Symbiont Biodiversity and Morphology Influences on Coral Reflectance

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NASA
Biodiversity
How does this variability influence the uncertainties in remote sensing of corals?

- 3D radiative transfer modeling

**Canopy structure leads to variation in reflectance at a fixed LAI**

Hedley et al. 2017, Frontiers in Marine Sciences
Hedlet et al. 2015, Remote Sensing Environment
Opportunistic Symbiotic Dinoflagellates


No specific reflectance signature to differentiate type of symbiont

Field Experiments Feb 2017
• Big Island of Hawaii, High winds, big waves
• Collection permit

In situ optics too imprecise due to current surges and surface waves
Specimen collections

Porites compressa, finger coral
Our “Lab”

1) Hyperspectral Imagery
2) Morphology
3) Fluorescence
4) Sample for DNA and pigment analyses
Hyperspectral Imager (Surface Optics) - image corals freshly out of water

-Broom with spoon used to estimate diffuse and direct component of sunlight

Coral 008 – *Porites evermanni*
Coral 008 – Imagery with spoon

Symbiont identification and concentrations completed
Next set of slides

3D structure of corals input into 3D radiative transfer model

Results are being prepared for publication and show that shading reduces the benthic reflectance according to sun angle.

A correction factor is developed.
THANK YOU FOR YOUR TIME!
Stay tuned as the results progress