

The dataset consists vertical profiles of atmospheric variables measured by the Vaisala DigiCORA Tethersonde System (TT12).

The instrumentation consisted of 7 m<sup>3</sup> helium filled balloon for lifting sondes, an electrical winch with 2000 m kevlar line, two sondes suspended on the tether line below the balloon at approximately 10 m vertical intervals, and a ground station.

The balloon with tethersondes was ascended and descended with a constant speed of approximately 1 m s<sup>-1</sup>. However, the balloon usually did not gain height at this speed, but depending of the wind speed it also drifted along the wind. Due to the variability of the wind speed in a vertical profile, data recording height interval was also variable. The sampling interval of the sounding system when using two sondes on a line was in average about 5-6 seconds.

**Measurement site:** Hornsund (Svalbard archipelago), at Polish Polar Station on the northern coast of Hornsund Fjord (the surrounding area represents a complex orography).

**Measurement site location:** 77.00 N 15.55 E

**Measurement site altitude:** 12 m above sea level

**Measurements date:** 7 October - 1 November 2009

Data is stored in Excel spreadsheet format where each worksheet represents one sounding profile and is marked according to the measurement date (dd.mm.yy) and ID number.

Worksheet of one sounding consists 2 vertical profiles from 2 different sondes. Vertical profile of each sonde includes both ascending and descending profile.

Data from sondes are ordered in worksheet rows as following:

SONDE\_1: first sonde on the line (closest to the surface)

SONDE\_2: second sonde on the line (higher than sonde\_1)

Columns of the worksheet contain the following variables:

**Time (UTC):** indicates the time when single measurement was recorded

<b>Press (hPa):</b>	air pressure
<b>Temp (°C):</b>	air temperature
<b>Rh (%):</b>	relative humidity
<b>Alt (m):</b>	altitude in meters
<b>Speed (mps):</b>	wind speed in $\text{m s}^{-1}$
<b>Dir (deg):</b>	wind direction in degrees
<b>P.Temp (°C):</b>	potential temperature (software computed)
<b>Dew (°C):</b>	dew point temperature (software computed)
<b>S.H. (<math>\text{g m}^{-3}</math>):</b>	specific humidity (software computed)

## NOTES

- 1) Please note that the recorded wind speed values are systematically higher during descend than ascend. Tethered balloon and sondes were drifting along the wind when ascending and pulled against the wind when descending. Therefore the measured wind speed somewhat differs from a natural value. However, when averaging of two profiles will be applied then true value should be found.
- 2) Due to the vicinity of the geomagnetic pole, the wind direction measurements were sensitive to the tilt of the magnetic compass inside of the sonde.
- 3) The use of the tether sonde system is limited by the wind. Soundings could not be performed with the wind speed more than  $15 \text{ m s}^{-1}$  at the surface level.
- 4) Soundings started from about 1 m altitude above the surface. Measured altitude in data is relative to the surface and not the absolute altitude above sea level.
- 5) Data was checked manually for errors. Some distinct obviously erroneous signals and spike values were removed from the data but no averaging over the heights and time was done.