

Coastal observations using UAVs and radio-controlled boats

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The fate of riverine water is decided by the intensity of mixing at riverfronts, the boundary of riverine and oceanic water. In the presence of tidal currents, the location of riverfronts changes quickly, and observing its behavior from ship observations has been difficult. UAVs, thus, is a powerful tool to capture the spatial structure of riverfronts. However, determining the location of riverfronts relied on finding a visible signal such as a continuous line of bubbles at the sea surface. How water dynamical water mass properties change across these fronts remained unknown. We will introduce a new method to observe riverfronts using UAVs and radio-controlled (RC) boats. We attached temperature/salinity/chlorophyll measurement instruments and ADCP to RC-boats and measured the water mass and the flow field while UAVs were flown directly above. We were successful at obtaining water mass properties at a spatial resolution below a meter while obtaining the spatial structure of riverfronts. By obtaining both aerial and direct observations, we were also able to distinguish fronts that are not associated with a difference in density. Data suggest that our approach of using UAV and RC-boat is a promising method for observing estuaries and shallow coastal regions.

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