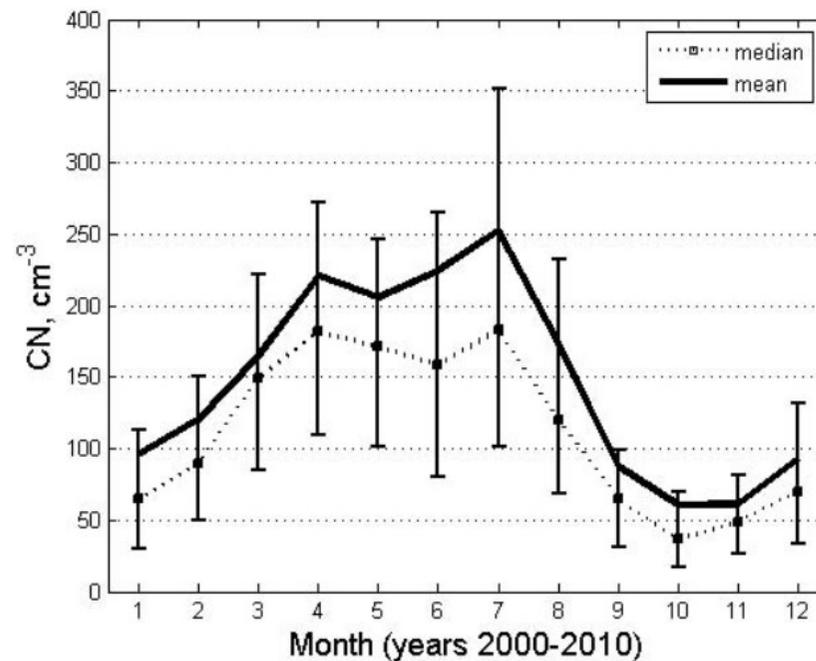
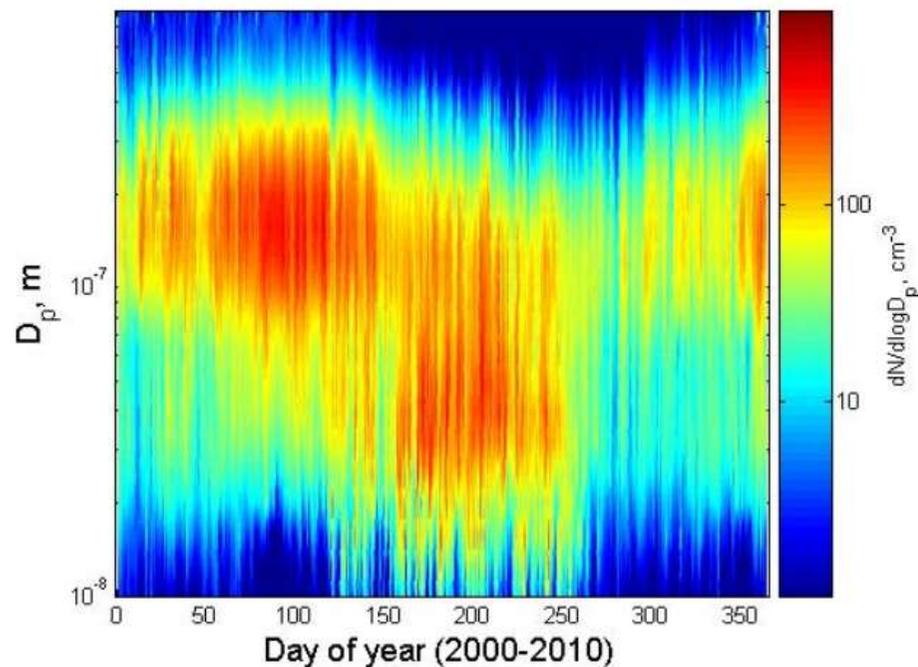


Summary of lidar and star-photometer
measurements in Ny-Alesund during the
moon-photometer intercomparison
campaign

Christoph Ritter
(AWI Potsdam)

christoph.ritter@awi.de

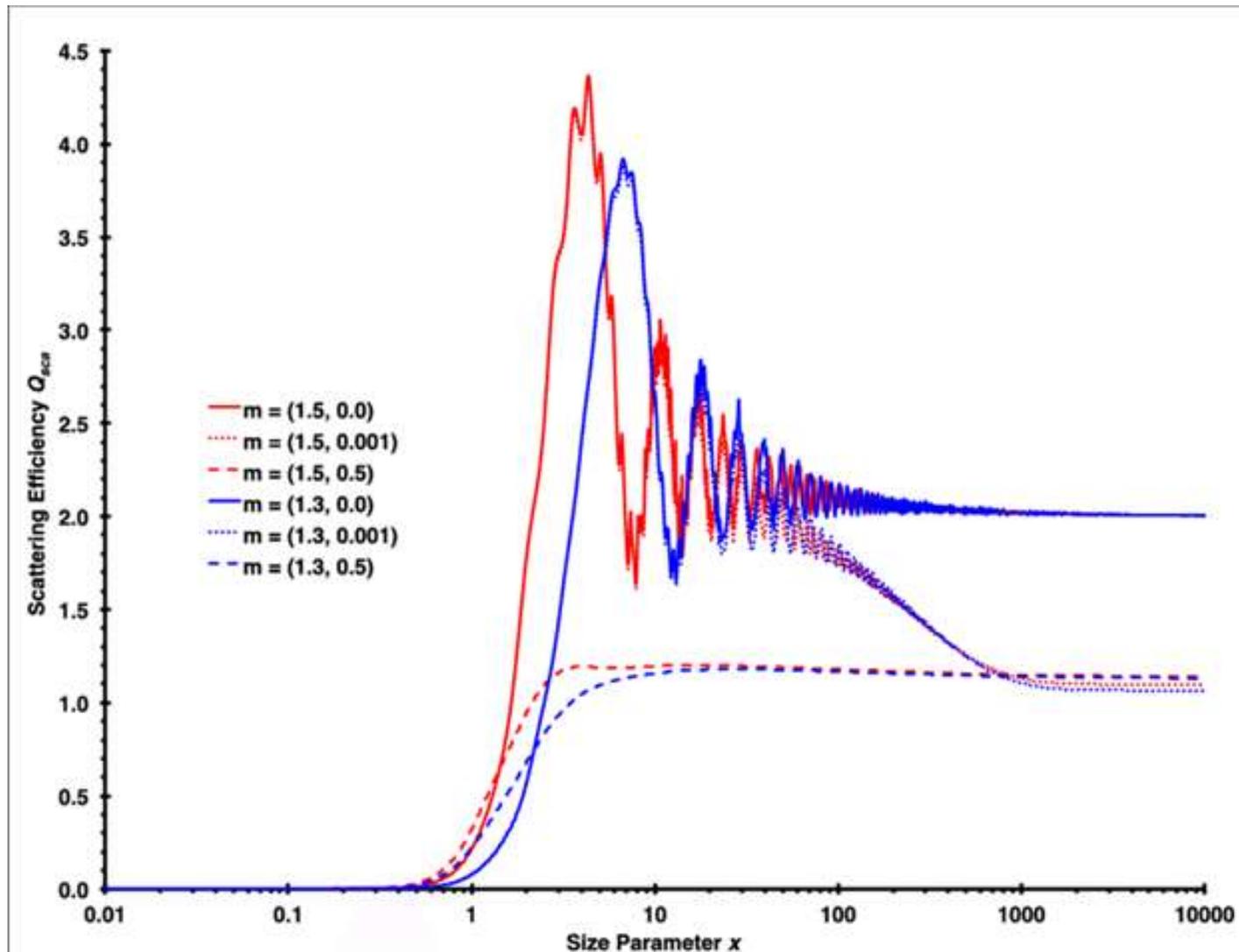
Tunved 2013, ACP: Arctic aerosol life cycle



Arctic Haze in spring: because particles are larger, have larger scattering efficiency

Max. aerosol number concentration in summer due to marine aerosol

Scattering efficiency, Mie theory:



Size
parameter:

$$x = \frac{2 \pi r}{\lambda}$$

$x=1$ for
 $\lambda = 355\text{nm}$
means:
 $r = 56\text{nm}$

Arctic aerosol is generally small and at the edge of visibility!
Size more important than chem. composition!

KARL: Koldewey Aerosol Raman Lidar

Backscatter (β) @ 355nm, 532nm, 1064nm

Extinktion (α) @ 355nm, 532nm

Depolarisation (δ) @ 355nm, 532nm

Water vapor (m_r) @ 407nm, 660nm



Spectra 290 /50 Laser (10W / colour)

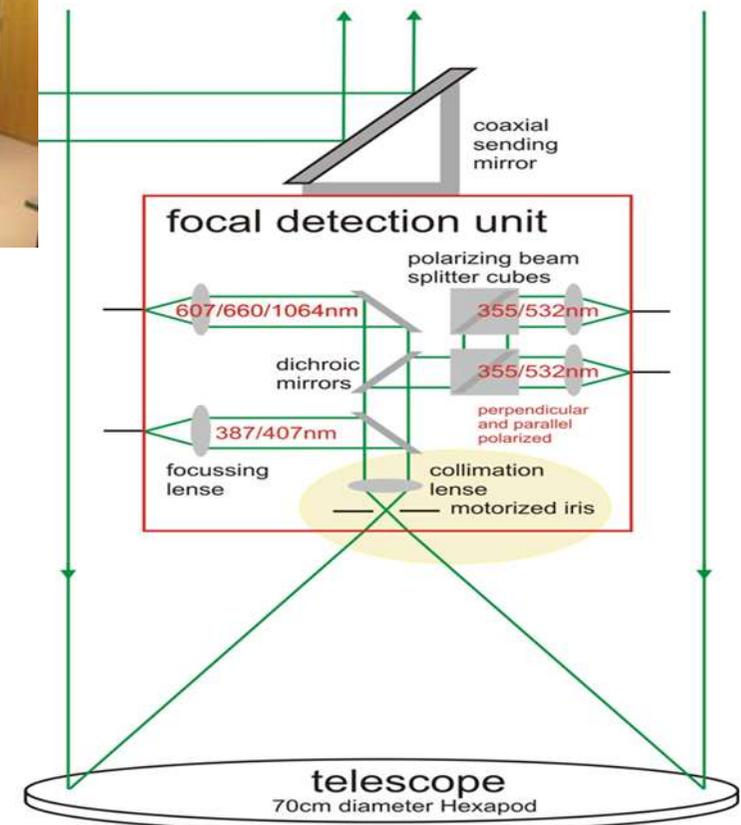
70cm mirror

Fov: 2.2 mrad

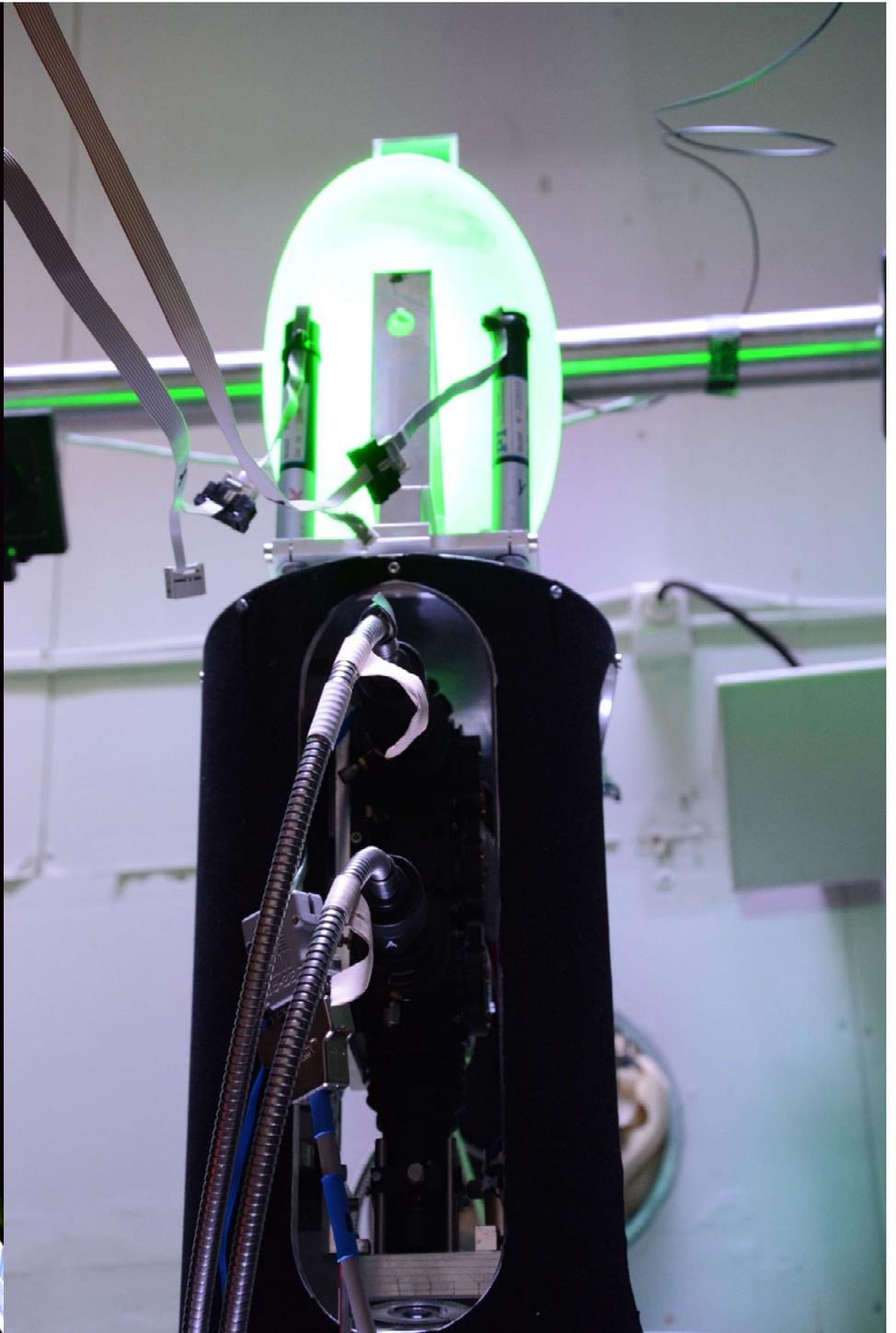
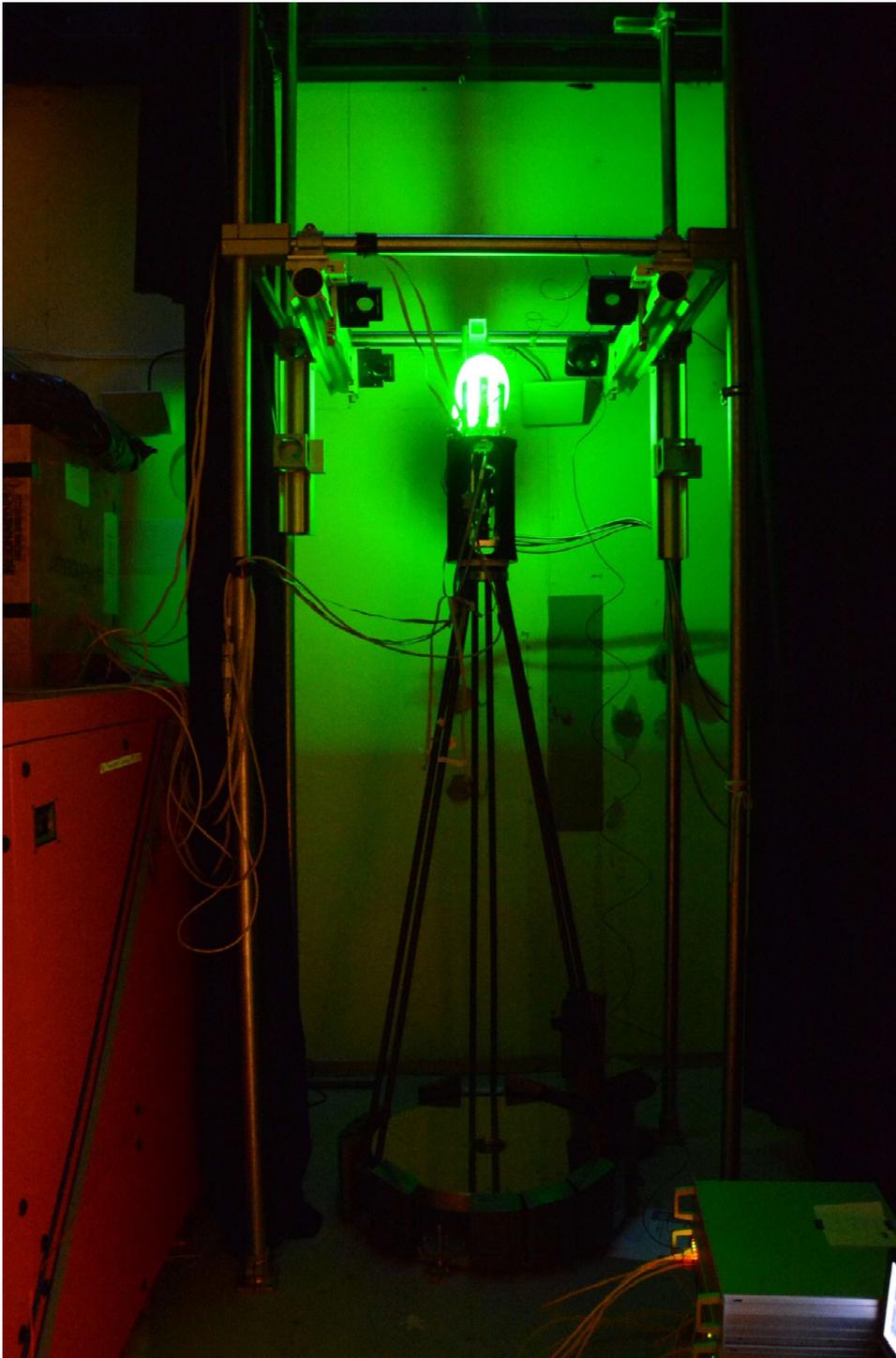
Licel transients, Hamamatsu PMTs

Overlapp > 700m

Tropo- & stratosphere

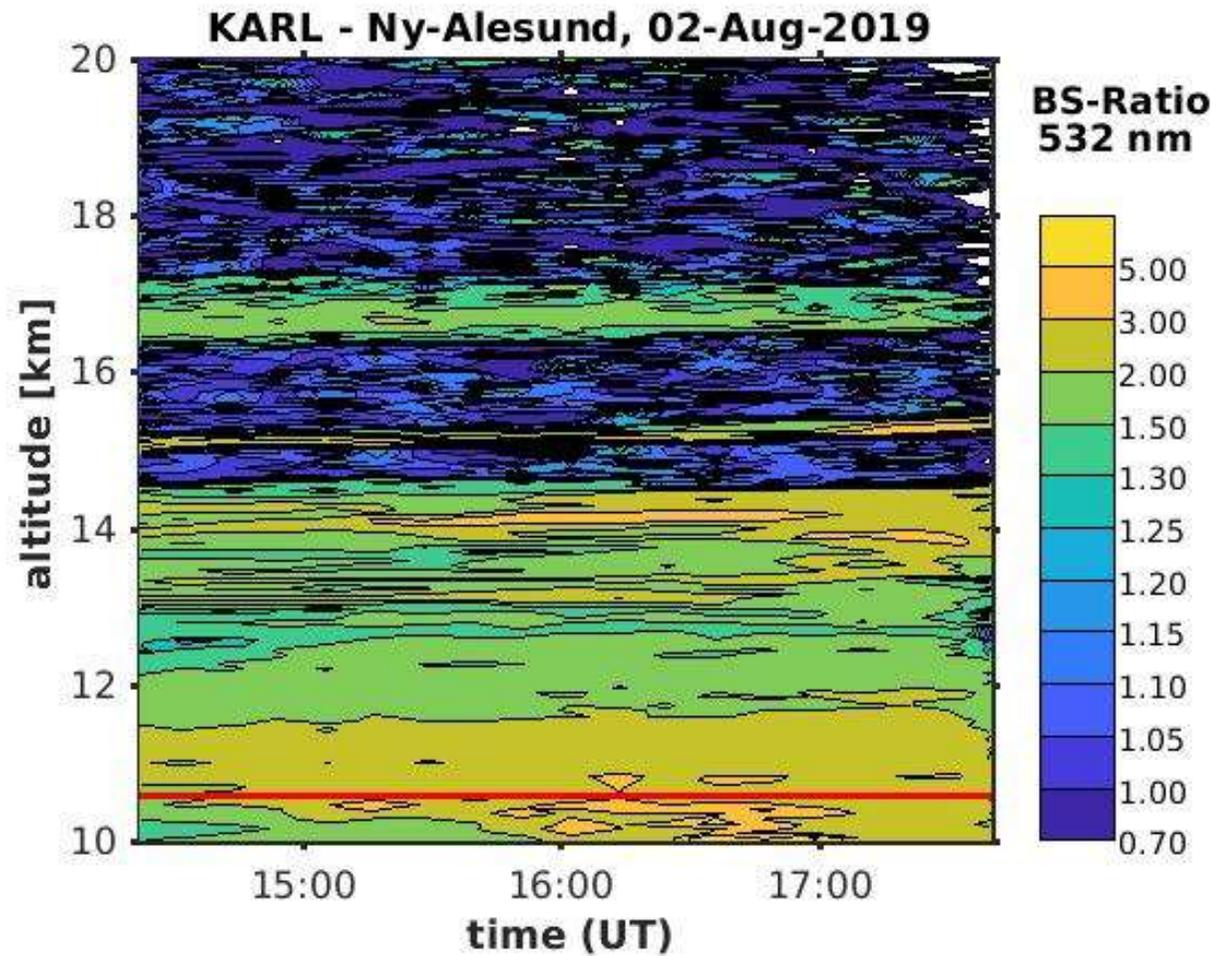






(something partially different)

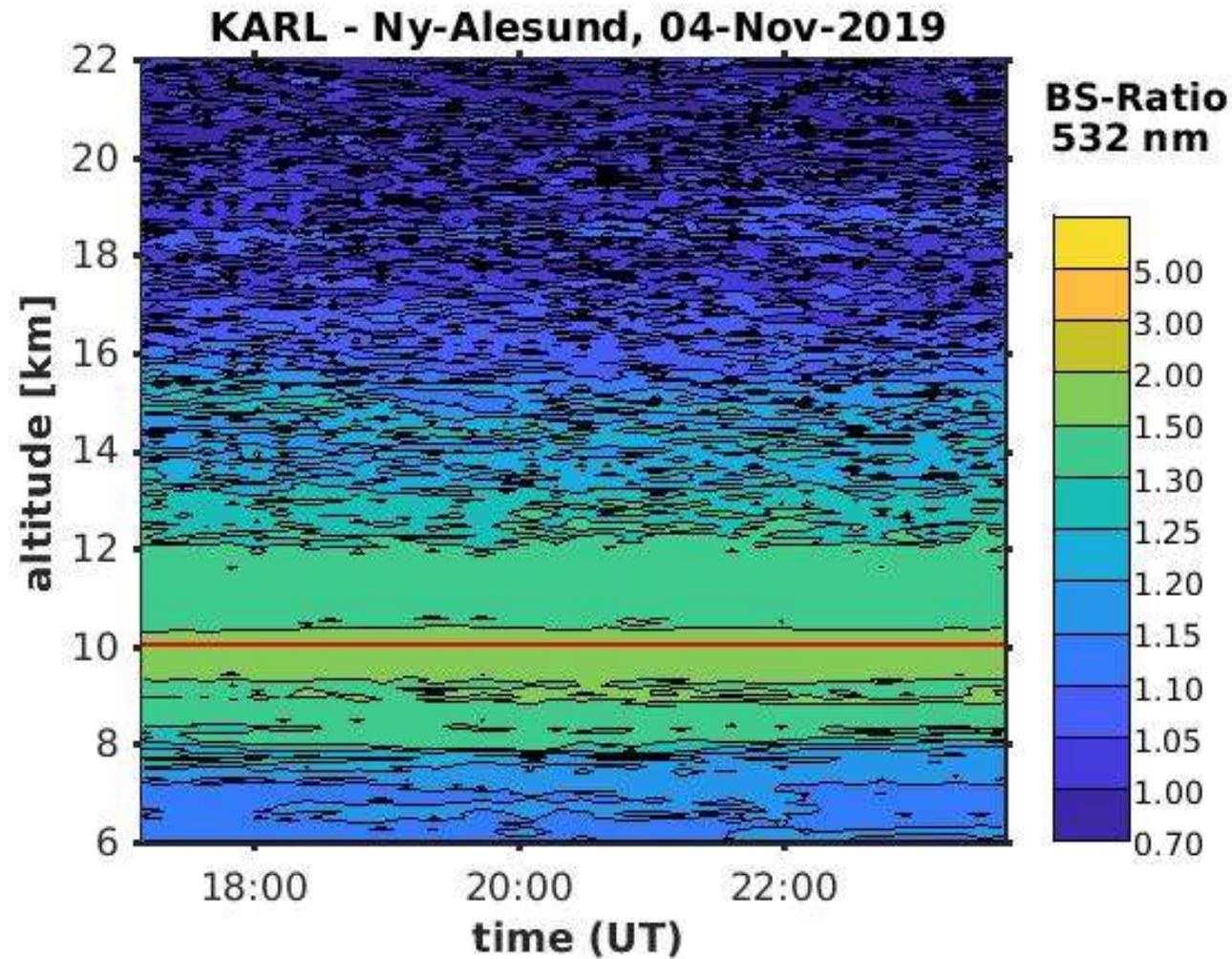
Stratospheric aerosol layer late summer – early winter 2019 / 20



LR355 = 30 sr (+-5)

LR532: ?? Too
noisy, daylight

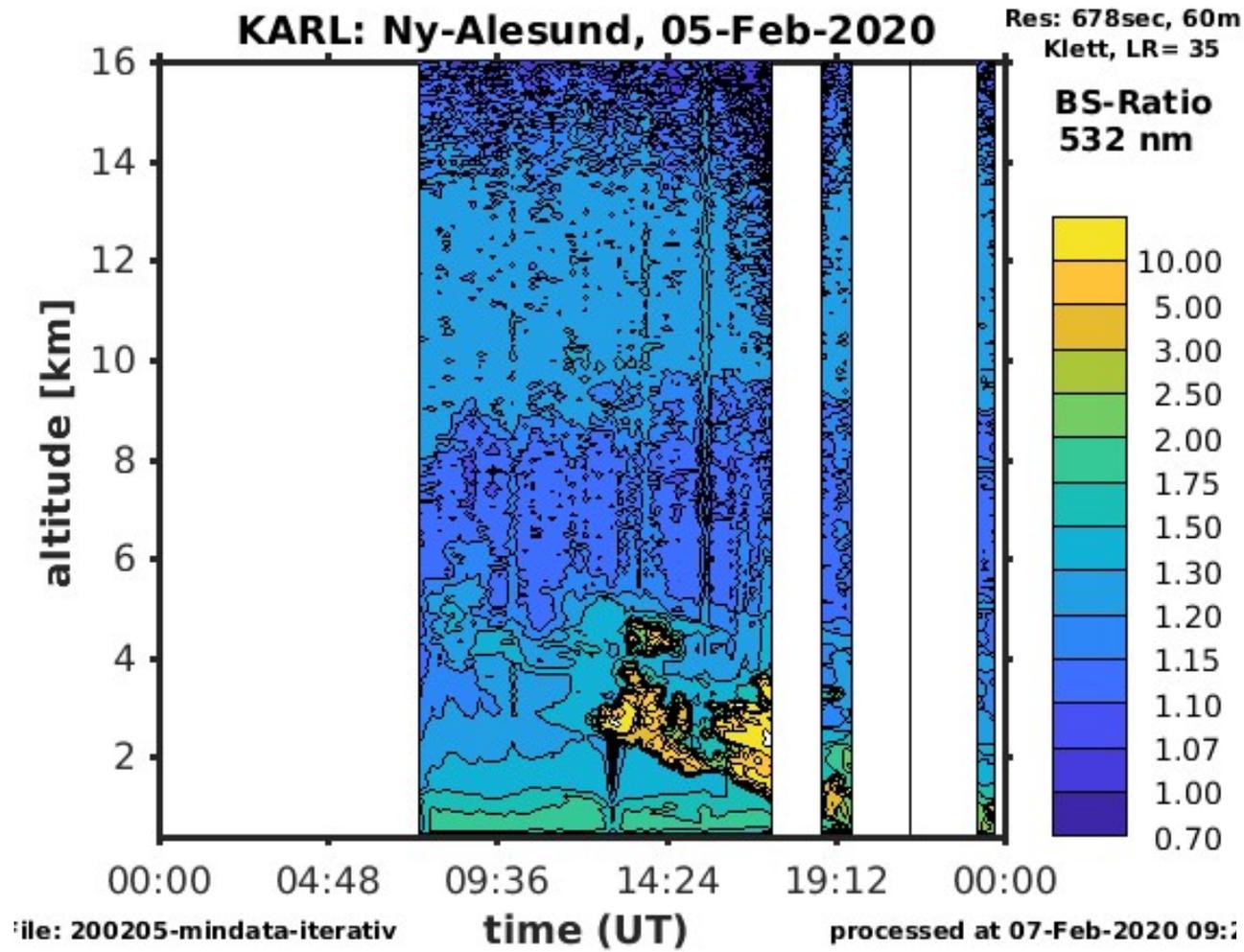
3 months later:



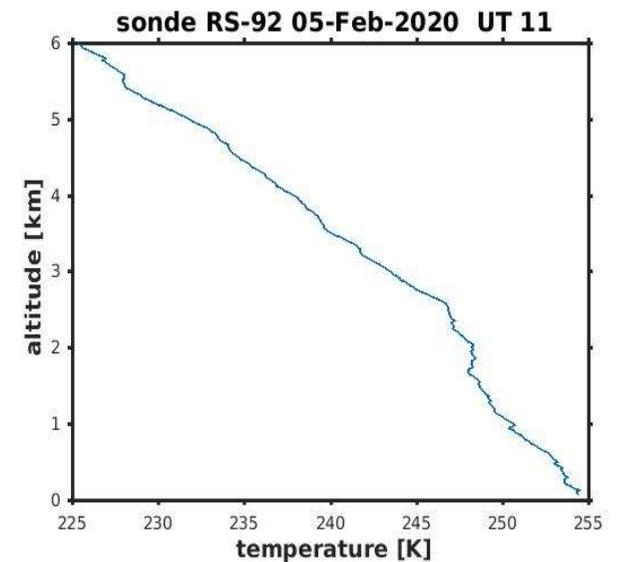
LR355 = 54 sr
LR532 = 80 sr
each ± 12 sr

Depolarisation
around 2%

Now our campaign: case 5 Feb

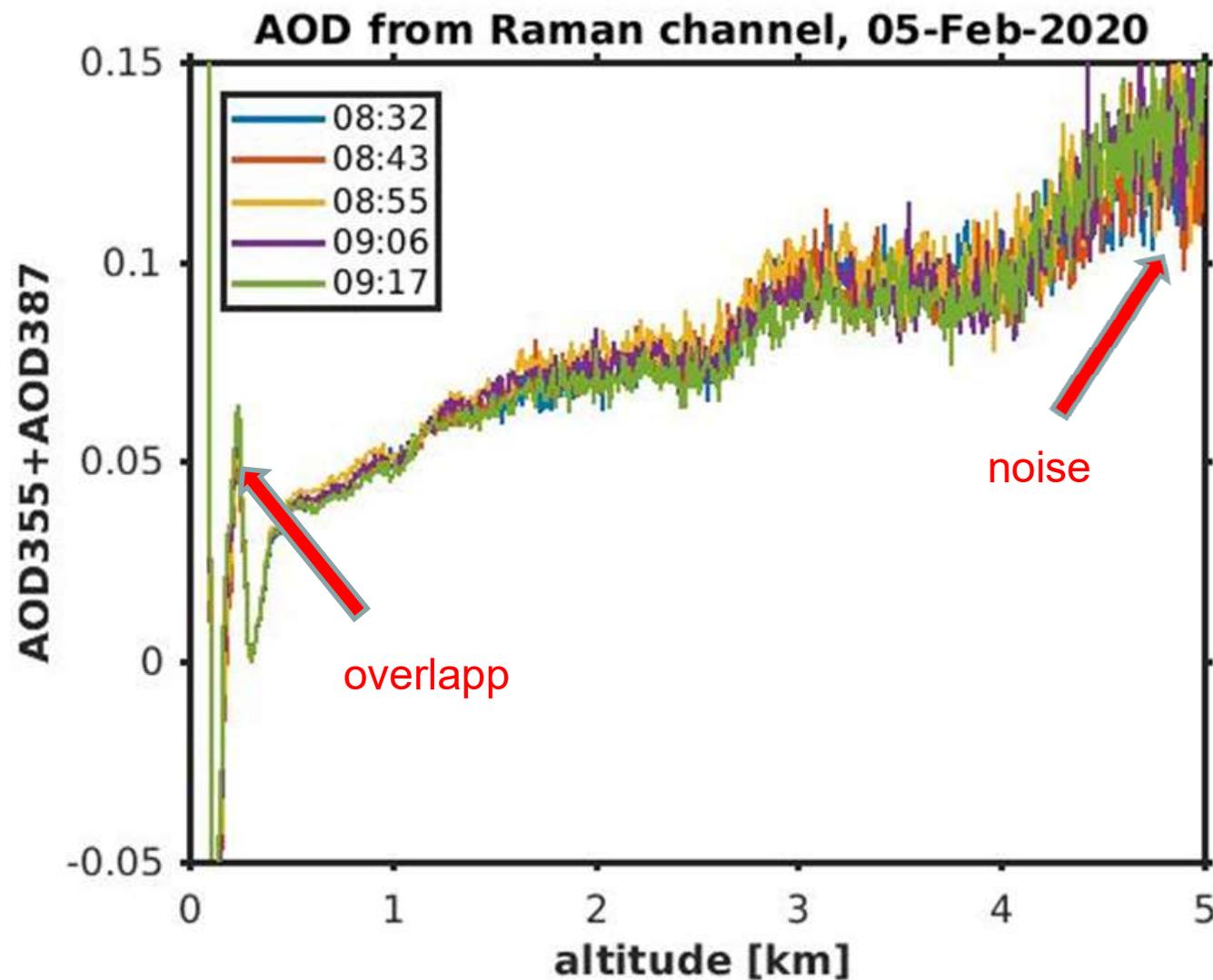


No PSC



AOD from Raman lidar:

Closest to raw data is AOD355 + AOD387

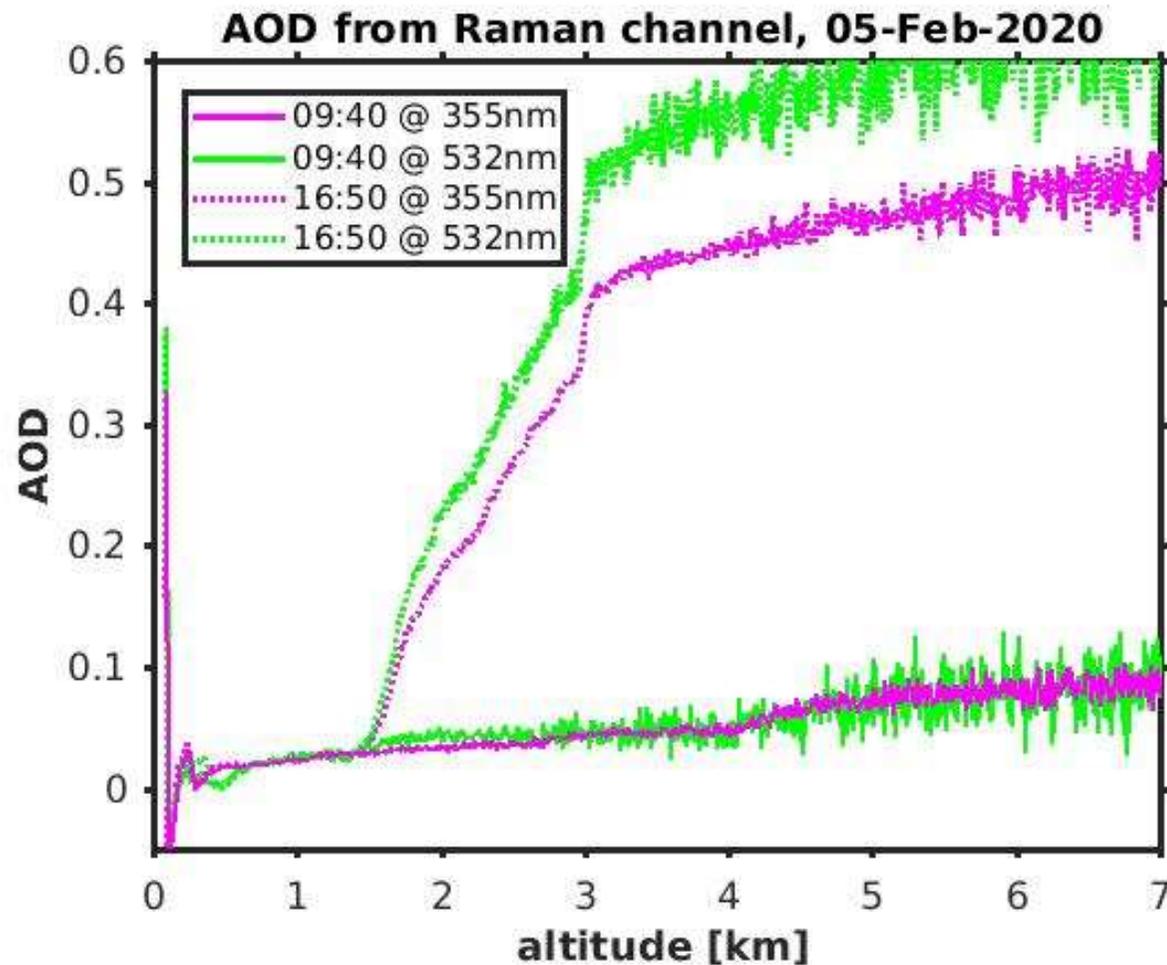


AOD is easier
than extinction ...

At least Δ AOD
from 1km to
6km is save.

We need the uncritical assumption of an AE to separate into AOD355 and AOD387

AOD from Raman Lidar

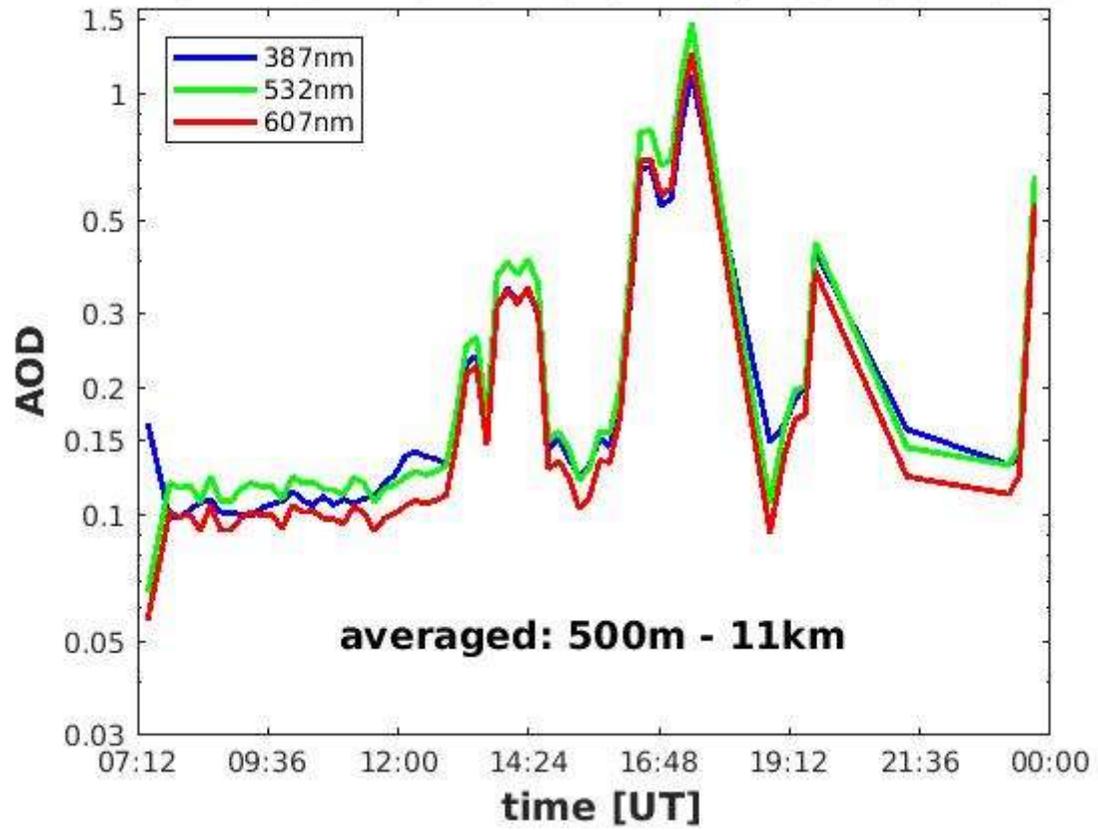


Higher noise for
607nm (ok)

Higher AOD532 in
cloud than AOD355,
this is significant
(below 2km!)

Different overlaps
for UV and VIS
→ start above
700m

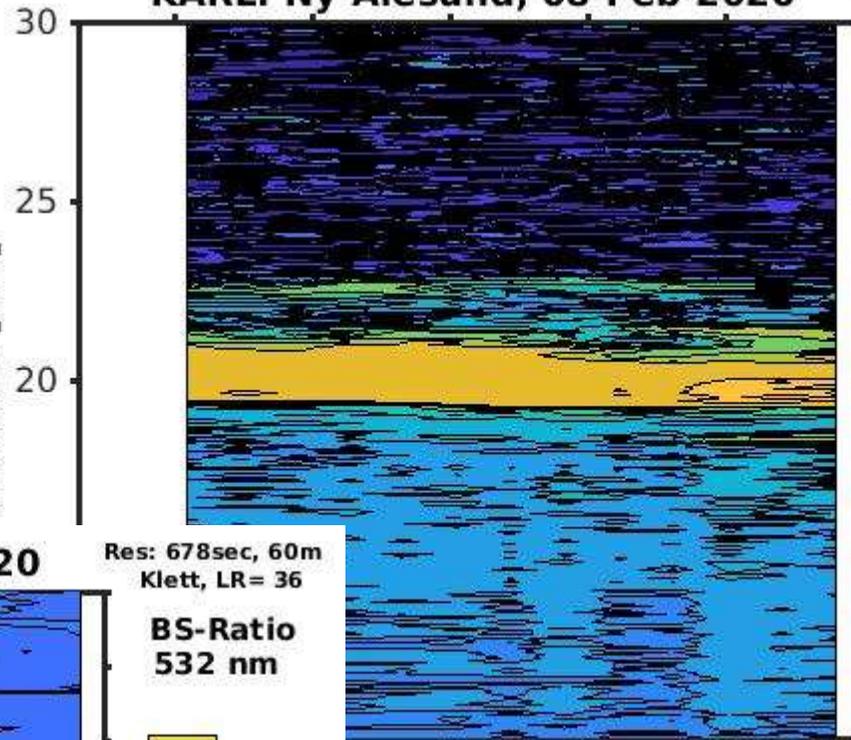
AOD from Raman channel, 05-Feb-2020



KARL: Ny-Alesund, 08-Feb-2020

Res: 678sec, 60m
Klett, LR= 36

altitude [km]



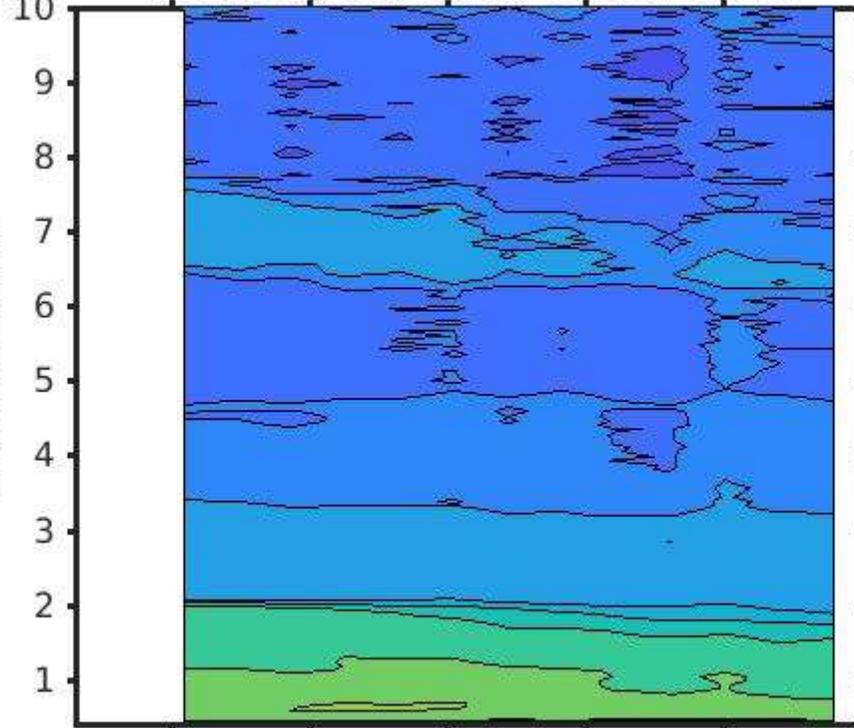
**BS-Ratio
532 nm**

10.00
5.00
3.00
2.50
2.00
1.75
1.50
1.30
1.20
1.15
1.10
1.07
1.00
0.70

KARL: Ny-Alesund, 08-Feb-2020

Res: 678sec, 60m
Klett, LR= 36

altitude [km]



**BS-Ratio
532 nm**

10.00
5.00
3.00
2.50
2.00
1.75
1.50
1.30
1.20
1.15
1.10
1.07
1.00
0.70

4 22:33 23:02 23:31

time (UT)

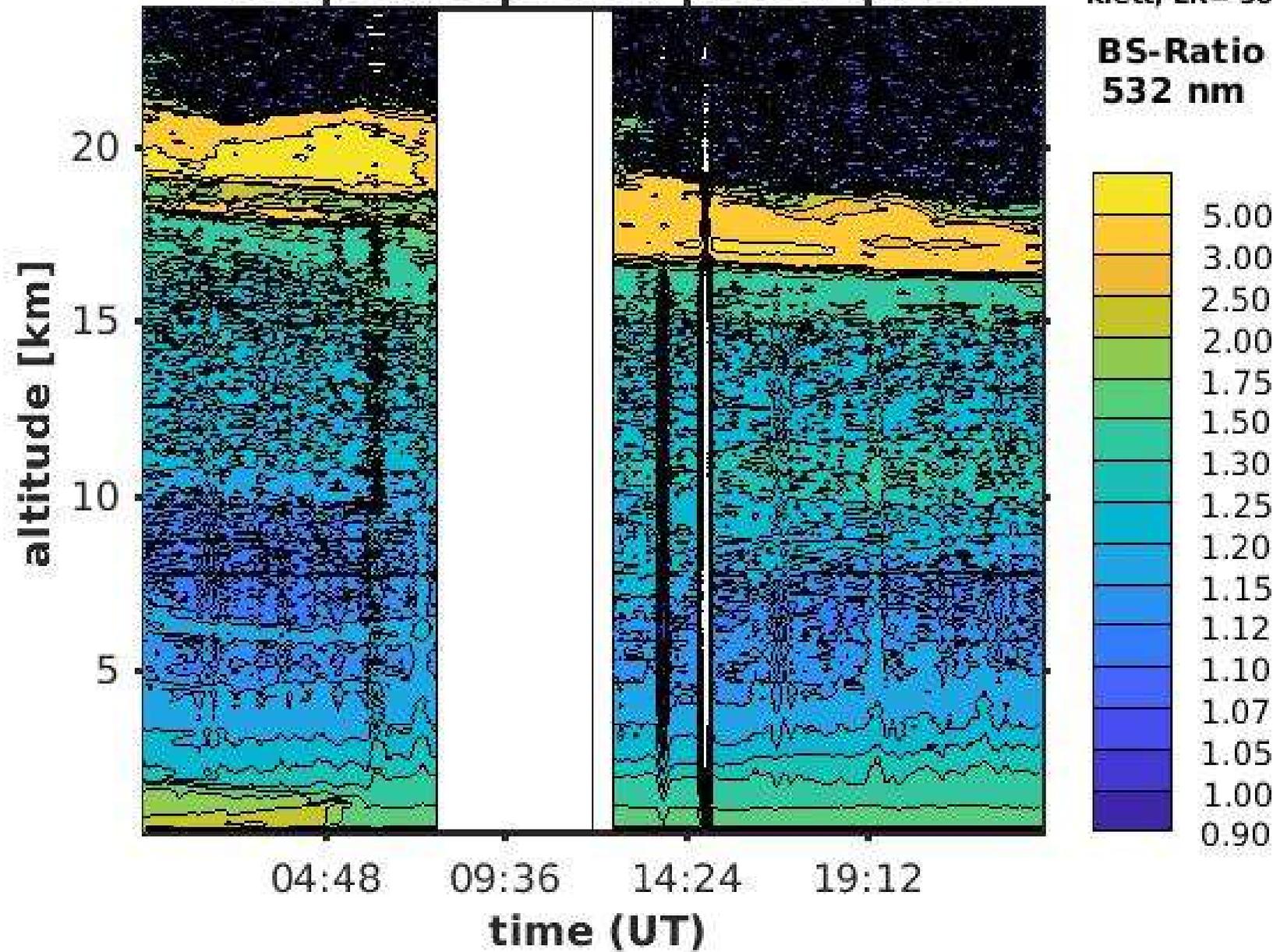
processed at 09-Feb-2020 08:31

21:36 22:04 22:33 23:02 23:31

KARL: Ny-Alesund, 09-Feb-2020

Res: 678sec, 60m

Klett, LR= 36



KARL: Ny-Alesund, 09-Feb-2020

Res: 678sec, 60m
Klett, LR= 36

