of packaging (and/or size) parameter in both experiments, and (2) the ratio of the beam-attenuation of ac-9 to that of the LISST, indicative of proportional increase in particles larger than 20 μm, due to the different acceptance angles of the two instruments. For aggregating particles, we did not find in our lab experiment that the information from spectral measurements of the VSF in the back direction provided as clear a picture of changes in particle size as that of spectral particulate beam-attenuation. More work is needed to understand the spectral shape of backscattering for natural particles.

In all but the simplest environments, attempting to understand how particle dynamic processes such as settling and aggregation affect observed optical properties is difficult, as examining hypotheses is muddied due to the presence of other ongoing processes, such as advection or local resuspension. The results presented here reinforce the use of *in situ* manipulation and idealized lab experiments where processes can be studied in isolation, as frameworks to help interpret field observations. Indeed, while we think these experiments are useful in isolating the effects of individual processes on optical properties, it is important to recognize their limitations as well. In this work, our measurements have focused on sediment-dominated systems, first near-bottom in an estuary, and second laboratory clays aggregated in salt. We expect that many of our results will be widely applicable, but must also acknowledge that in other cases such as large highly-absorbing phytoplankton aggregates, our understanding is incomplete and additional research is needed.

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