Snowdrift event detection at Princess Elisabeth station

Comparison of

Ground-based and spaceborne remote sensing

Alexandra Gossart

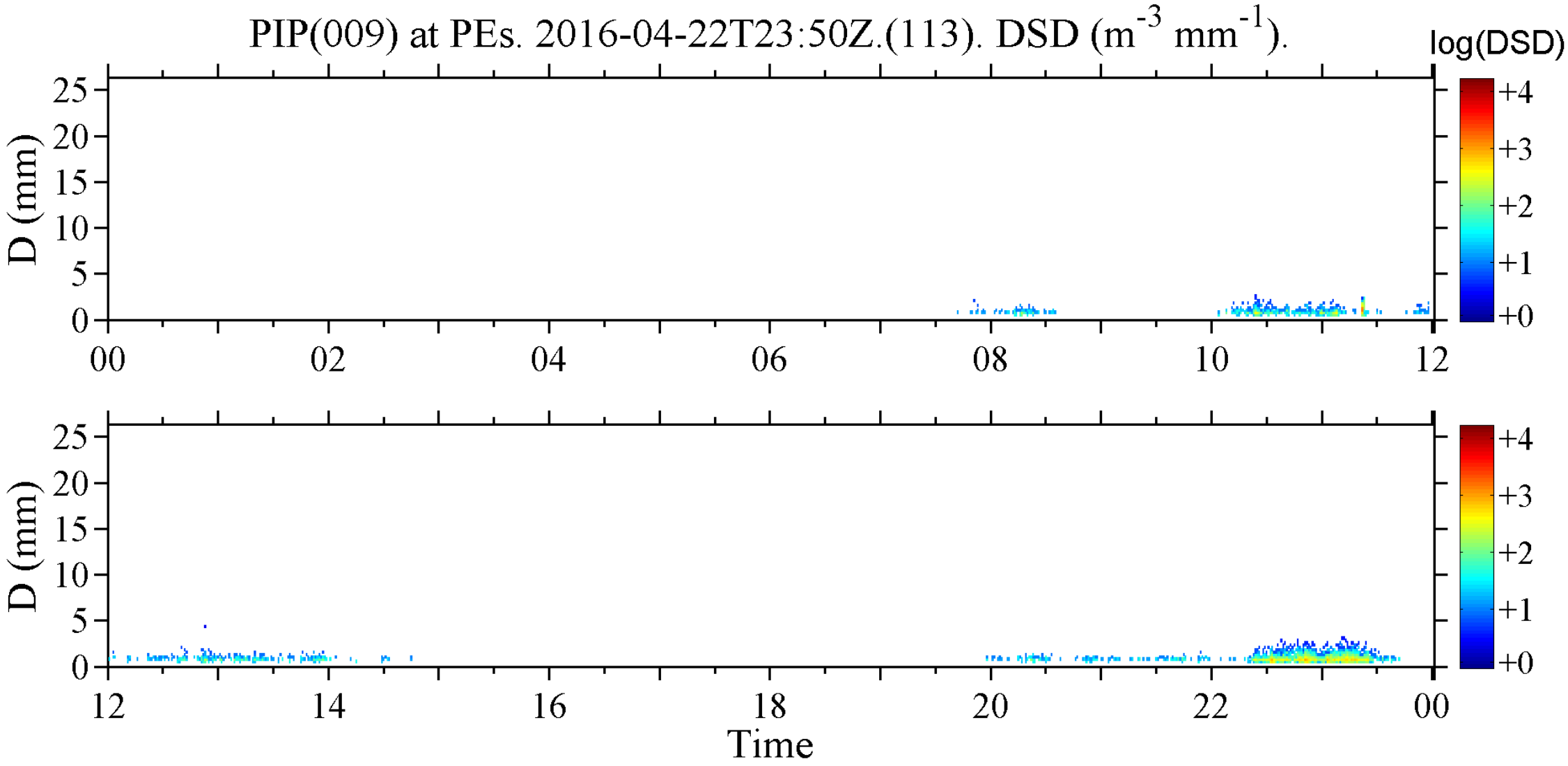

How much snow is transported?

Surface mass balance (SMB) component

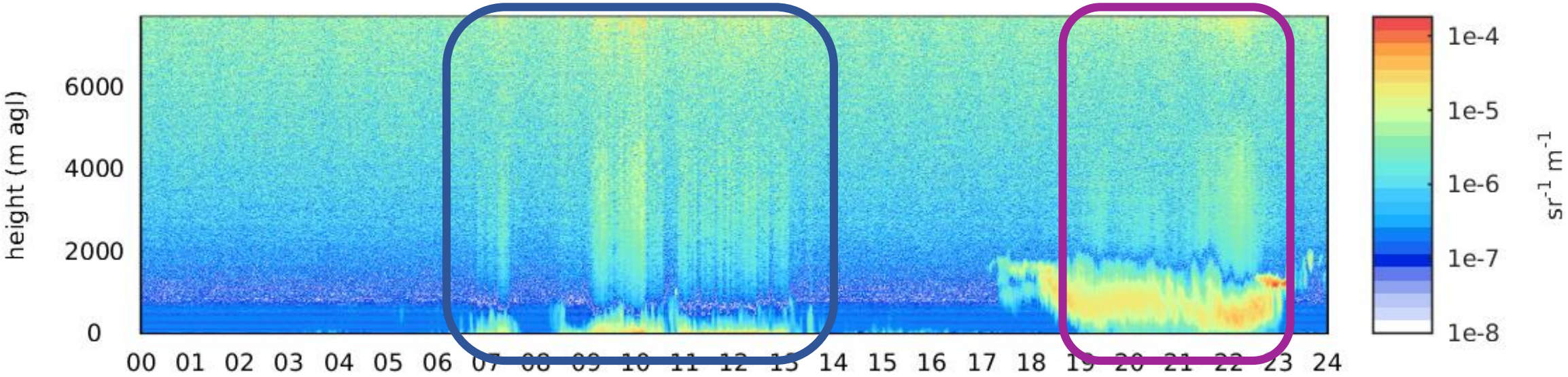
$$SMB = P_{in} + M_{out} + (S_{out} + S_{d,out}) + Er_d$$

Webcam image
22.04.2015

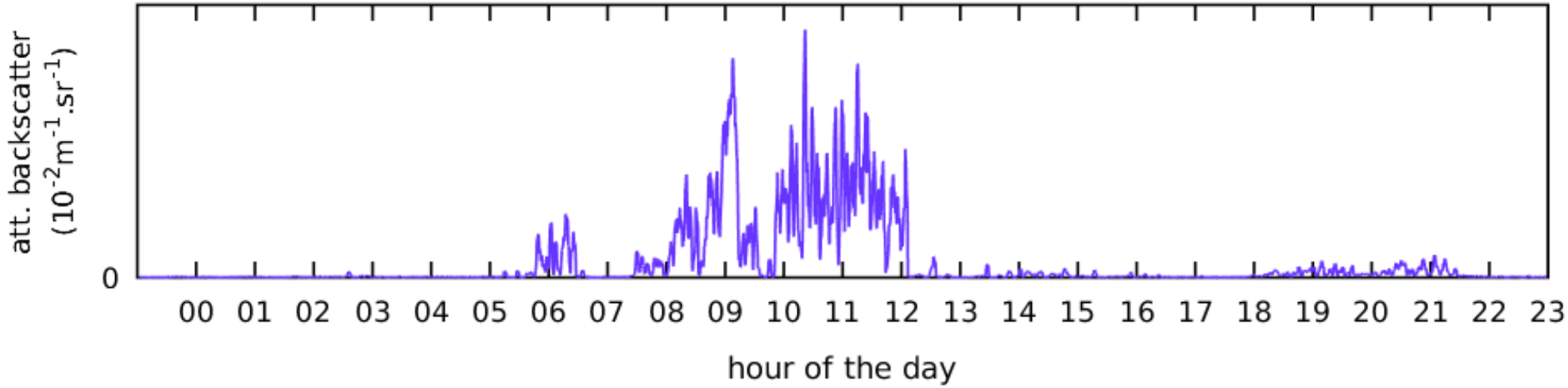
Snowflake visualisation imager

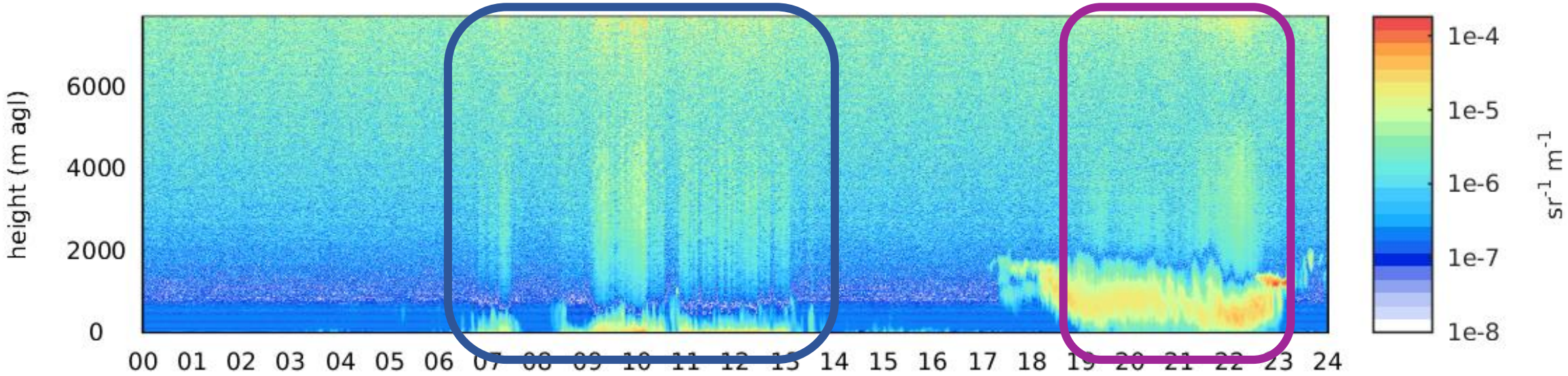


Ceilometer attenuated backscatter



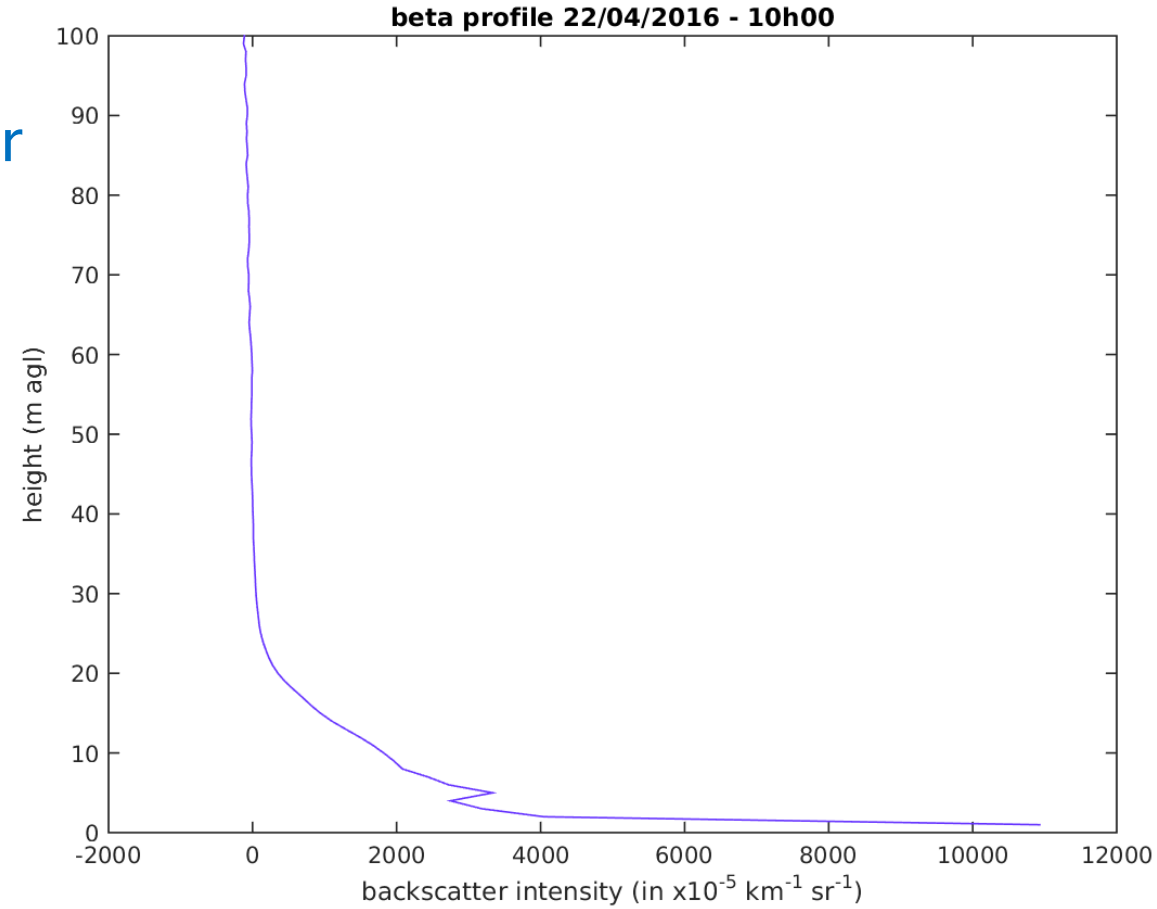
Ceilometer attenuated backscatter

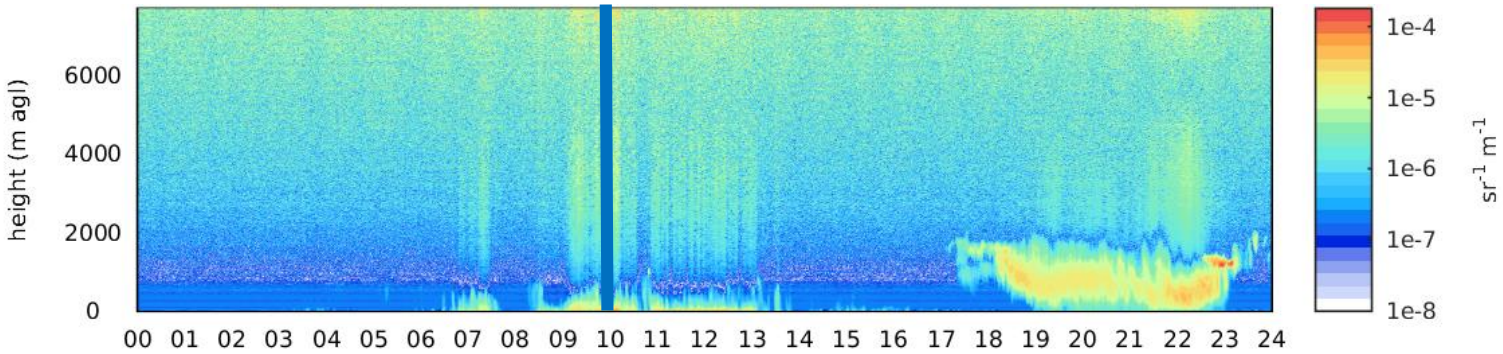




Ceilometer attenuated backscatter

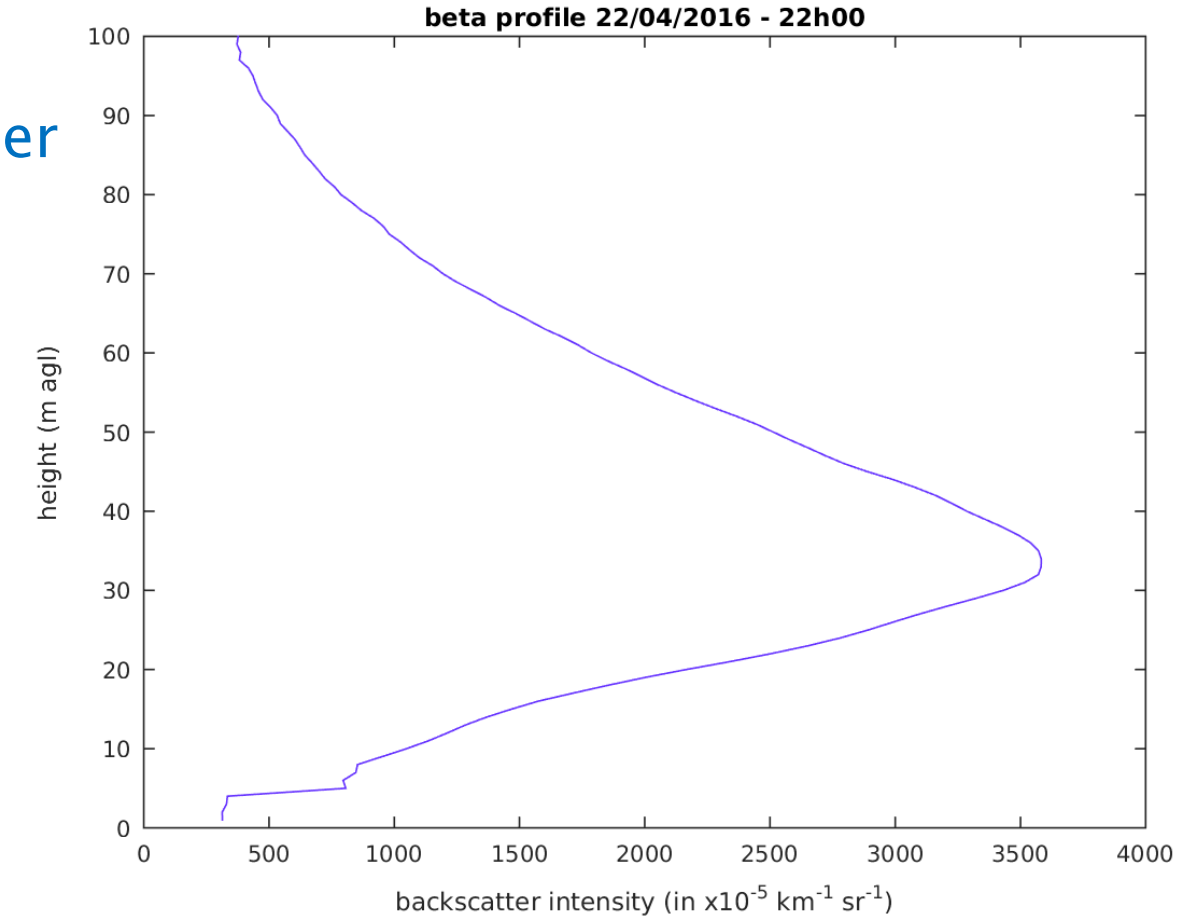
blowing snow

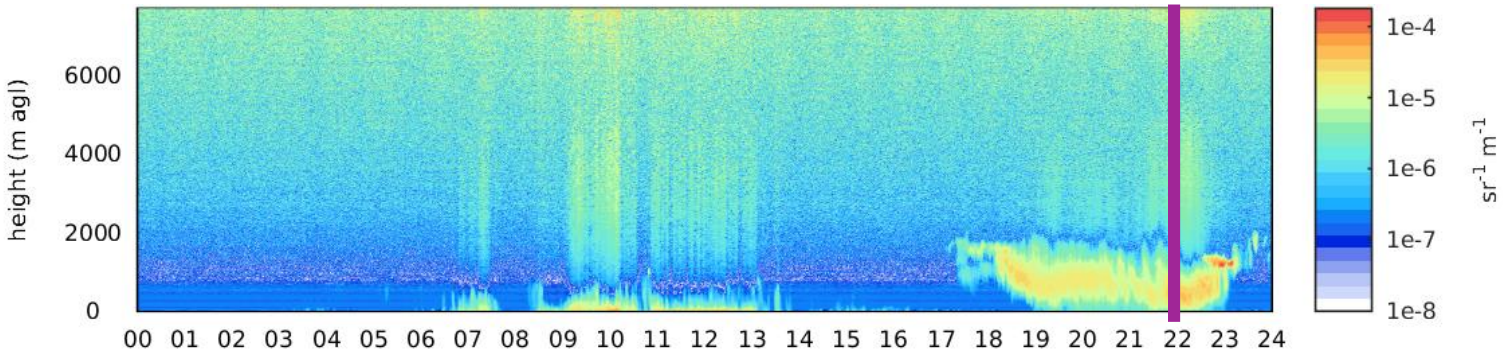




Ceilometer attenuated backscatter

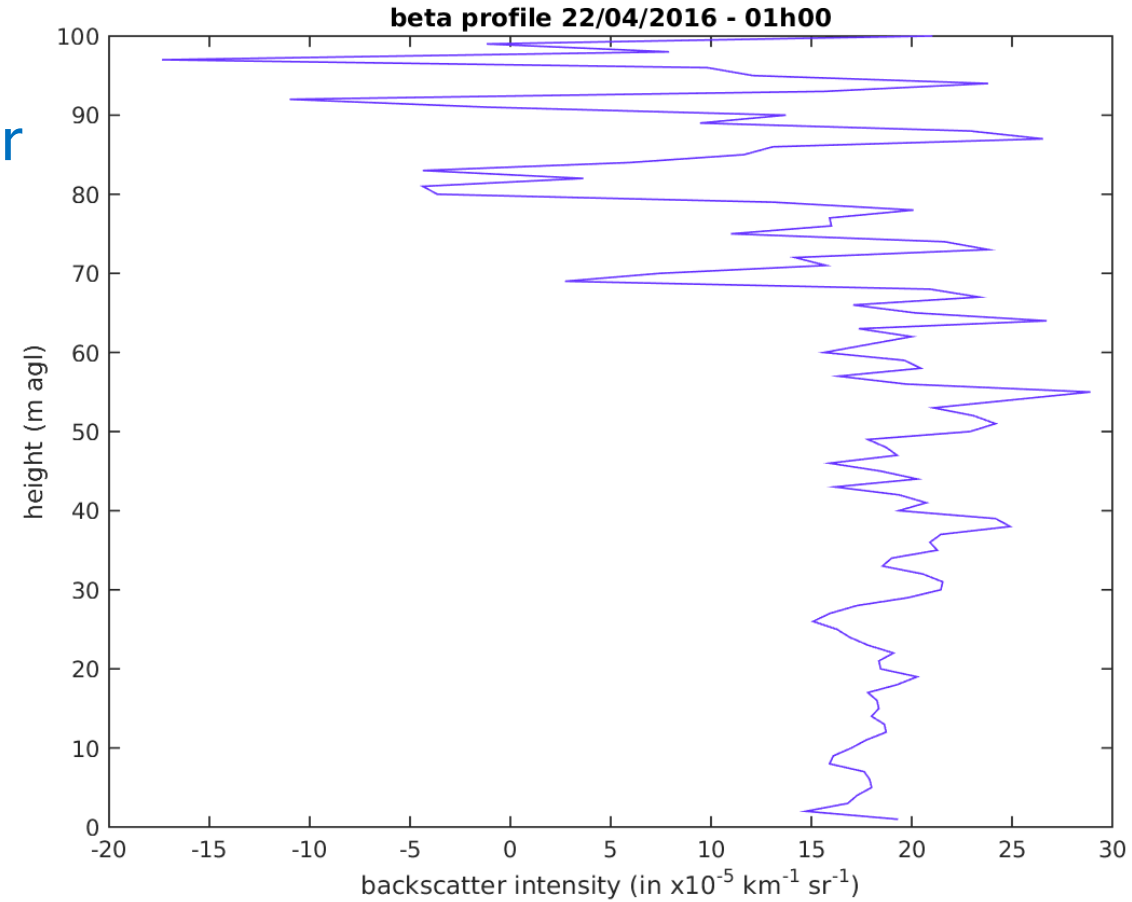
cloud

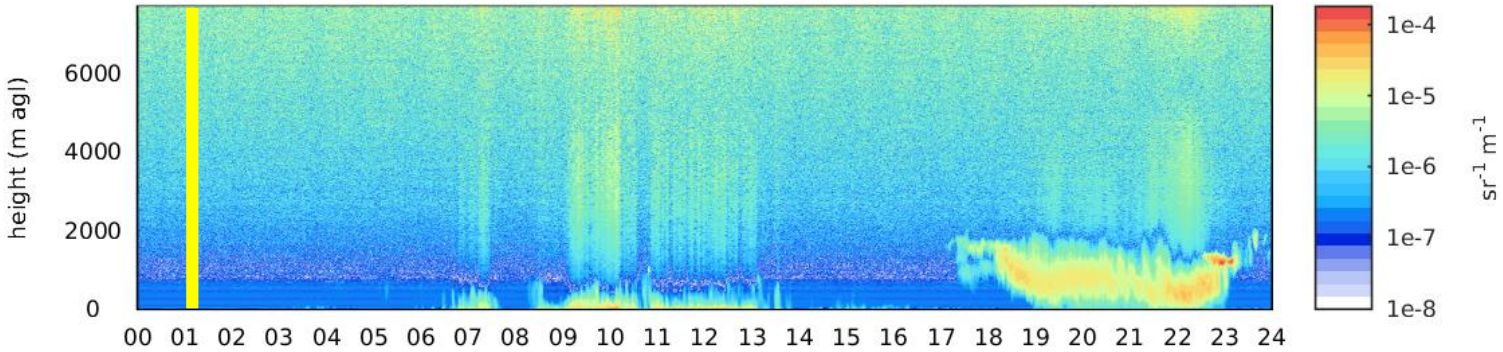




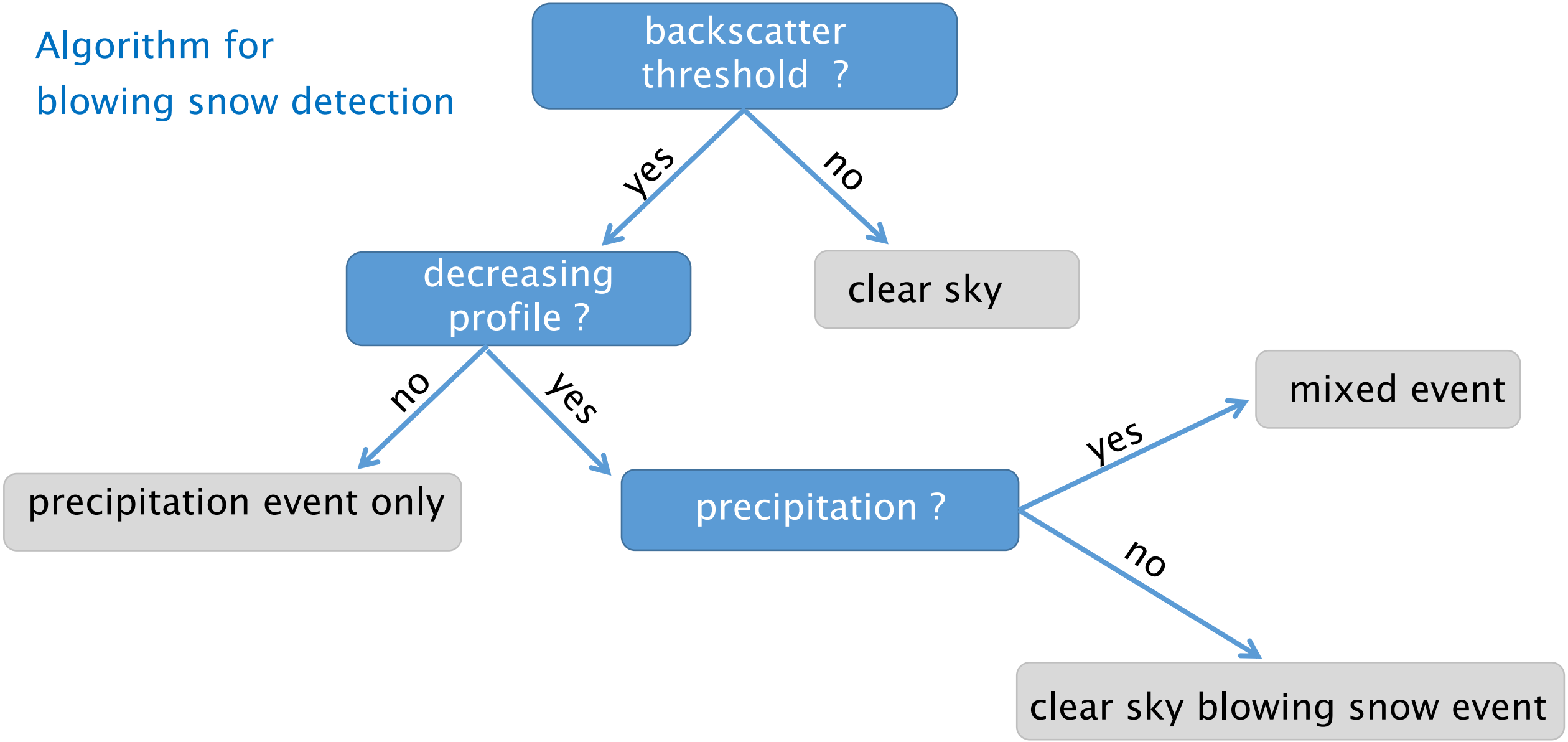
Ceilometer attenuated backscatter

clear-sky

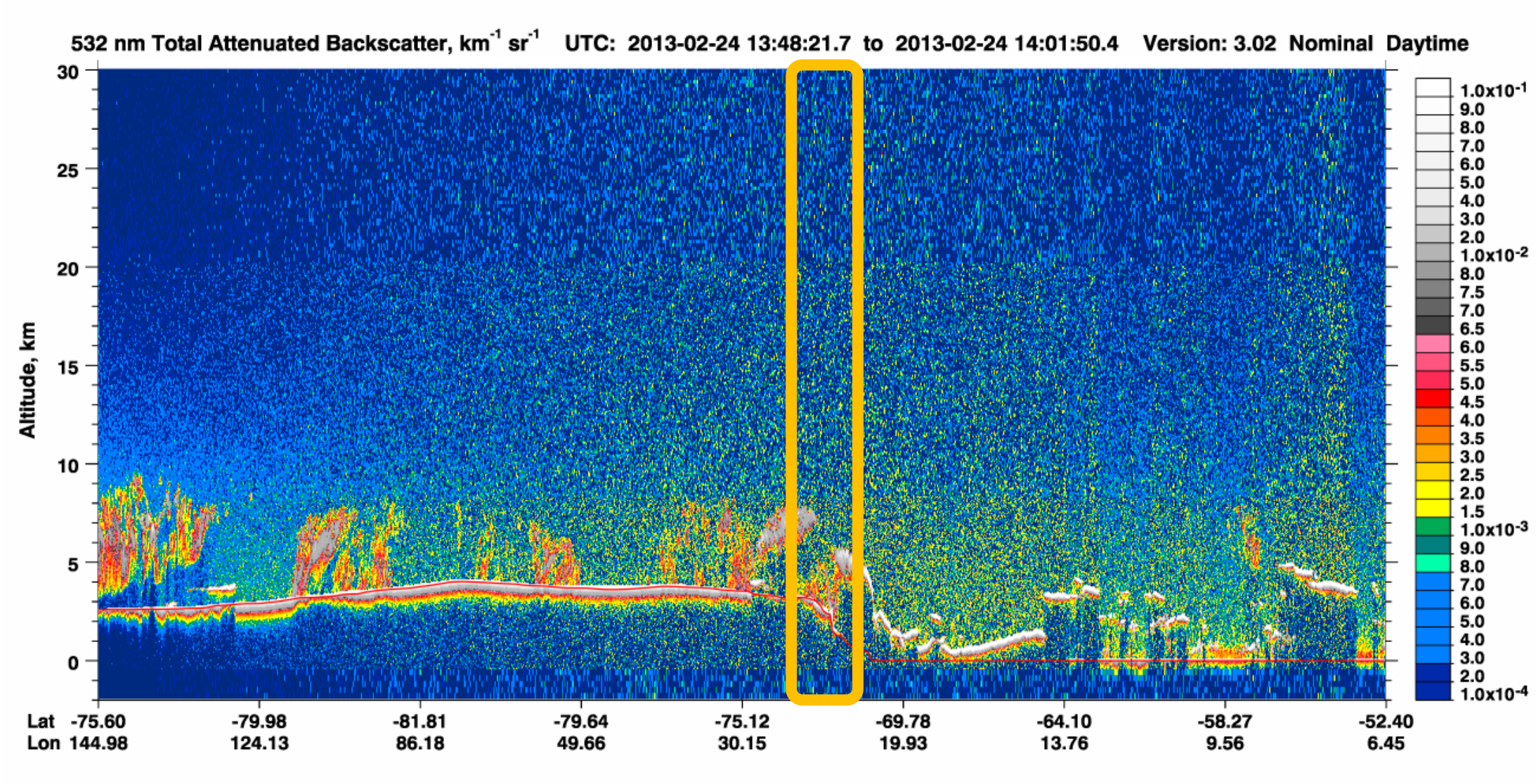




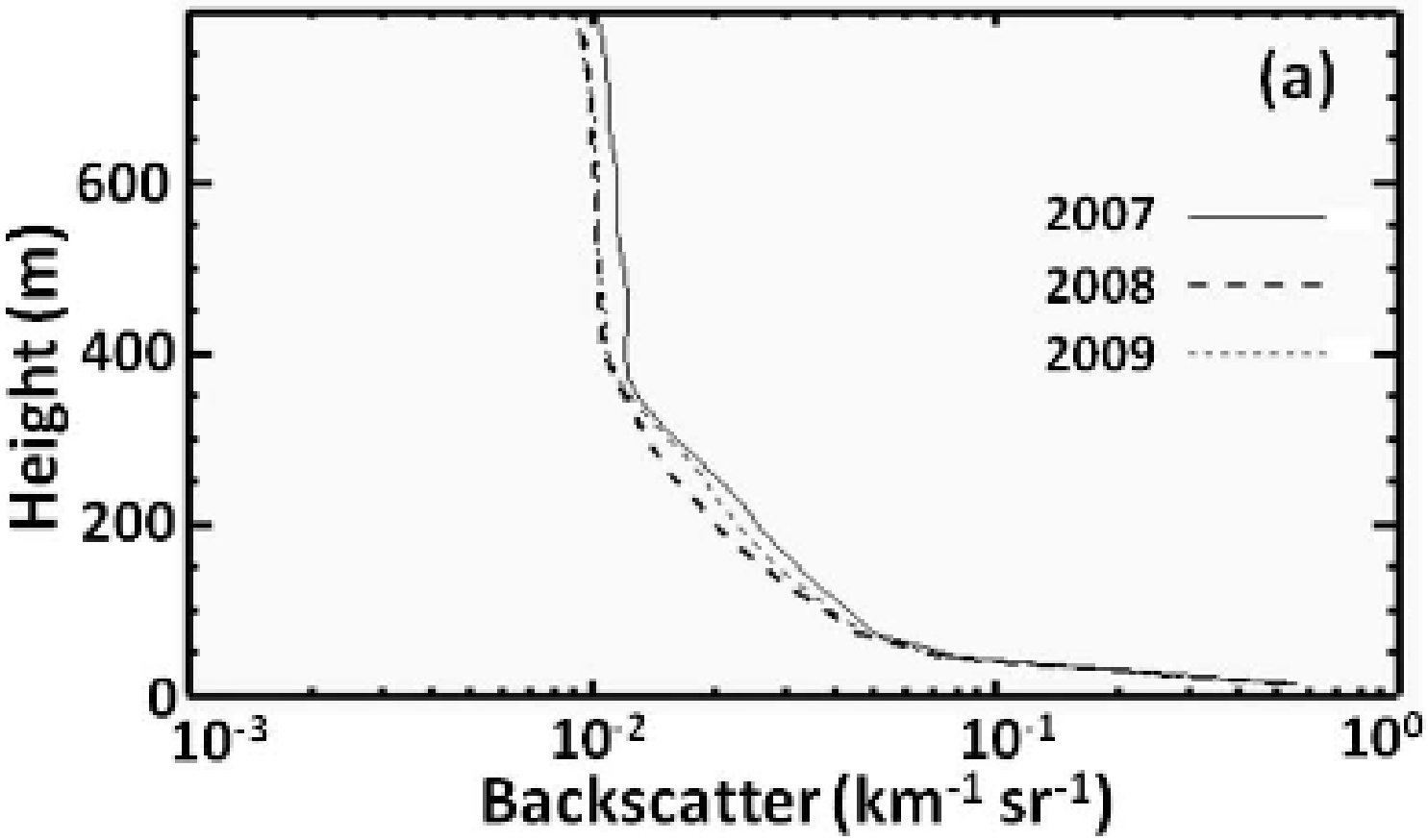
Algorithm for blowing snow detection



Palm et al (2011): routine to estimate blowing snow

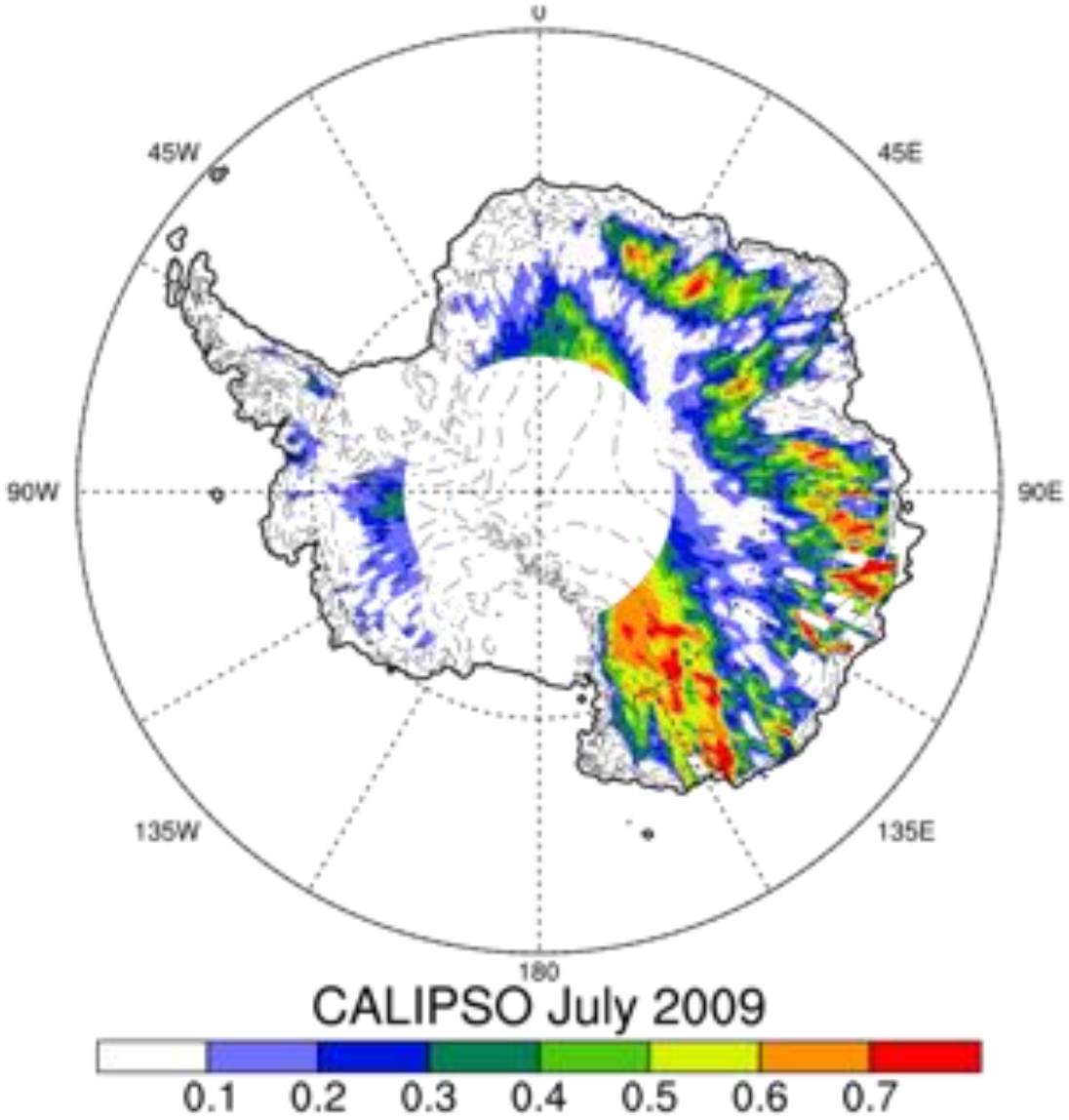


Palm et al (2011): routine to estimate blowing snow



The average (April through October) attenuated backscatter profile through all blowing snow layers detected over the megadune region for 2007,2008 and 2009 (Palm et al., 2011)

Palm et al (2011): routine to detect blowing snow



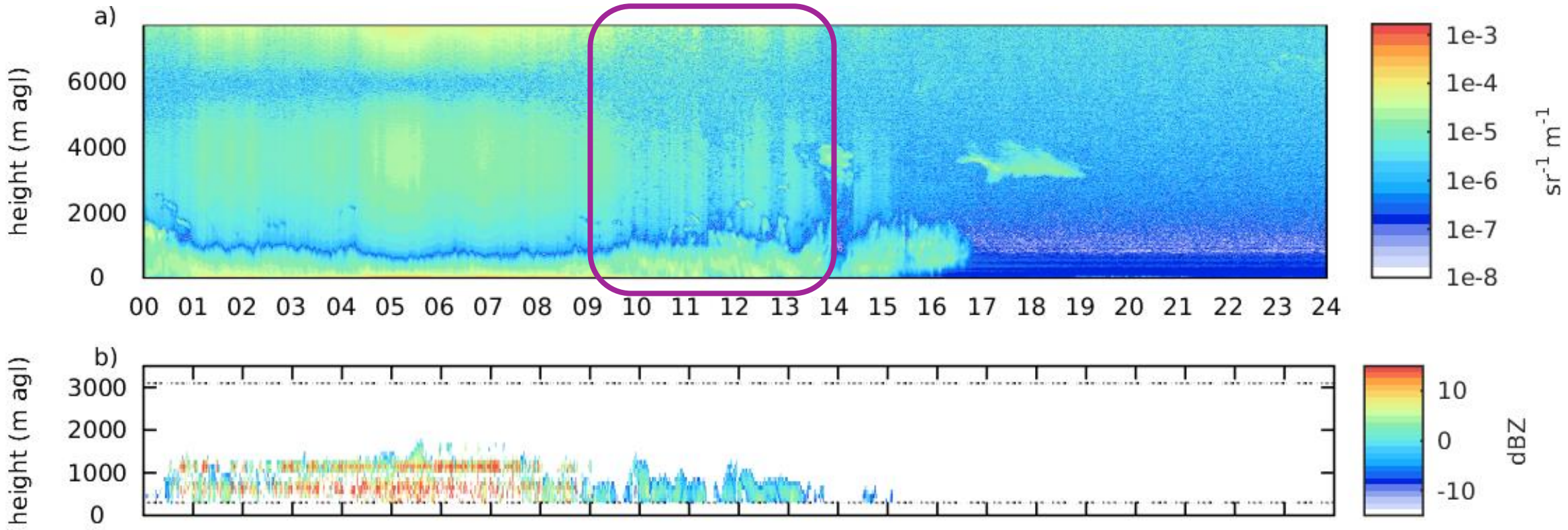
The blowing snow frequency (fraction) and spatial distribution for June 2009 as determined from analysis of CALIPSO data
(courtsy of J.Lenaerts)

Mixed event


Princess Elisabeth Station
Utsteinen, Antarctica
2016-04-24 GMT 09:59:49

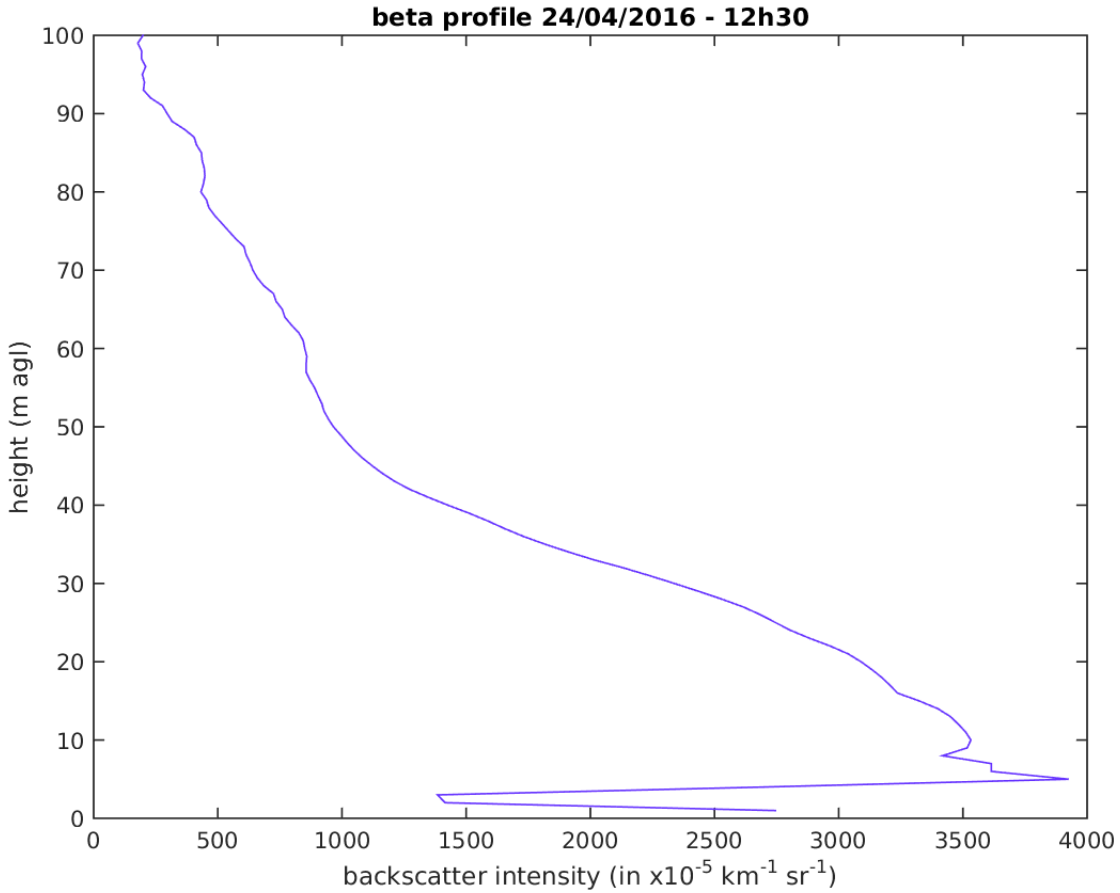
Ceilometer attenuated backscatter

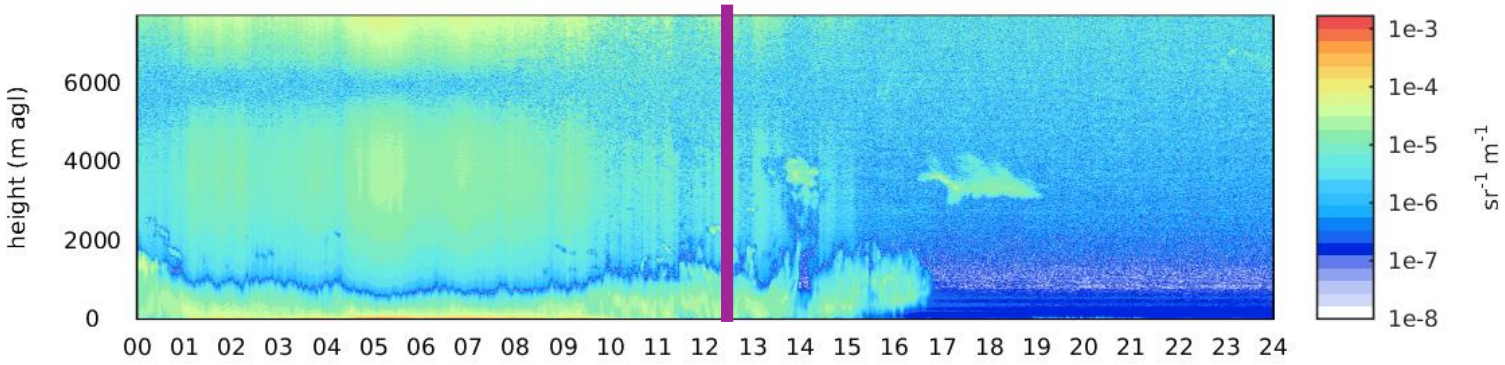
mixed event



Ceilometer attenuated backscatter

mixed event





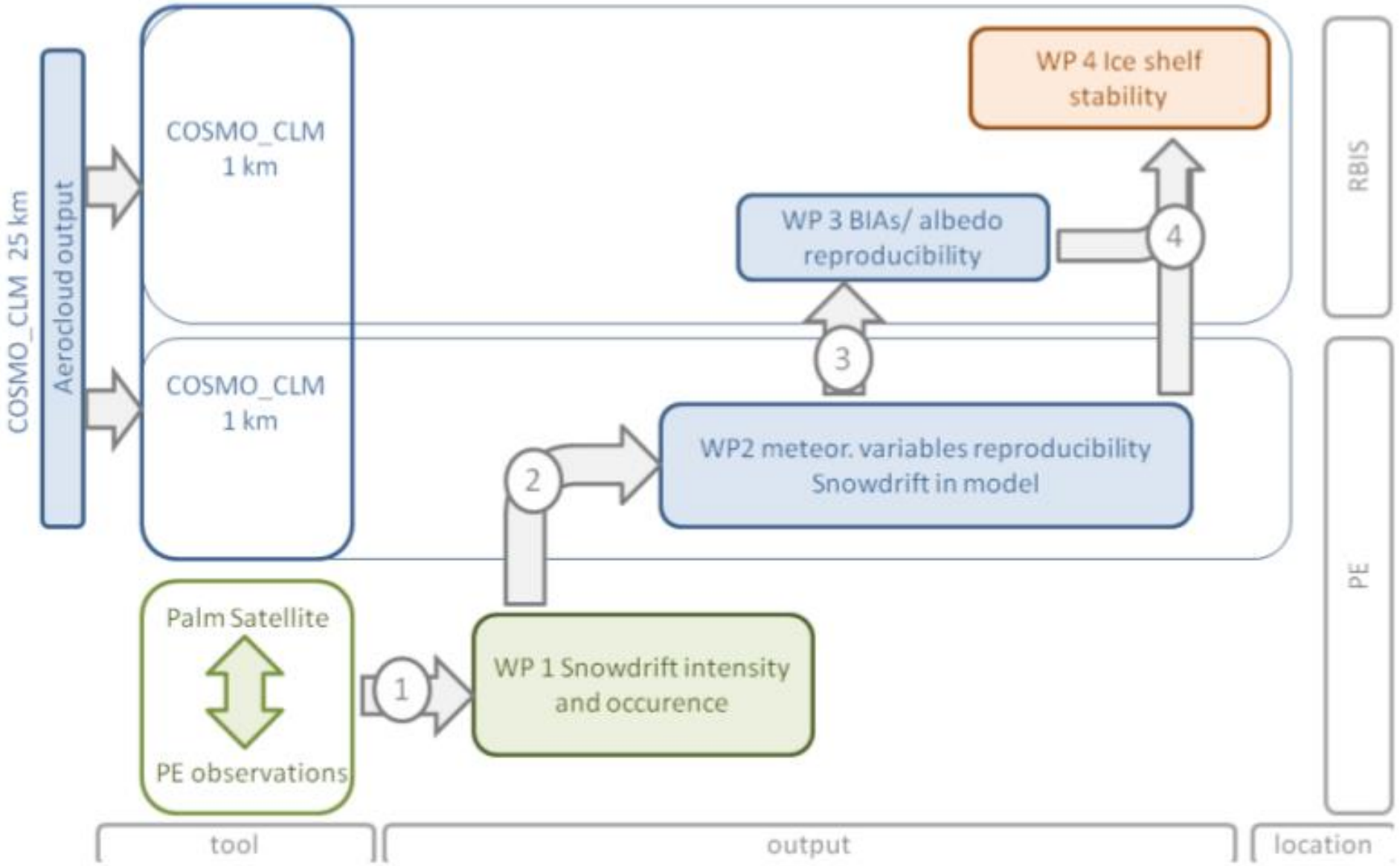
Advantages

- closer to the ground
- not limited to clear sky conditions
- other qualitative data

Work in progress

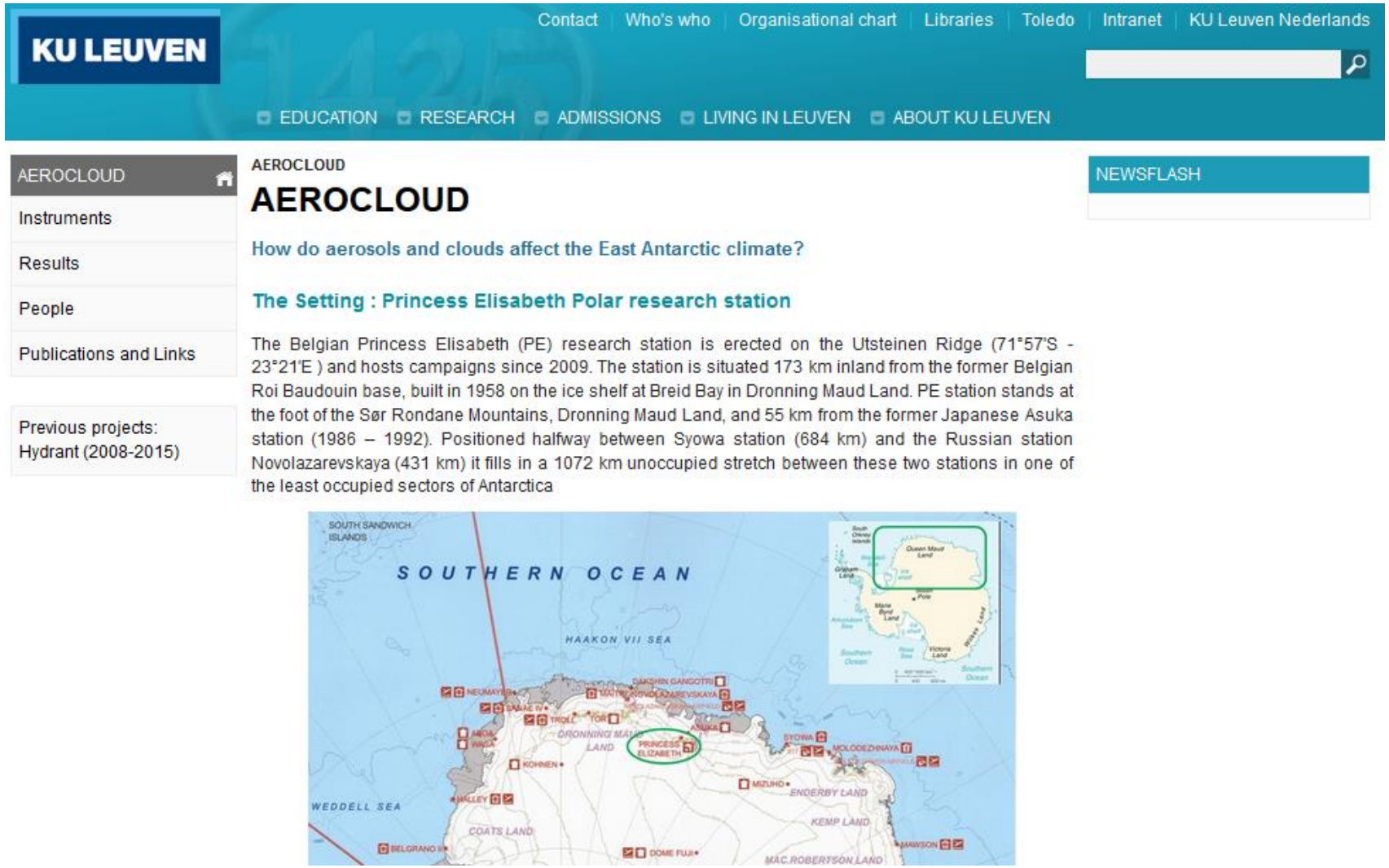
- snow threshold determination
- sensitivity of the instrument
- attenuation of the backscatter signal

The whole project



http://ees.kuleuven.be/aerocloud

alexandra.gossart@kuleuven.be



References

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- Palm S.P., Y. Yang, J.D. Spirnhirne and A. Marshak (2011), Satellite remote sensing of blowing snow properties over Antarctica, Journal of Geophysical Research,116,D16123,doi:10.1029/2011JD015828.
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