

Turbulence measurements for surface-layer micrometeorological studies over sea and sea-ice

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Since 1990 the air-sea interaction research group at NOAA ESRL has been pursuing and implementing turbulence observation technology in marine near-surface layers over the ocean from the Tropics to the Arctic. Our efforts have focused principally on developing a robust, ship-based system for seagoing air-sea flux observations, but a considerable effort has also gone to tower-based observations over snow or sea ice. Applications include air-sea and air-ice momentum and energy flux parameterizations, small-scale turbulence and dissipation, wind-wave coupling, air-sea/ice transfer of trace gases and the ocean as a source/sink for aerosols. We are attempting to develop systems for long-term (multi-month) deployments with little or no attendance by expert personnel. The ship-based observations require corrections for wave- and maneuver-induced motion contamination of sonic anemometer signals plus a collection of problems associated with a salt-encrusted harsh environment and flow distortion by the ship's structure. The Arctic observations face the obvious problems of extreme low temperatures, the irritating tendency for sensitive sensors to grow beards of ice crystals, and a multitude of non-canonical boundary layers. This talk will include a historical perspective, some amusing examples, and a description of recent progress.