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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Airborne observations of the Eyjafjalla volcano ash cloud over Europe during air space closure in April and May 2010" *by* U. Schumann et al.

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The description of the Grimm Sky-OPC is not allways correct.

The optical cell and the data processing of the Grimm Sky-OPC is identical with the Grimm aerosol spectrometer 1.109 (e.g. Heim et al. 2008). The difference is the external vacuum pump for sample air flow and the flow control by critical orifices both for sample volume flow and for rinsing air volume flow, to be independent on ambient pressure.

The Sky-OPC instrument is not a Forward Scattering Spectrometer Probe as listed in line 8 on page 22141. The Sky-OPC is a Optical Particle Counter or laser aerosol

spectrometer or Light scattering aerosol spectrometer, according to the definition of BS ISO 21501-1 "Determination of particle size distribution - Single particle light interaction methods - Light scattering aerosol spectrometer". I do not mind which definition is used, but please nothing with Forward Scattering.

Page 22141, line 6 suggestion for change: Optical Particle Counter (OPC) Grimm SKY-OPC model 1.129, Passive Cavity Aerosol Spectrometer Probe (PCASP), and Forward Scattering Spectrometer Probe (FSSP) of type PMS PCASP-100X, and PMS FSSP-300 (Weinzierl et al., 2009), see Table 1.

I also would like to mention, that the Sky-OPC detects particle in the size range 0,25μm < D < 32μm. Therefore the laser diode is operated in a so called multiplex mode. Means the laser power is switched between high power and low power. During high power operation 16 size channels from 0,25μm to 2,5μm are measured for 1 second. Then during low power operation another 16 size channels are measured from 2,5μm up to 32μm for 5 seconds. After 6 seconds the dataset for 31 channels is stored (15 channels 0,25μm to 2,0μm ONE MEAN value at 2,5μm and 15 channels 3μm to 32μm). To measure faster than 6 seconds one can switch the multplex mode off and operate the Sky-OPC in the high or low laser mode continuously with 1 Hz.

Exscecially for the vulcano aerosol the size range >2,5μm, which can be detected by the Sky-OPC is from importance. Unfortunately the DLR Falcon is not equipped with a sampling inlet for a reproduceible and correct sampling of such particle sizes. I would appreciate if the reader of the paper can be informed about this two problems: 1. the bad time resolution of the Grimm Sky-OPC for the total size range up to 32μm and 2. the not existing sampling inlet for such big particles of even particle >2μm. Last can be seen in particular in the two dN/dlog(Dp) figures left and rigth in figure 7 page 22201. In the left figure (Leipzig, 19 April) 19 size channels are plotted, 0,25<D<1,3μm looking fine and 1,6μm<D<4μm with strong effects of particle losses in the sampling inlet. In the right figure (North Atlantic 2 May) 21 size channels are plotted, 0,25<D<1,3μm looking fine and 1,6μm<D<6,5μm again with strong effects of particle losses in the

sampling inlet.

Page 22201, Figure 7 caption text: suggestion for change:

....SKY-OPC data as green triangles....

Page 22191, Table 1 suggestion for change:

31-channel Optical Particle Counter Total and non-volatile size distribution (0.25 μm< (Grimm OPC 1.129) operated with 16- D<2.5 μm) chennels in 1 Hz

Best regards

Heim Michael, Benjamin J. Mullins, Heinz Umhauer,and Gerhard Kasper: Performance evaluation of three optical particle counters with an efficient “multimodal” calibration method AerosolScience39, (2008) 1019-1031

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/10/C10065/2010/acpd-10-C10065-2010-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 22131, 2010.