ASLO 2024 Meeting

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*Adapting to a Changing World*

**Title**, must be in all caps and must not exceed 160 characters:

Quantifying Error Introduced by Spatiotemporal Mismatches in Satellite and *In-Situ* Data Acquisition for Ocean Color Algorithm Development.

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**Abstract**, maximum character count of 1600 including spaces:

*In-situ* measurements of optically active indicators of water quality are used to develop and validate spatiotemporally robust and cost-effective satellite remote sensing algorithms. Outputs from water quality algorithms routinely inform policymaker decisions that impact environmental well-being, and, consequently, human health and economic stability. Therefore, understanding sources of error in these algorithms and communicating them to managers is crucial for their proper interpretation. Currently, algorithm error is largely attributed to the assumptions inherent in the algorithms themselves. However, the error introduced by temporal mismatch between field and satellite data acquisition is often cited but poorly constrained. In the time between field and satellite data collection, the *in-situ* surface water parcel that represented the optical conditions of a location at time of sample collection could have traveled outside the bounds of the associated satellite pixel. Here, we assess the possible contributions of this spatiotemporal error by modeling the movement of a surface water parcel over six hours under a variety of wind speeds and directions. We compare the distance and direction traveled to the pixel size of Planet, Sentinel 2, and Sentinel 3 imagery, generating an error estimate for high to coarse resolution imagery under a range of potential sampling conditions. The results of this simulation will clarify a source of disconnect between *in-situ* and algorithm-derived measurements of water quality, improving stakeholder understanding, communication, and engagement.