



The Greenland flow distortion experiment

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Greenland has a major influence on the atmospheric circulation of the North Atlantic-Western Europe region, dictating the location and strength of mesoscale weather systems around the coastal seas of Greenland and directly influencing synoptic-scale weather systems both locally and downstream over Europe. High winds associated with the local weather systems can induce large air-sea fluxes of heat, moisture and momentum in a region that is critical to the overturning of the thermohaline circulation and so play a key role in controlling the coupled atmosphere-ocean climate system. The Greenland Flow Distortion (GFD) project is investigating the role of Greenland in defining the structure and the predictability of both local and downstream weather systems, through a programme of aircraft-based observation and numerical modelling. The GFD experiment centered upon an aircraft-based field campaign in February and March 2007 - at the dawn of the International Polar Year. Twelve missions were flown with the Facility for Airborne Atmospheric Measurements, based out of Keflavik, Iceland. These included the first aircraft-based observations of a reverse tip jet event; the first aircraft-based observations of barrier winds off SE Greenland; two polar mesoscale cyclones; a dramatic case of lee cyclogenesis; and several targeted observation missions into areas where additional observations were predicted to improve forecasts. In this overview of the GFD experiment the background; aims and objectives; and facilities and logistics are described. A summary of the campaign is provided, along with some of the highlights of the experiment.