The major factor governing light penetration in the ocean is Colored Dissolved Organic Matter (CDOM), a ubiquitous pool of organic material that remains mostly uncharacterized. Spectral properties of CDOM are source dependent and can be used as a proxy for chemical structure. Hyperspectral fluorescence and absorbance techniques can be used to discriminate sources and to examine temporal and spatial changes in the underwater light field.

In the optically blue waters of the Northwest Australian Shelf, which lacks riverine influences, marine processes control CDOM dynamics year round. These same marine processes become more important in riverine driven coastal systems during the dry season, in drought years, and with increasing distance offshore throughout the year. Autotrophic production in shallow coastal bays and sediments, and from remineralization in deep waters are all sources of CDOM. Major sinks are photochemical bleaching and mixing with low CDOM water masses. In this paper, we will compare and contrast CDOM dynamics in these two very different coastal systems and examine the usefulness of various optical parameters for modeling CDOM and DOC concentration and composition.

Comparison of several CDOM optical parameters vs DOC concentrations for samples collected on the West Florida Shelf and NW Australia Shelf. Although the shelves are quite different environments, a robust relationship can be established.

Fluorescence Efficiencies (F/Qe)
- WFS and NW Australia shelf waters show a strong relationship between fluorescence and $a(280)$, where highest values were found for inshore surface waters and 100-200m deep offshore waters
- Slope of the fluorescence efficiency at $a(280)$ was similar for both the WFS and NW Australia, ranging between 2.5 and 4.0
- Indicates that photobleaching equally effects both fluorescence and absorbance at this wavelength

Optical indicator of DOC
- The optical parameter that best correlates with DOC concentration on the WFS is the absorption coefficient at 250 nm ($a_{250}$), not fluorescence
- Absorption coefficients at longer wavelengths have an increasingly poor correlation

Findings
- Although geographically different, shelf waters on a river dominated (WFS) and a non-river dominated (NW Australia Shelf) margin were found to be spectrally similar
- CDOM fluorescence is a very strong proxy of absorption across the spectrum in all seasons and regions of the WFS and for the NW Australia Shelf
- $a_{250}$ was found to be an optical indicator of DOC on the WFS regardless of season and salinity