Atmos. Chem. Phys. Discuss., 13, C1498–C1501, 2013
www.atmos-chem-phys-discuss.net/13/C1498/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term monitoring of persistent organic pollutants (POPs) at the Norwegian Troll station in Dronning Maud Land, Antarctica" *by* R. Kallenborn et al.

R. Kallenborn et al.

roland.kallenborn@umb.no

Received and published: 18 April 2013

Dear Editors, dear Dr. Bidleman, We very much appreciate the comments and the constructive contributions of the reviewer to our manuscript. Here our reply. Page 6229, section 10: "possible breakthrough of HCB during austral summer collection". Laboratory test during the method testing prior to the atmospheric monitoring at NILU gave no indications for saturation or even breakthrough issues on the DIGITEL PUF filters for high volume POP sampling (2000 – 2500 m3). However, unfortunately no accompanying experiments were performed in-situ at the Troll monitoring site during the here reported atmospheric POPs monitoring. Therefore, potential loss of HCB and

thus, an overestimation of the summer concentrations, cannot be completely excluded. Similar and even higher sample volumes (> 3000 m3) are collected and reported for the Canadian Arctic monitoring sites (Alert, Taggish, Little Fox Lake, etc.). For the early Taggish monitoring campaigns 30% of breakthrough is reported for HCB (Hung et al 2010), whereas Alert and other Canadian stations are not reporting breakthrough issues in the available literature (Hung et al 2010). In addition, the ambient temperatures reported for Troll are quite low, even during the summer season, rarely exceeding the 0 ° C mark in summer (figure 1). The ambient temperatures at the Antarctic Troll station are usually significantly lower compared with the Arctic stations, varying in average between -25 ° C (winter) and -8 ° C (summer), see figure 1. Thus, we consider breakthrough issues for the volatile POPs (HCB, α-HCH, mono – tri-chlorinated PCBs) as a minor issue for the Troll monitoring program. However, for safety reasons and since no supporting information is available, we added a statement in the text, that the here reported seasonal differences for HCB might be slightly overestimated due to possible breakthrough for the PUF filters during summer sampling. However, this will not change our statement, that HCB expresses a clear seasonal pattern in the Troll monitoring data in contrast to the Arctic. Page 6230, section 10, "DDT ratio": We agree with the reviewer, the p,p′-DDE/ p,p′-DDT ratio is more suitable to identify potential application of technical DDT as potential "fresh" contamination source for the measured air masses. Therefore, figure 3 was changed accordingly. The section has therefore been completely revised. The different p,p′-DDT/o,p′-DDT ratios for Dicofol versus technical DDT are mentioned now in the text. Page 6233, historical data: We agree with the reviewer, there might be more studies on atmospheric POPs as presented in the table 2. The comparability of this type of information is obviously restricted due to sampling methodology used, the geographic location as well as meteorological characterization of the respective station. The meteorology as well as potential source characterization at a sampling site at the Ross Sea will be different compared to sampling locations at the Weddell Sea or on the Antarctic Peninsula. Having this in mind, we decided to select studies were the sampling and analytical procedures were comparable (The

Signy island as well as the early Terra Nova Bay samples were sampled and analysed at NILU with similar methods as applied for the Troll long-term POP monitoring). The referencing in table 2 has been changed. Figure 1. Meteorological information for the Troll station during the monitoring period Rel. Humidity [%]

References H. Hung, R. Kallenborn, K. Breivik, S. Manø, E. Brorstrøm-Lunden, K. Olafsdottir, S. Leppanen, G. Stern, E. Sverko, P. Fellin, H. Skov (2010) Atmospheric Monitoring of Organic Pollutants in the Arctic under the Arctic Monitoring and Assessment Programme (AMAP): 1993-2006. Sci. Tot. Environ. 408: 2854-2873.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 6219, 2013.

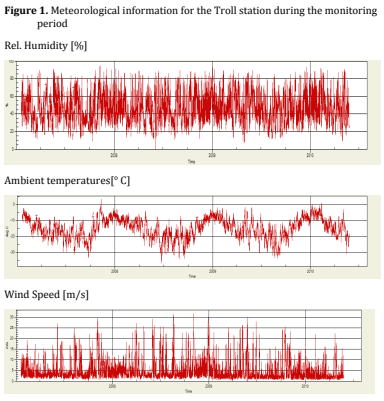

Fig. 1. Troll meteorology