Atmos. Meas. Tech. Discuss., 2, C998–C1000, 2009
www.atmos-meas-tech-discuss.net/2/C998/2009/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Development of an autonomous sea ice tethered buoy for the study of ocean-atmosphere-sea ice-snow pack interactions: the O-buoy" *by* T. N. Knepp et al.

Anonymous Referee #2

Received and published: 21 December 2009

In the paper "Development of an autonomous sea ice tethered buoy for the study of ocean-atmosphere-sea ice-snow pack interactions: the O-buoy", the authors describe a novel buoy designed for autonomous measurements of CO2, O3, BrO and meteorological parameters. The mechanical set-up is briefly described, power, computer and communication are discussed and the three main instruments are presented in different levels of detail.

The paper is well written and provides a lot of detailed information on the buoy and some of its instruments. This information is useful for future users of data taken with this platform which has the potential to greatly improve our understanding of ozone

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

depletion events in the polar troposphere if successfully deployed in sufficient numbers. I therefore recommend publication in AMT after consideration of my comments given below.

The paper is very technical and apart from the nice introduction does not link to the scientific goals behind the measurements. I'm not entirely convinced that such a paper should be in the peer reviewed literature as there is very little I can add as a reviewer to a list of technical details which I can't check. On the other hand such detail needs to be documented for data users and as I hope that this will be a larger project, it might make sense to put it into AMT.

My main concerns for an autonomous instrument operating in the Arctic would be

* Will the platform survive a full annual cycle?

* Will the inlets still be open in spring, will the DOAS still be able to move?

* What happens in case of temporary power loss?

* What happens in case of software problems?

* Will the accuracy and precision of the measurements still be good enough after one year of operation?

Some of these questions cannot be answered after a few months of deployment, but I'm sure that the authors have thought about them (and probably have more experience by now) and may be they can comment on this.

While the paper discusses accuracies and calibration in several places, it would be good to gather this information in one place. What is the accuracy and precision needed to address the science questions? What is the accuracy and precision estimated for the instruments deployed? What has been done to validate the measurements before, during and after the deployment? Have the instruments drifted during the deployment and how did the measurement noise change?

AMTD

2, C998–C1000, 2009

The level of detail for the three instruments is very different. While the CO2 instrument and its operation are described in depth, much less detail is given for the ozone instrument and how it has been operated. The calibration has been well described but as already pointed out by the other reviewer it is not clear what is being done during deployment of the buoy. I think the section on the ozone instrument needs to be extended or adequate references been given.

One relevant question for an autonomous system is reliability. It therefore would be interesting to see more than just a few days of data. Have the instruments been working all the time? Have all data been successfully transferred to the data centre? Can you show overview time series of ozone, CO2, and BrO to demonstrate the performance of the platform and its instruments?

In Figure 7, something is wrong with the time axis for the BrO – there are less daily cycles than I would expect. Also the label of the y-axis is duplicated. In Fig. 8, the caption is hard to read and it would be good to have the same number of axis ticks in the lower panel as in the upper one.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 2087, 2009.