Friday, October 12
Oral Session 11
11:30–12:30

11:30–11:50

IDENTIFYING THE OPTIMAL VIEW ANGLE FOR POLARIZATION BASED SKY-GLINT REMOVAL FOR DRONE-BORNE WATER QUALITY PARAMETER ESTIMATION

Spectral camera systems deployed on drone platforms can assess the substantial spatial and temporal variability in water quality parameters that occurs in complex ocean regions such as the very nearshore. Sun- and sky-glint are two of the largest sources of inaccuracy for drone-based optical water quality assessment. We present a new viewing geometry for drone-borne spectral cameras, which when combined with a polarization-based sky-glint correction technique enables higher accuracy and repeatability measurements, without assuming sky homogeneity. We ascertained the optimal view angle for this polarization-based glint correction through a study at the Martha's Vineyard Coastal Observatory in the coastal northwest Atlantic Ocean, where we deployed a hyperspectral line scan camera with an integrated polarizer for a two-month period in spring 2018. The instrument was positioned with a water viewing geometry of 135 degrees from the solar plane at noon in early March, with the spatial dimension observing from 36 degrees to 54 degrees from nadir. A concurrently deployed in situ chlorophyll fluorometer provided a parallel reference dataset of in water chlorophyll concentration. The resulting multi-month dataset provided information on the optimal angles for maximizing accuracy and minimizing variance in optically predicted chlorophyll concentrations, even when accounting for pitch inaccuracies from any future uses on drone platforms. Finally, we compared the accuracy and repeatability of polarization based glint correction technique to a sky-radiance based correction technique. From this study we determine the accuracy limitations of the polarization based sky-glint correction technique for drone-borne mapping applications in a variety of environmental conditions.

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