

Use of Aircraft for Coastal and Oceanographic Research and Observations

ISHIZAKA, Joji^{1*}

¹Hydrospheric Atmospheric Research Center, Nagoya University

Aircraft should be useful to observe coastal and ocean environments, including physical, chemical and biological properties, especially under the raid, unexpected and dangerous conditions, such as typhoon or volcanic eruption, where ship operation is difficult. It is expected that there are two methods of observations from aircraft, other than seaplane, for oceanographic research; one is remote sensing and another is use of air-deployable sensors or platforms. Various remote sensing sensors are available using visible, infrared, microwave and sound waves. They have advantage to satellite-based remote sensors with high resolution and more flexible overflight, and they should be useful for coastal applications. Most of the remote sensing sensors can only obtain surface information; however LIDAR can detect vertical profiles of some parameters such as plankton distribution. Air-deployable sensors have been used for measurements of vertical profiles of temperature (AXBT; Airborne eXpendable BathyThermograph), salinity (AXCTD; Airborne eXpendable Conductivity Temperature and Depth probes), and current (AXCP; Airborne eXpendable Current Profilers). More recently, vertical profiling floats are developed and deployed for Argo project. There were attempts to deploy one of the vertical profiling floats, Electromagnetic Autonomous Profiling Explorer (EX-APEC), from airplane for typhoon observation and obtained profiles of temperature, density and currents. Autonomous profiling floats are now developing equipped with chemical, optical and biological parameters, and should be deployable from aircraft. Other various types of small autonomous underwater vehicles (AUV) are also underdevelopment and may be deployable from airplane in future. Combination studies of those physical, chemical, and biological parameters in coastal and ocean environments with atmospheric information, such as weather condition and chemical properties, are necessary to understand coupled atmospheric-ocean system.

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