THE NEXT FRONTIER FOR REMOTE SENSING OF FRESHWATER HABS: UTILIZING IMAGING SPECTROSCOPY DATA TO IDENTIFY CYANOBACTERIA BLOOM TYPES

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Cyanobacteria Harmful Algal Blooms (HABs) and their associated toxicity are a concern for inland waters. Due to the extensive spatial coverage and frequent data availability of satellite-based sensors, multi-spectral remote sensing tools have demonstrated utility for monitoring, understanding, and managing these blooms. The next frontier is utilizing high spectral resolution imaging spectroscopy data, such as from NASA's upcoming PACE, GLIMR, and SBG missions planned for this decade, which allow for the development of more sophisticated cyanobacteria detection algorithms. We evaluate the performance of cyanobacteria genera differentiation algorithms using precursor datasets in support of these upcoming hyperspectral missions. *In situ* measurements of lake optical, biological, chemical, and physical properties are used to characterize cyanobacteria blooms in hypereutrophic Clear Lake, CA, USA, which supports large, diverse algal and cyanobacteria populations. Data collection occurred during 12 field events in 2021-2022 across all seasons. Three field events were conducted concurrently with hyperspectral data acquisitions from the DESIS sensor on the International Space Station. The results of this study will support the development of future tools utilizing satellite-based imaging spectroscopy data to identify the cyanobacteria genera present in a bloom, and thus the potential for cyanotoxin production. This outcome – the ability to quickly characterize a cyanobacteria bloom at a low cost – will have enormous benefits for public health.

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