HYPERSPECTRAL REMOTE SENSING OF AQUATIC MICROBES TO SUPPORT WATER RESOURCE MANAGEMENT

Presented by:

Grace E. Kim, PhD & Evan Poworoznek (Booz Allen Hamilton, Strategic Innovation Group)

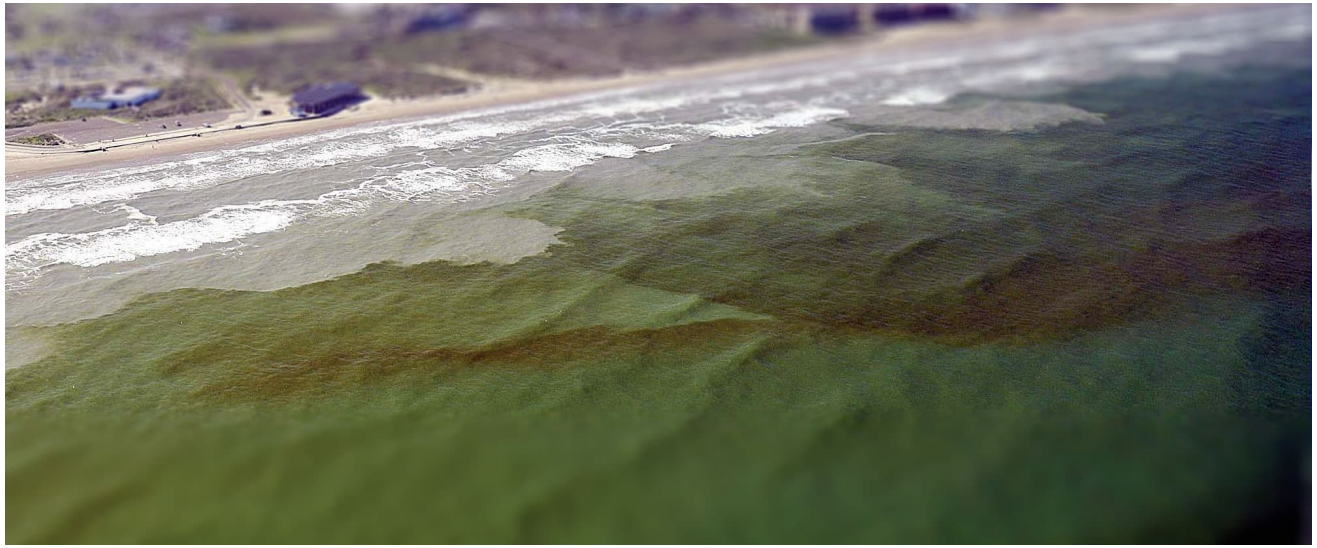
kim_grace2 [at] bah.com

Collaborators: Susanne E. Craig, PhD (NASA GSFC, Ocean Ecology Lab; USRA)

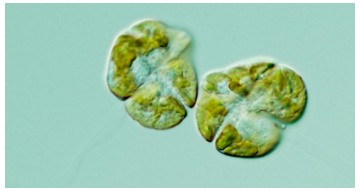
NEURIPS 2020

TACKLING CLIMATE CHANGE WITH MACHINE LEARNING

WATER QUALITY MONITORING IS TIME AND RESOURCE INTENSIVE



Blooms of harmful algae, like this "red tide" off the coast of Texas, can cause illness and death in humans and animals.

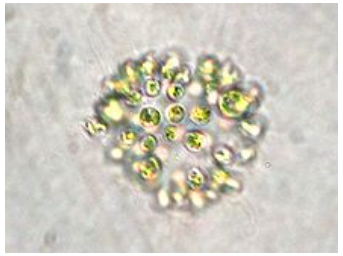


Karenia brevis

Image Credits:

- https://oceanservice.noaa.gov/hazards/hab/gulf-mexico.html
- https://www.scienceintheclassroom.org/research-papers/algal-toxins-effect-oysters

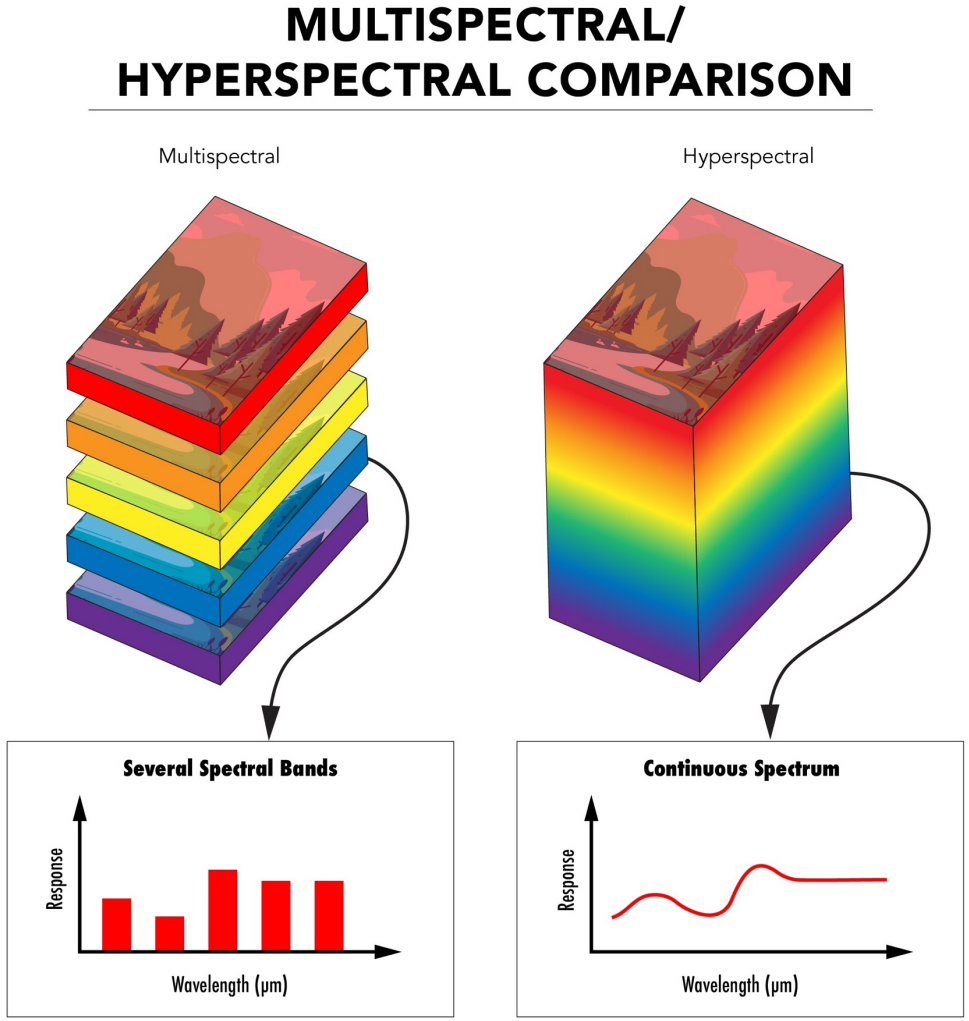
Lake Erie algae bloom, fueled by torrential spring rains that washed fertilizer into the lake, promote the growth of microcystin-producing cyanobacteria blooms.



Glass of water from drinking water supply intake for the city of Toledo.

- https://en.wikipedia.org/wiki/Algal_bloom
- https://en.wikipedia.org/wiki/Microcystis
- https://tidesandcurrents.noaa.gov/lake_erie_hab_article.html

HYPERSPECTRAL REMOTE SENSING



Multi-spectral

Hyperspectral

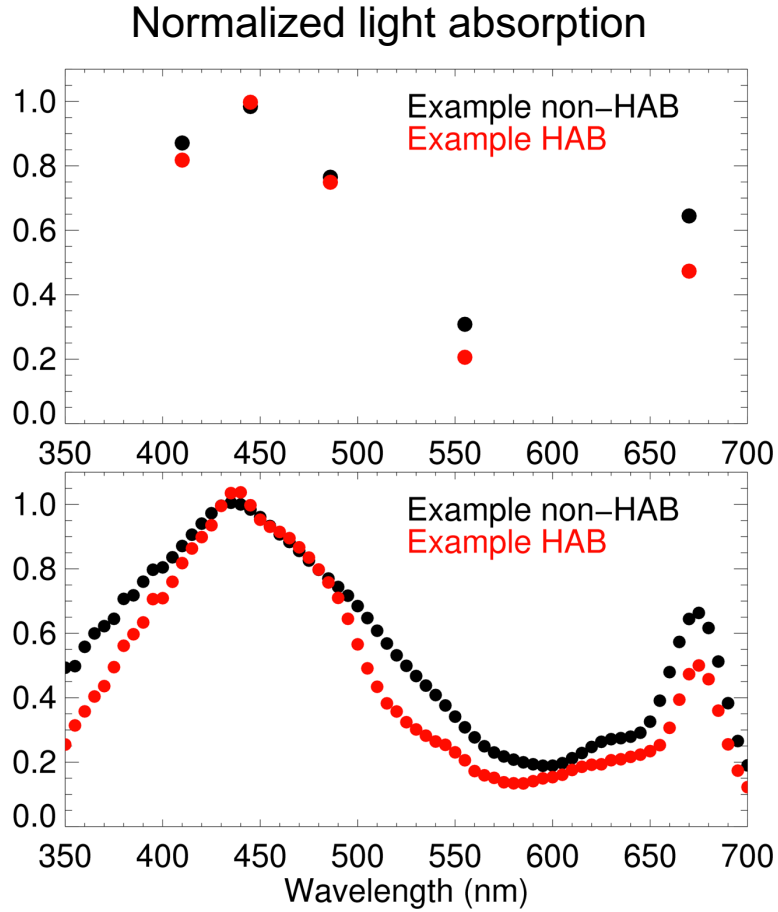


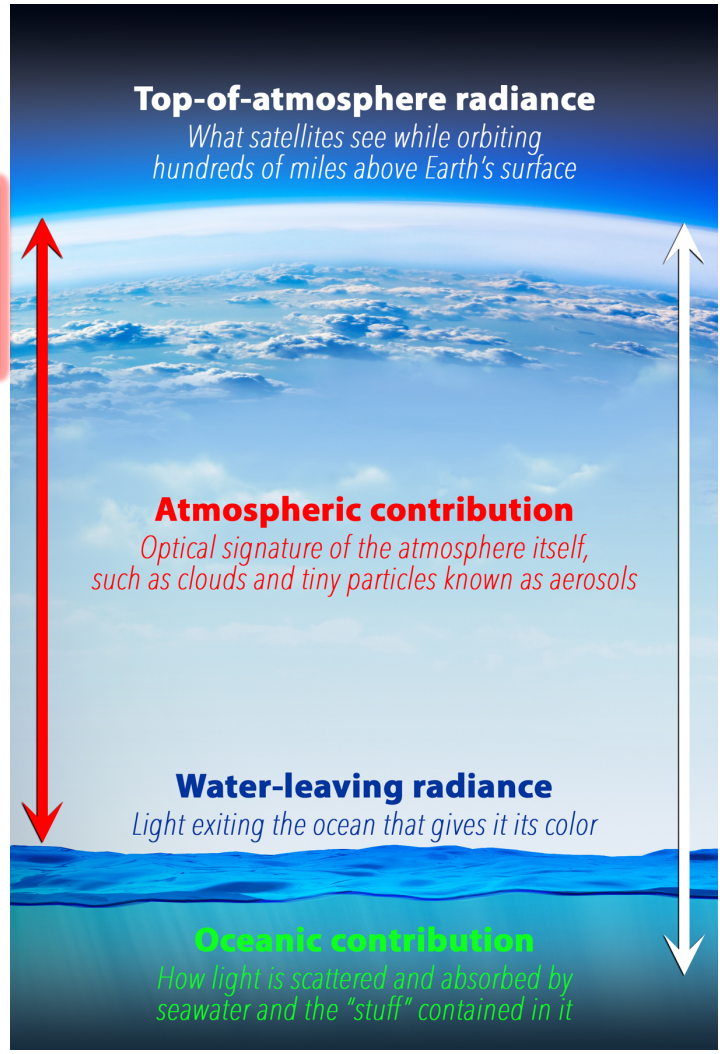
Image Credits:

- https://www.edmundoptics.eu/knowledge-center/application-notes/imaging/hyperspectral-and-multispectral-imaging/
- https://pace.oceansciences.org/about.htm

CASE STUDY: OCEAN COLOR REMOTE SENSING

LOW SIGNAL, ATMOSPHERIC INTERFERENCE, COMPLEX TARGET

< 10% of ocean signal



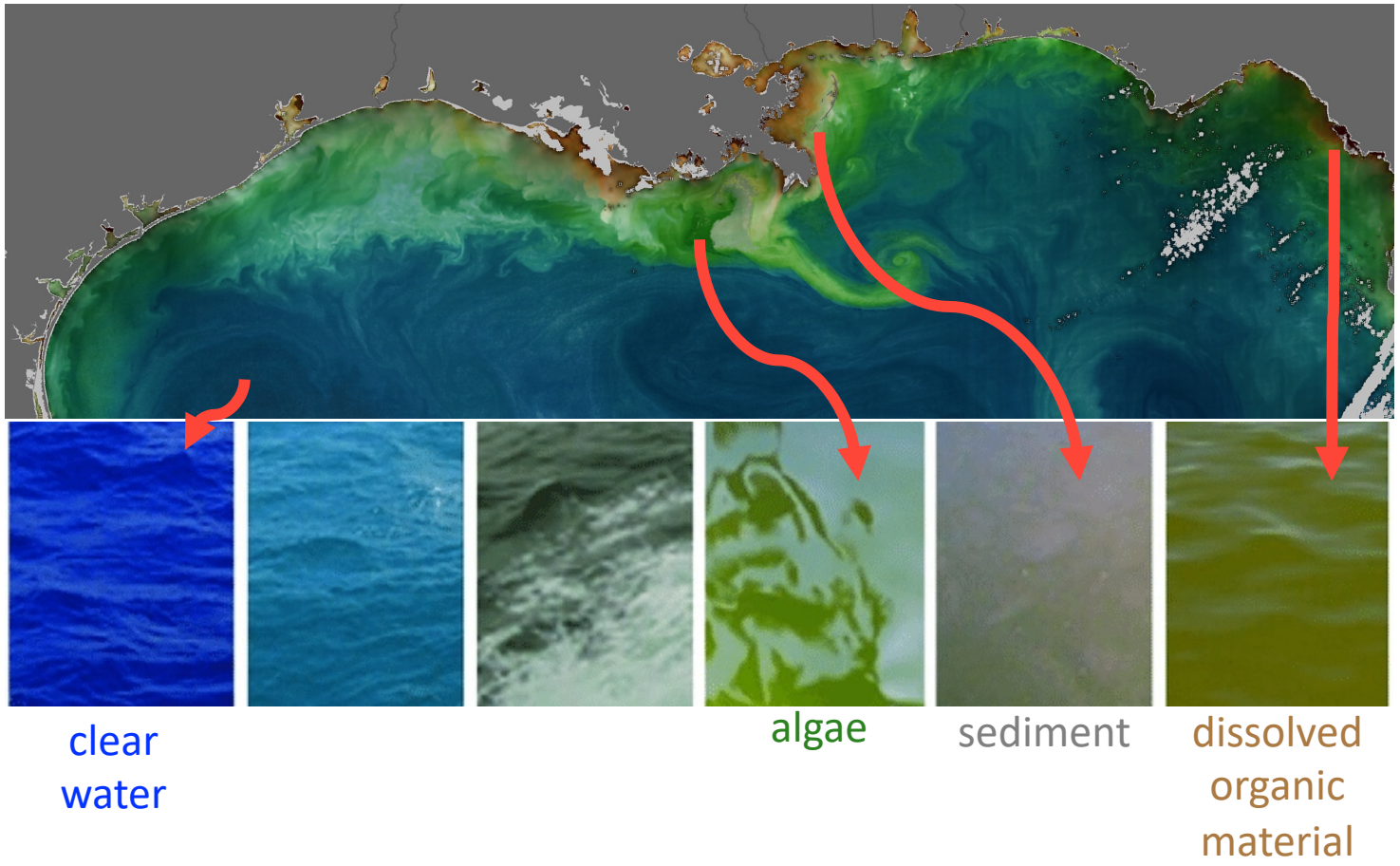


Image Credits:

- https://pace.oceansciences.org/science.htm
- https://svs.gsfc.nasa.gov/30783
- https://link.springer.com/chapter/10.1007/978-3-319-93284-2_4