

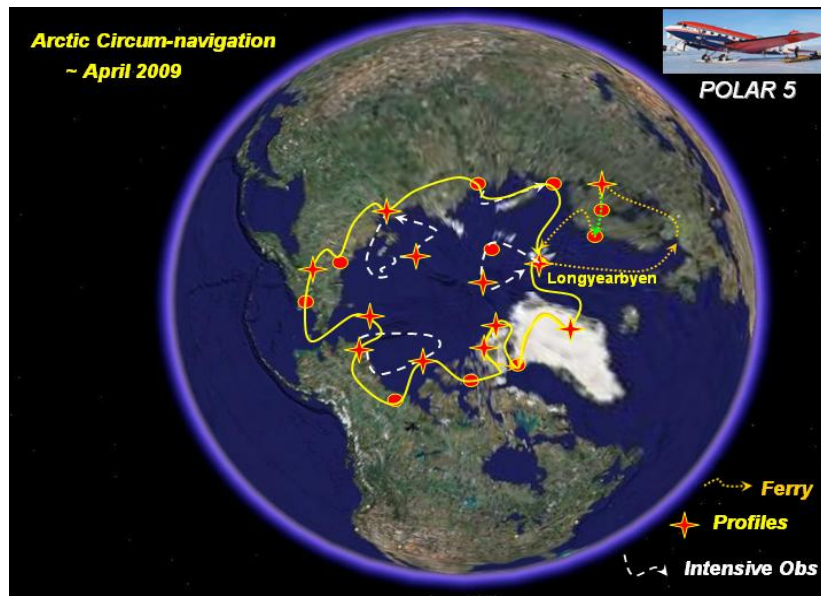
## Circum Arctic Monitoring of the Environment from Research Aircraft

R.S. Stone<sup>1</sup>, A. Herber<sup>2</sup>, and C. Sweeney<sup>1</sup>

<sup>1</sup>Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO 80309; 303-497-6056, Fax: 303-497-5590, E-mail: robert.stone@noaa.gov

<sup>2</sup>Alfred Wegener Institute, Bremerhaven, Germany

The Arctic is undergoing dramatic environmental changes as a consequence of global warming. Snow and sea ice cover have declined significantly in recent decades, resulting in a decrease in surface albedo, which has perturbed the energy balance of the earth-atmosphere system. Owing to a lack of observational data, the underlying processes that drive these interactions are not well understood and thus are inadequately parameterized in climate models. Monitoring and analyzing key geophysical processes in this remote region is a necessary step towards improving climate predictions on a global scale. While polar orbiters provide fair temporal and spatial coverage, satellite retrievals of atmospheric and surface properties require careful validation using in situ and ground-based measurements. CAMERA (Circum Arctic Monitoring of the Environment from Research Aircraft) is being proposed as a means to obtain data sets that can be used for a variety of important studies related to the Arctic climate system. Using a state-of-the-art research aircraft, the Alfred Wegener Institute (AWI) of Germany, with international partners, proposes to make circum Arctic flights to provide twice-yearly snapshots of sea ice conditions, aerosol and cloud properties and gas concentrations around the Arctic Basin. Unique, comprehensive data sets will be obtained for a myriad of investigations. NOAA ESRL has been invited to participate, specifically to monitor gases using their Programmable Flask Packages (PFP) and other devices to measure ozone, CO<sub>2</sub> and CH<sub>4</sub> continuously during these flights. In addition, NOAA will provide photometric measurements needed to characterize the horizontal and vertical properties of aerosols and evaluate their radiative impact on climate. The project will be described in terms of the primary goals of an April 2009 pilot flight, the tentative flight track (Figure 1), participating institutes, their deployments and what data sets will be obtained. The mission coincides with the culmination of the International Polar Year (IPY) and is being coordinated with ongoing ground-based and satellite observations being made at a network of Arctic observatories, several of which NOAA maintains monitoring programs. Finally, these flights will provide a test bed for developing systems that may one day be flown routinely on unmanned aircraft to monitor the Arctic environment.



**Figure 1.** The tentative track of the AWI POLAR-5 circum Arctic flight planned for April 2009.