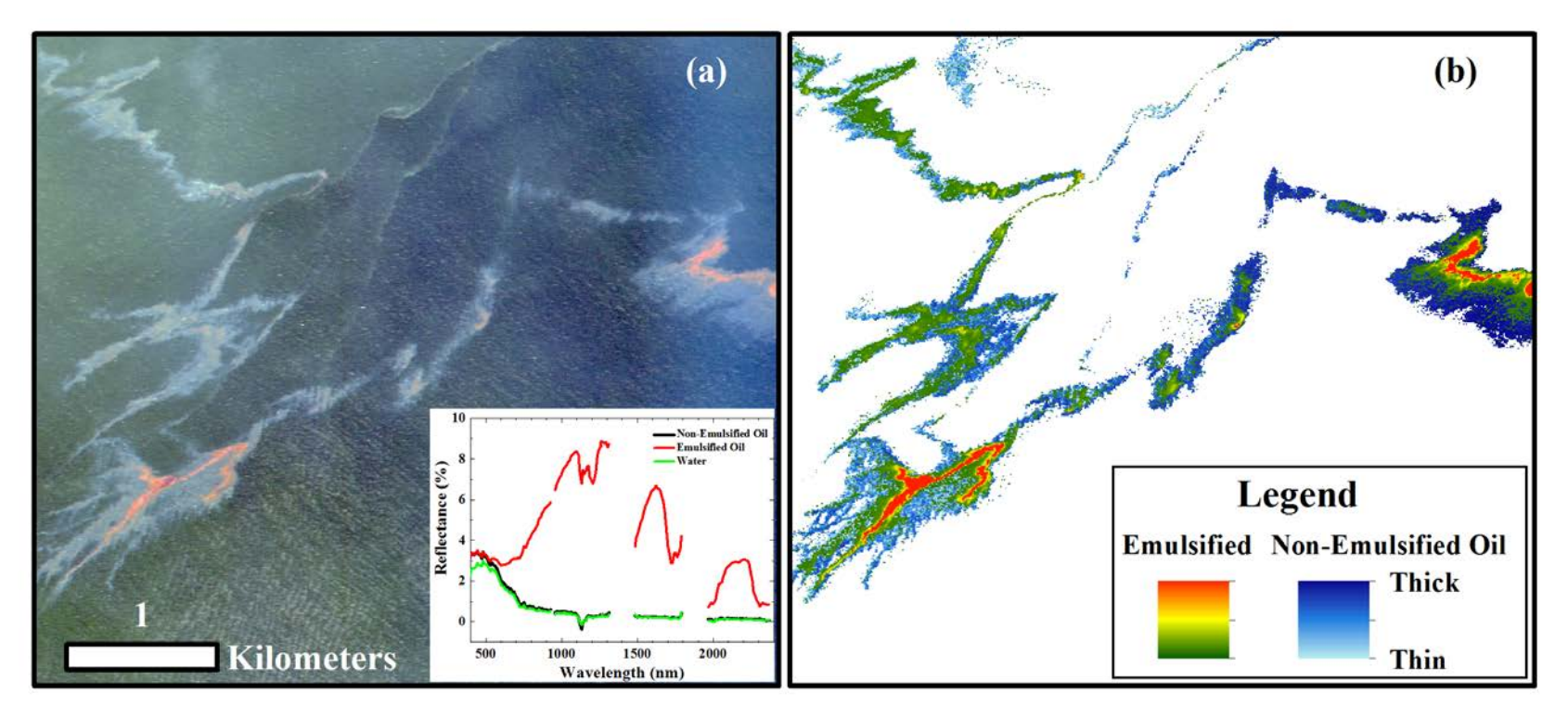
April 29, 2010, Terra and Aqua, 2.5 hours apart



HICO also shows different optical contrasts



Bi-partitioned classification



From Sun et al., (submitted)

Gaps/Opportunites

- Lack of reliable algorithms for quantifying oil volume
- Lack of reliable methods to measure oil thickness in the field
- Lack of real-time system for spill response