

Review of “NYTEFOX - The NY-Ålesund Turbulence Fiber Optic eXperiment investigating the Arctic boundary layer, Svalbard” by Marie-Louise Zeller, Jannis-Michael Huss², Lena Pfister, Karl E Lapo, Daniela Littmann, Johann Schneider, Alexander Schulz, and Christoph K Thomas

Ian Brooks

This paper documents a unique set of measurements obtained using a relatively new technique for temperature and wind measurement – fibre optic distributed sensing – along with some supporting measurements using well established techniques.

The installation is well documented, as are the data processing and quality control procedures. The example data and analysis shown is convincing as to the potential utility of the fibre optic measurement system for the study of small-scale, near-surface processes in the atmospheric boundary layer, particularly under conditions, as here, where spatial and temporal variability is high, and the statistical behaviour not necessarily stationary.

The data collection period is limited (2 weeks), and the location in NyÅlesund has boundary-layer conditions strongly controlled by the local steep orography. The wider applicability of the data set for research purposes is thus perhaps limited; nevertheless it makes an excellent data set with which to gain practical experience of the fibre optic measurements, and assess its potential for other applications. This paper in particular is a valuable resource demonstrating the potential of this system.

The archived data on Zenodo is accompanied by appropriate documentation of both the installation and archived variables.

The paper is generally clear and well written, some minor editorial corrections are noted below.

Editorial comments

Line 4: ‘...transport in temperatures, wind...’ -> ‘...transport of temperature, wind...’

Line 17: ‘...role in Earth system...’ -> ‘...role in the Earth system...’

Line 23: ‘...as the rate of warming affects the Arctic more than twice as fast as global average...’ -> ‘...as the rate of warming in the Arctic is more than twice as fast as the global average...’

Line 27: define acronym AWIPEV.

Line 28: ‘Located at 79°N in the Arctic ocean it...’ -> ‘Located at 79°N it...’ – Svalbard isn’t really within the Arctic Ocean.

Line 45: ‘...high temporal (9 s) and spatial (0.127 m) scales.’ -> ‘...high temporal (9 s) and spatial (0.127 m) resolution.’

Line 55: ‘to close the observational gap between point measurements of the operational infrastructure at AWIPEV...’ -> ‘to close the observational gap between point measurements made by the operational infrastructure at AWIPEV...’

Line 63: Give the dates of the measurement campaign along with the location here – these are only given in the abstract, nowhere in the main text.

Lines 88-100: In the discussion of the installed equipment and figures 2 and 3 please provide information on all the items labelled ‘a’, ‘b’ etc on the figures. Some are documented here, but

not all...for example, what is the item labelled '(a) device' on figure 2?

It would be useful if these were also all listed briefly in the caption to figure 2 for easy reference.

Line 161: '(referred as low-resolution...' -> '(referred to as low-resolution...'

Line 253: '...temperature instationarities...' -> '...temperature heterogeneity...' or '...temperature non-stationarity...' depending on the precise meaning intended – spatial differences or changing statistical properties either spatially or temporally.

Line 259: 'The visualization proofs...' -> 'The visualization proves...'