

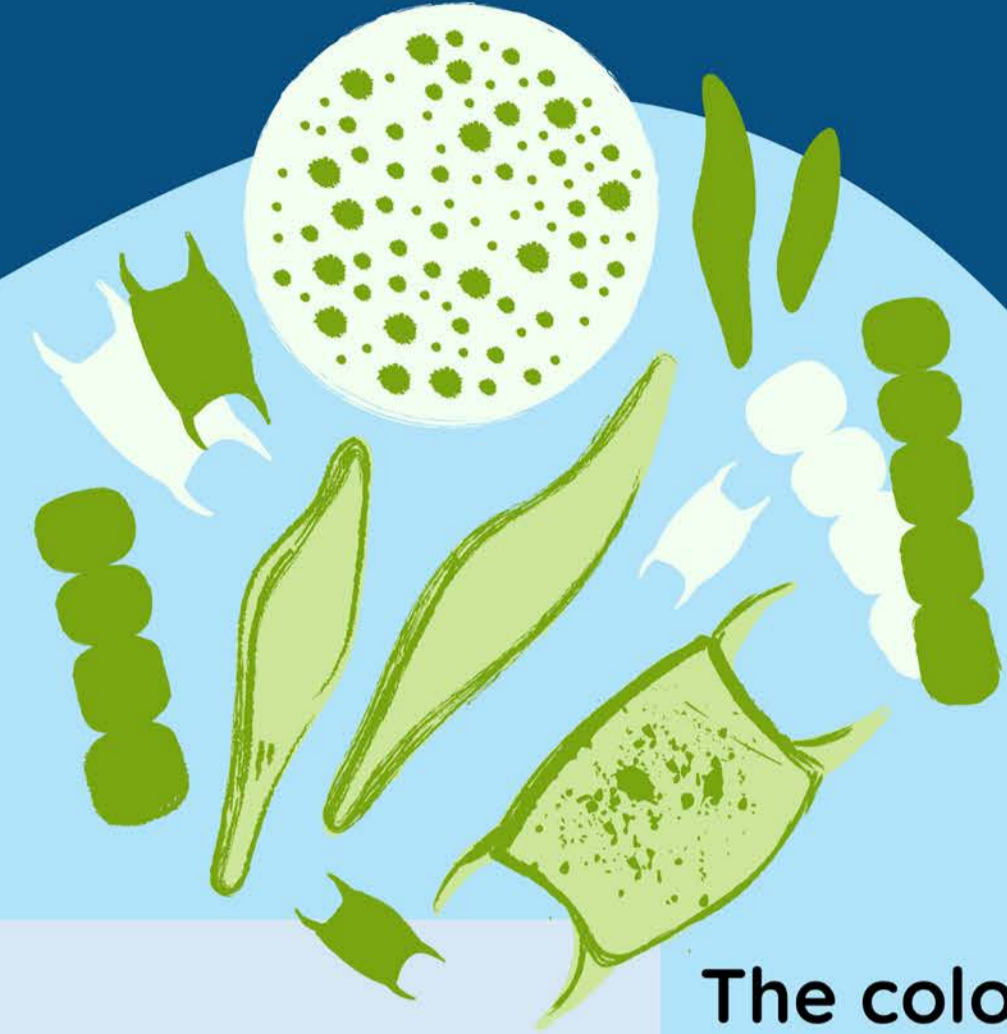
USING OCEAN COLOUR SATELLITE DATA TO ASSESS CLIMATE CHANGE IMPACTS IN COASTAL AND INLAND WATERS

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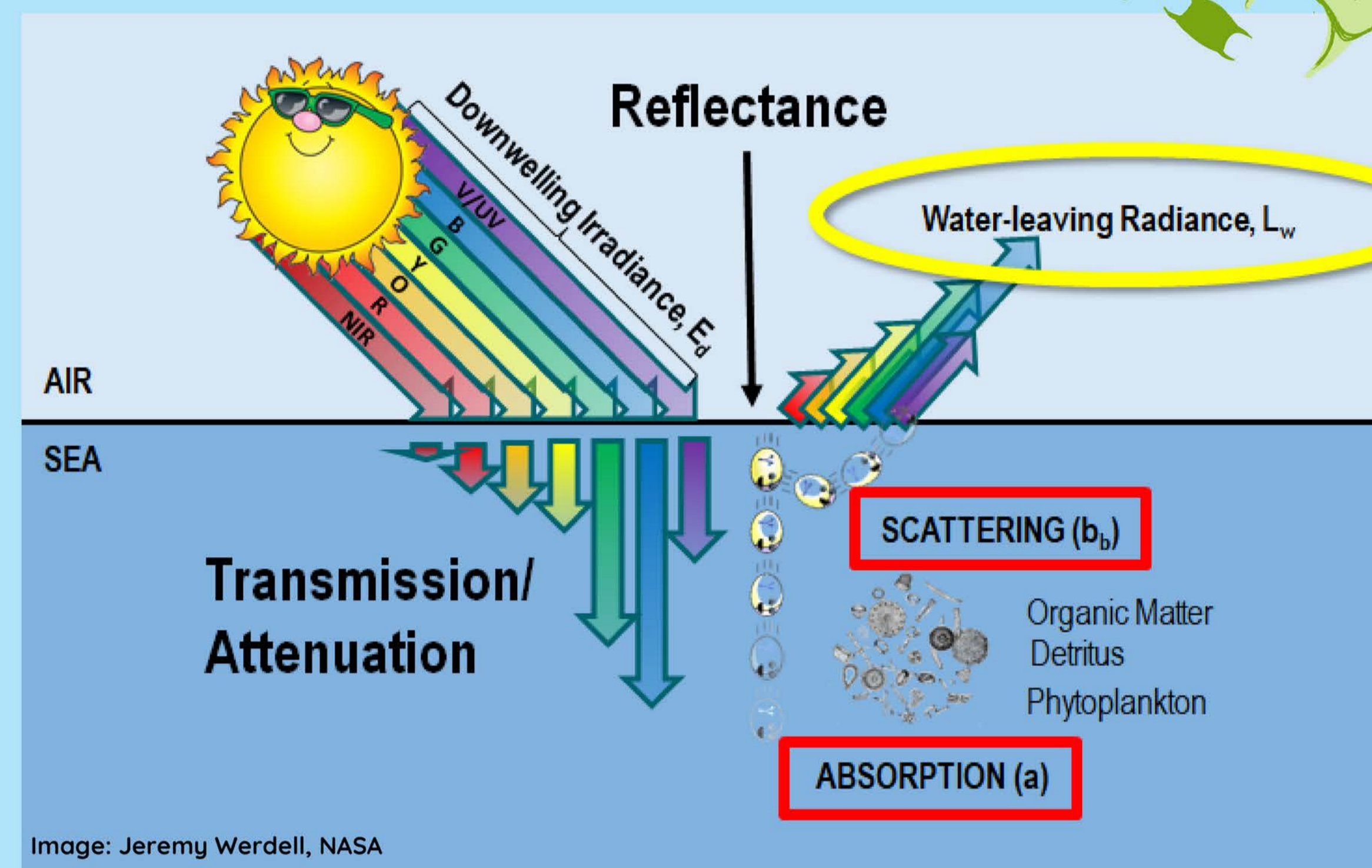
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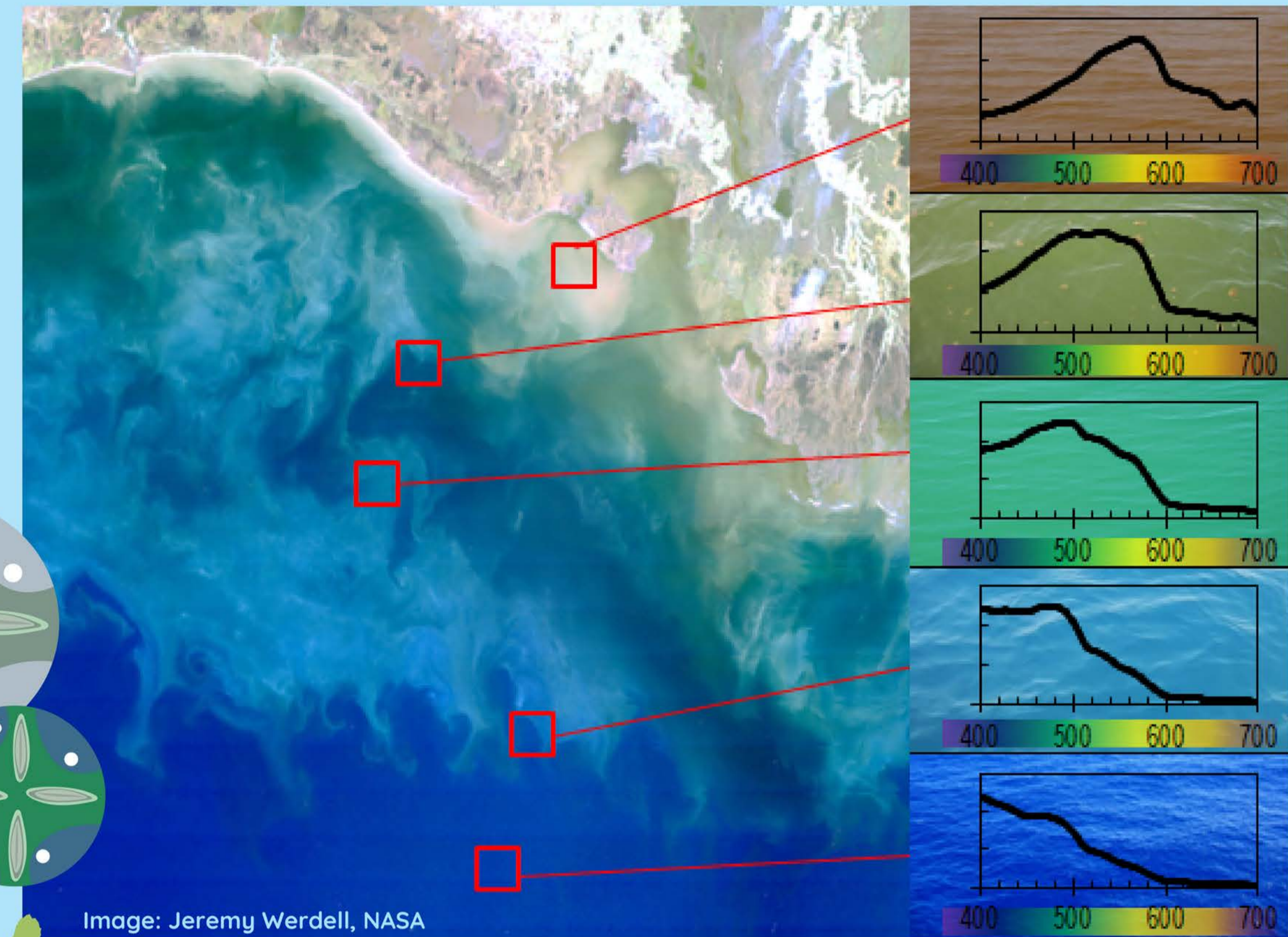
OCEAN COLOUR SCIENCE



The colour of the ocean varies with how water and its constituents absorb and scatter photons of different wavelengths. Ocean colour remote sensing from space can be used to understand the composition of water bodies on local to global scales.

Typical constituents include:

- Phytoplankton and pigments
- Dissolved organic matter
- Detritus (faecal pellets, dead cells)
- Inorganic particles (sediment)
- Water absorption and scatter



PHD RESEARCH

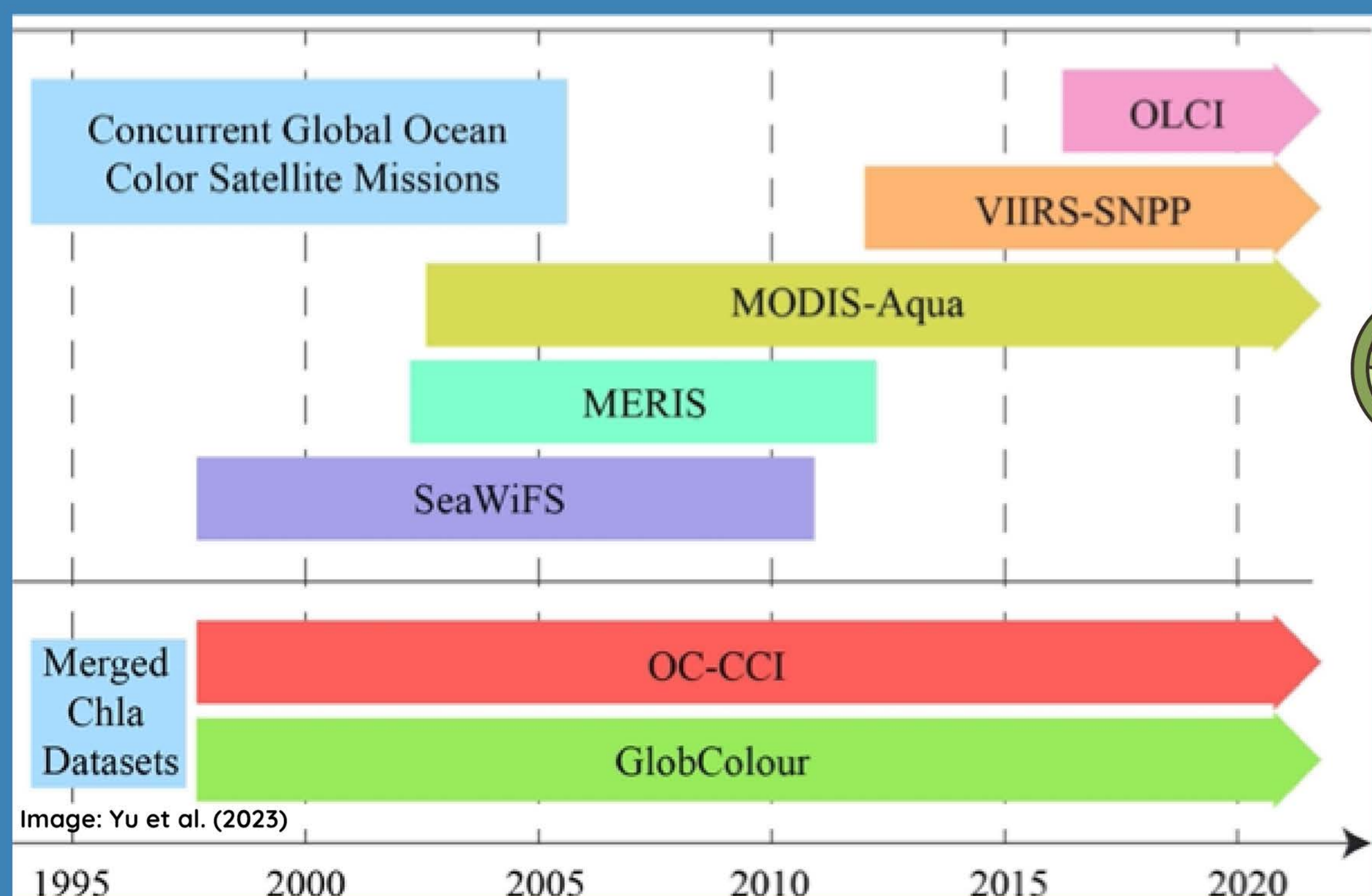
Research objectives: To evaluate long term trends in ocean colour since 1998 in the Baltic proper, the Bothnian Sea and Lake Vänern



1 Validation of the Remote Sensing Reflectance (R_{rs}) derived from various Atmospheric correction schemes will be evaluated using in situ R_{rs} data.

2 Algorithms to derived optically active constituents such as Chlorophyll-*a*, Colour Dissolved Organic Material and Total Suspended Matter will be applied to R_{rs} data. The best performing algorithm will be determined using in situ data.

3 To assess the long-term changes in water quality using ocean colour data, a long time series is required. Since satellites have a limited lifespan, merging of various sensors is needed to acquire a continuous time series. The regional algorithms will be applied to merged R_{rs} to evaluate long-term changes in optically active constituents.



SATELLITE SENSORS



Satellite sensors are used to measure the radiance of light at different wavelengths. This research will focus on the use of OLCI, Sentinel-3.

Satellite measurements in the Baltic Sea are challenging as a result of the high concentrations of Colour Dissolved Organic Material and turbidity. Standard algorithms provided by NASA and ESA still tend to fail within these optically complex water bodies, highlighting the need for development of suitable regional algorithms.

The results of the study would be to identify the algorithms best suited to conditions in this region, which can be applied to satellite data to do a long-term assessment of water quality, providing crucial information on the ecological status of water bodies and the effects of climate change.

