Description of data

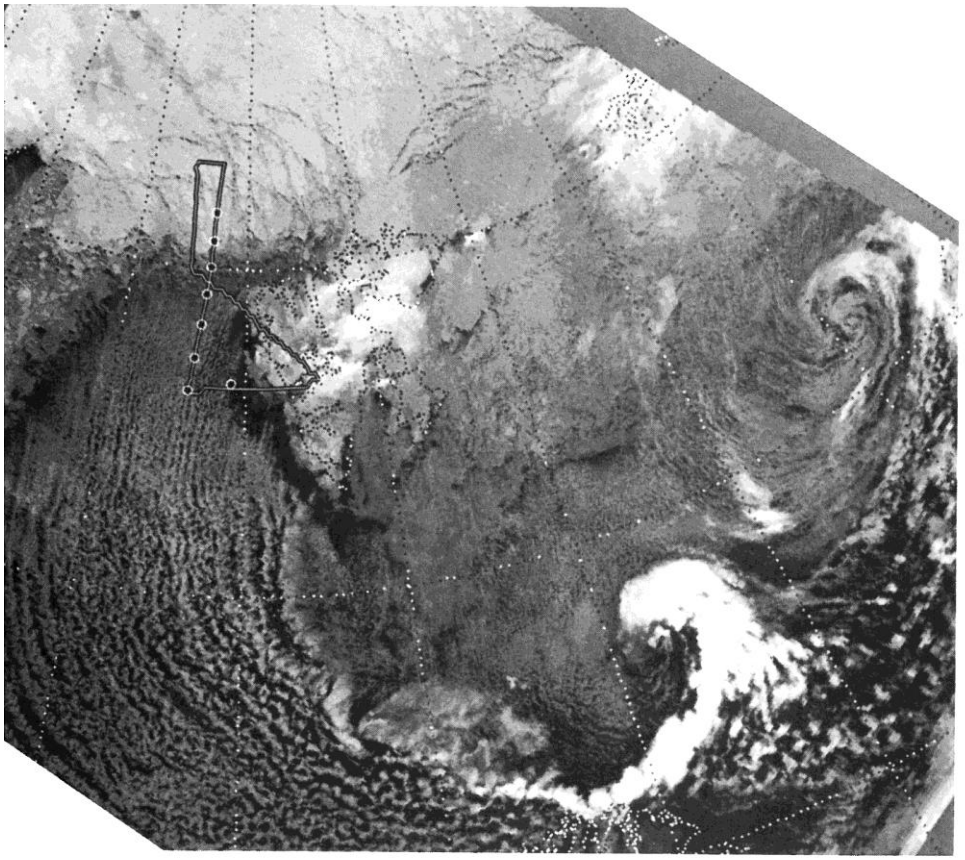

Figure 1

NOAA image of
4 March 1993
with Polar 4 flight track
and positions of
dropsonde releases.

The polar meteorology group of Alfred Wegener Institute in Bremerhaven carried out flights in cold air outbreaks over Fram Strait during the Radiation and Eddy Flux Experiment (REFLEX II, Kottmeier et al., 1994) in 1993. Sondes (Vaisala Marwin MW12c) have been dropped from the research aircraft Polar 4 on 4 March 1993 flying at 3000 m height west of Svalbard in a cold-air outbreak with strong convection over the open ocean (see Figure 1).

Since during the first few hundred meters of falling the dropsonde measurements were influenced by the aircraft's movement as well as by the temperature and humidity in the aircraft during initialization, the data are given only below about 2700 m. The first sonde (a) was released close to Svalbard. All others followed during a track from south to north roughly at longitude 7 E (exact position, see data files and Figure 1).

The sondes measured temperature, pressure, relative humidity related to water, dewpoint, and wind direction and speed. Other variables (potential temperature, specific humidity, relative humidity related to ice, and wind components) were derived.

Note that the used Omega wind finding system is not as accurate as wind finding systems based on GPS. Thus wind data should be interpreted with some caution (more details in Chechin et al., 2013).

The position of the pack ice edge (as observed visually from the aircraft and defined as the position with a sea ice concentration of about 95 %) was at 80.4 N.

Each data file contains the results of an individual dropsonde with columns for each variable and for time and position. Note that the given coordinates refer only to the position of release. One can assume that at a typical wind speed of 10 m/s the sondes drifted by roughly 3-4 km along the wind direction until they reached the surface.

Variables and units are:
time (seconds after release)
air pessure p (hPa)
air temperature T (deg C)
relative humidity rh_w (%)
dewpoint td (deg C)
wind direction dir (deg)
height (m)
component of wind towards east u (m/s)
component of wind towards north v (m/s)
specific humidity s (g/kg)
potential temperature Tpot (K)
relative humidity over ice rh_i (%)

Further information about the meteorological situation is available in Lüpkes and Schlünzen (1996) as well as Chechin et al. (2013) where the data have been used in modelling studies of cold air outbreaks.

References
Kottmeier, C., J. Hartmann, C. Wamser, A. Bochert, C. Lüpkes, D. Freese, and W. Cohrs, (1994), Radiation and Eddy Flux Experiment 1993 (REFLEX II), Reports on Polar Research, Alfred Wegener Institute, Bremerhaven, 133, 62 pp.

Lüpkes, C., and K.H. Schlünzen (1996), Modelling the arctic convective boundary-layer with different turbulence parameterizations, Boundary Layer Meteorol., 79(1), 107–130, doi:10.1007/BF00120077.

Chechin, D.G., C. Lüpkes, I.A. Repina, and V.M. Gryanik (2013), Idealized dry quasi 2-D mesoscale simulations of cold-air outbreaks over the marginal sea ice zone with fine and coarse resolution, J. Geophys. Res. Atmos., 118, 8787–8813, doi:10.1002/jgrd.50