How to use the Synergy of COPS Remote Sensing Data to Analyse Convection Initiation Processes in Complex Terrain?

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Hermann Mannstein, Matthias Grzeschik, Hans-Stefan Bauer**

IOP 9c

- Composite plots, CI sites, BL Hornisgrinde,
- Highlights for COPS Overview paper

IOP 8b

- CI locations of COPS, cloud top cooling rate, lid

IOP 13a

- Saharan dust, outflow boundary, DIAL data versus D-PHASE models

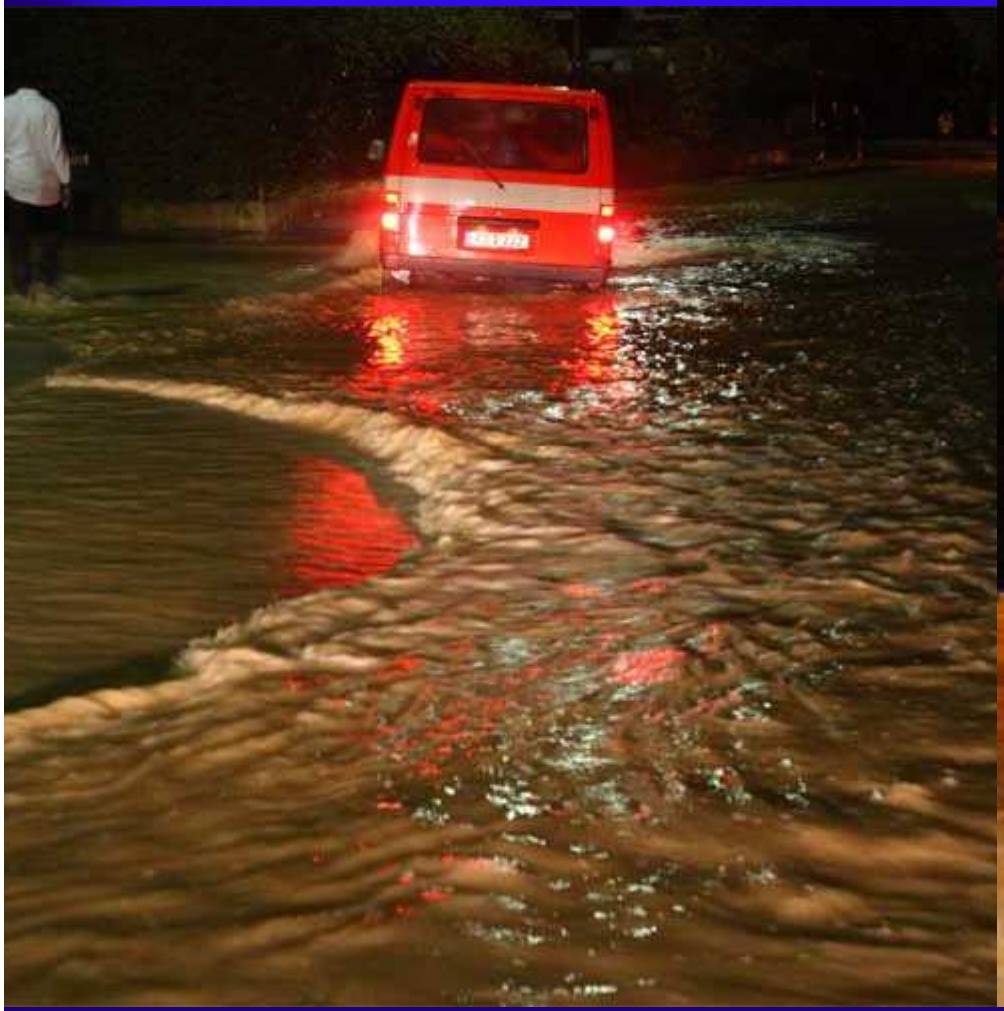
IOP 3a

- Temperature variance profile

IOP 9c, 20 July 2007

IOP 9c: Flooding in Bavaria (Erlangen, Forchheim)

„….up to 75 l/m²“

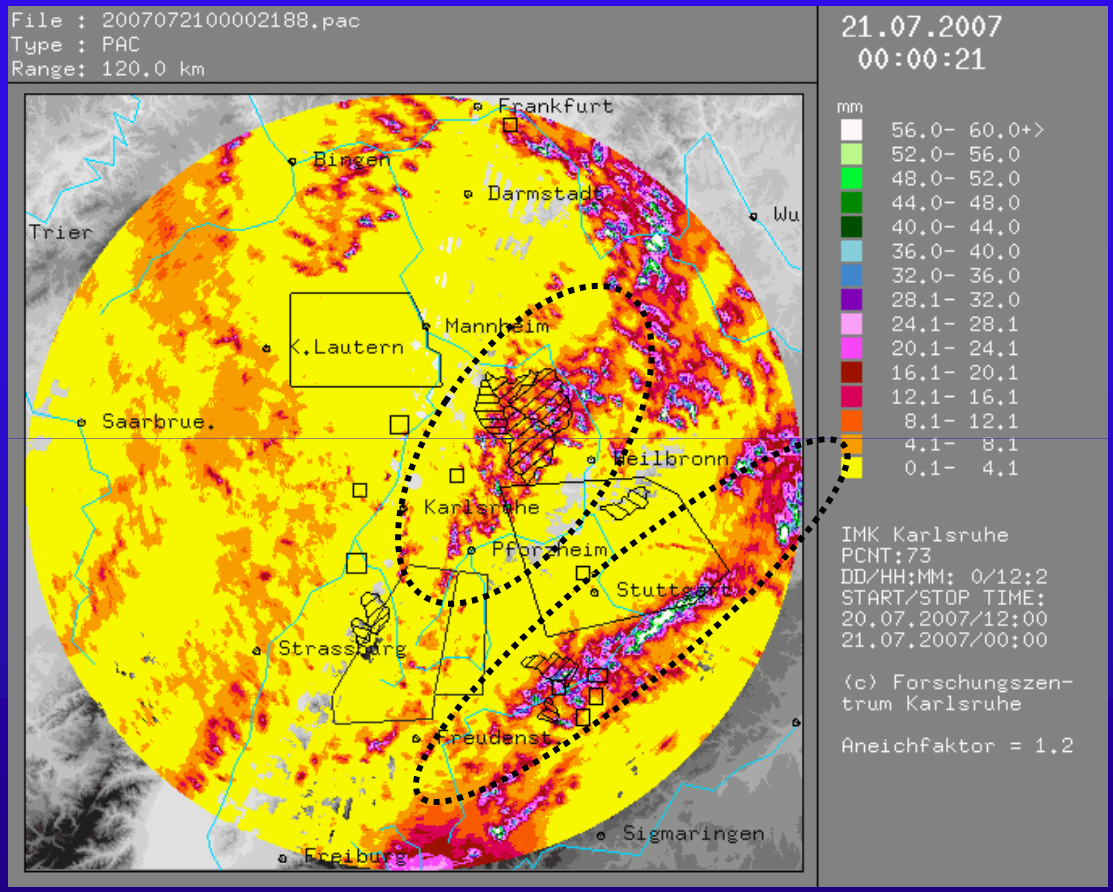


COPS Remote Sensing Instruments

	July																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
IOP	5a	5b		6				7a	7b					8a	8b	8c		9a	9b	9c			10		11a	11b				12	
No. of CI event	2	8		1				0	3					0	1	*		3	0	6			5		0	0				1	
Airborne																* no MSG rapid scan data available on this day															
DLR DIAL								x							x			x	x	x					x	x				x	
Leandre2														x	x	x		x	x	x					x	x				x	x
Mobile																															
DOW1	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
DOW2																					x	x	x	x				x	x	x	x
SuSiH																															
WV DIAL	x						x	x	x				x	x	x	x		x	x	x			x		x	x				x	
RRL	x						x	x	x				x	x	x	x		x	x	x		x	x								
Windtracer	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CloudRadar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x
CNR MWR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SuSiR																															
BASIL	x	x		x				x	x		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x		x		x	x
Doppler Lidar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CloudRadar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x
TARA	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x										
MWR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SuSiM																															
BERTHA	x	x		x				x	x			x	x	x	x			x	x	x	x	x	x		x	x				x	x
WiLi	x	x		x				x	x		x	x		x	x	x		x	x	x		x	x	x	x	x				x	x
MPL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CloudRadar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HATPRO	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SuSiV																															
TRESS	x	x		x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
CNRS RL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SuSiS																															
Ceilometer						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
WTR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MICCY	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
POLDIRAD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

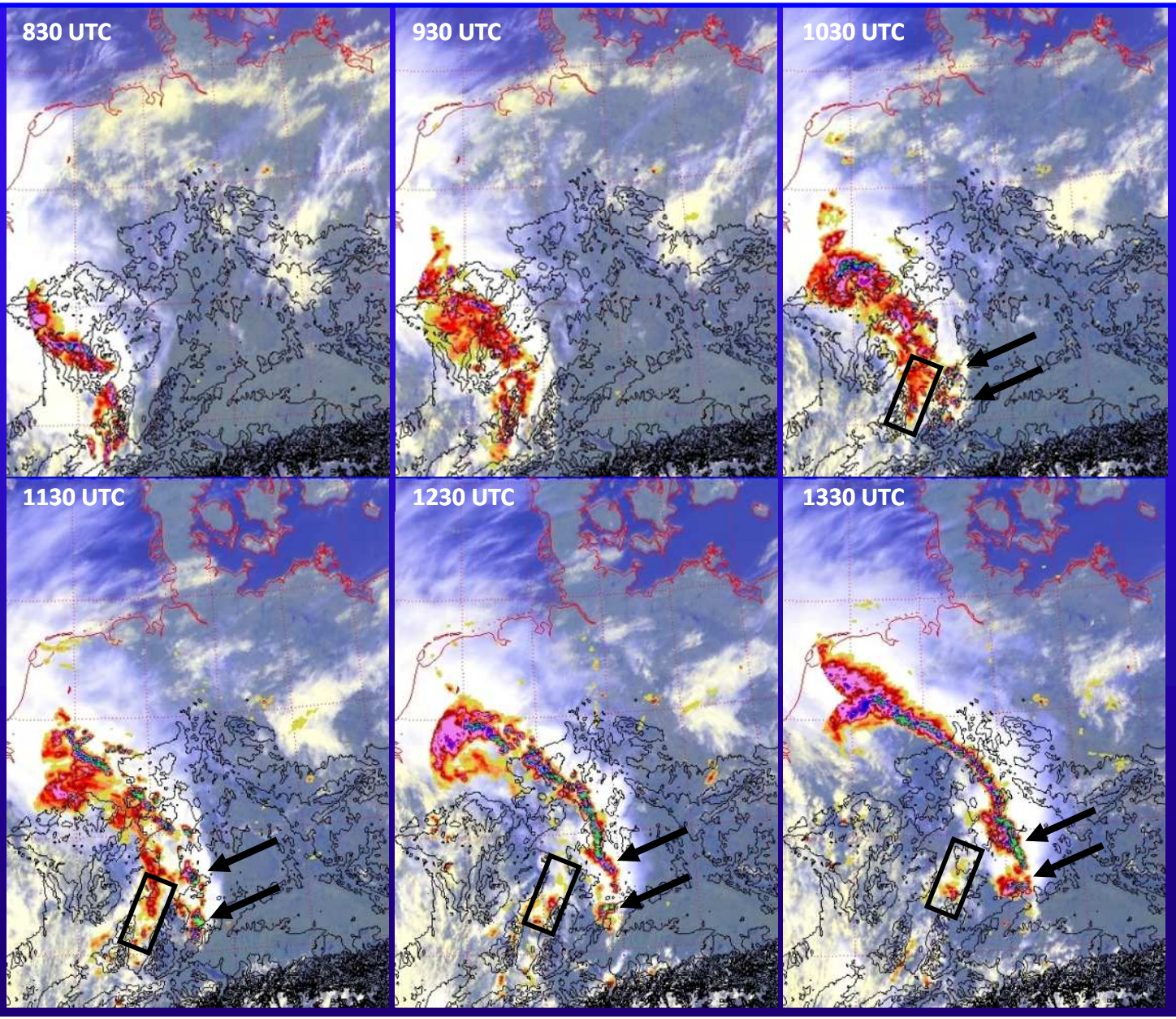
24 instruments (in addition to AMF, op. radars, GPS, MRRs, MSG RSS)!

IOP 9c: Precipitation Sum, Karlsruhe Radar

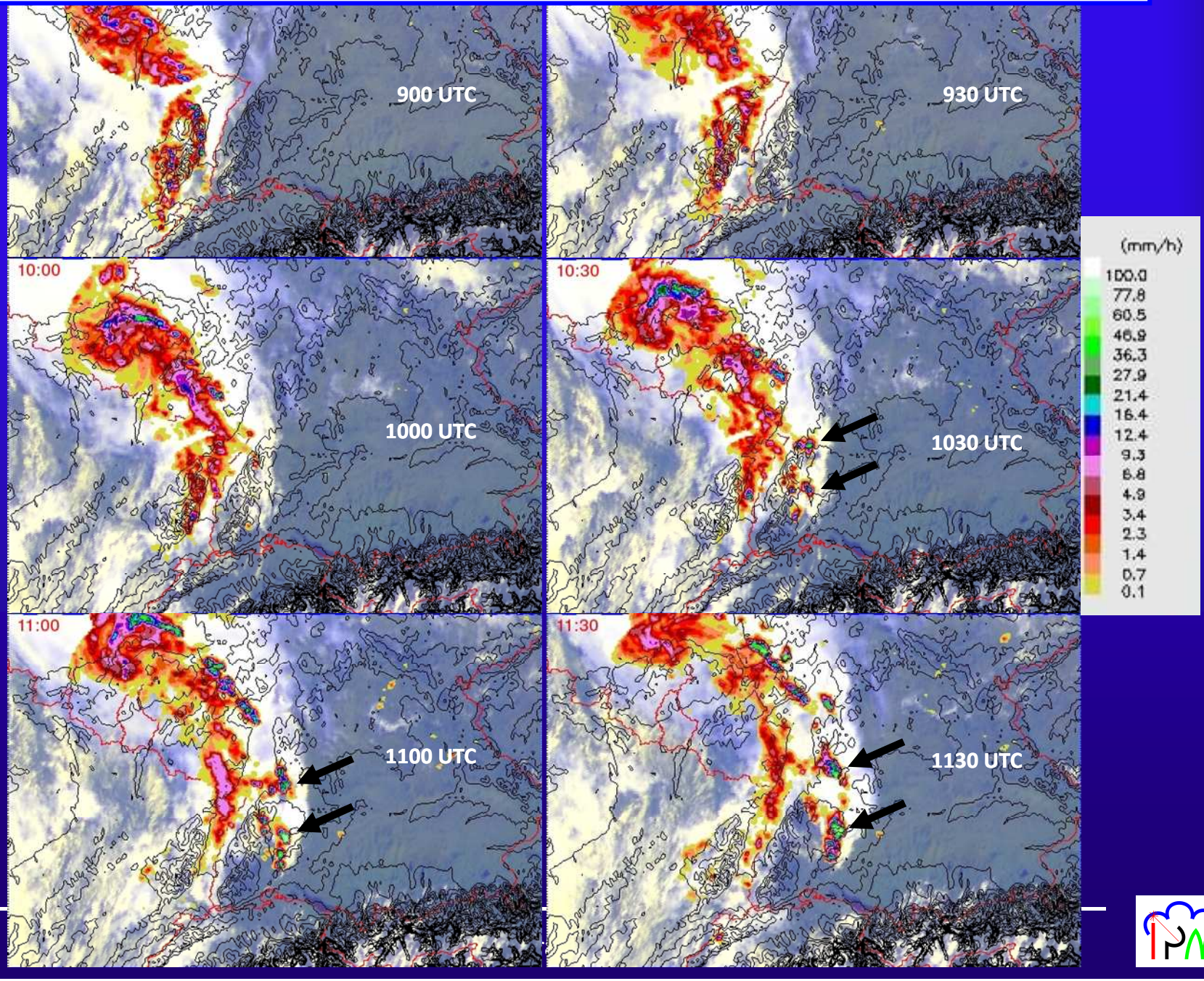


10 – 22 UTC

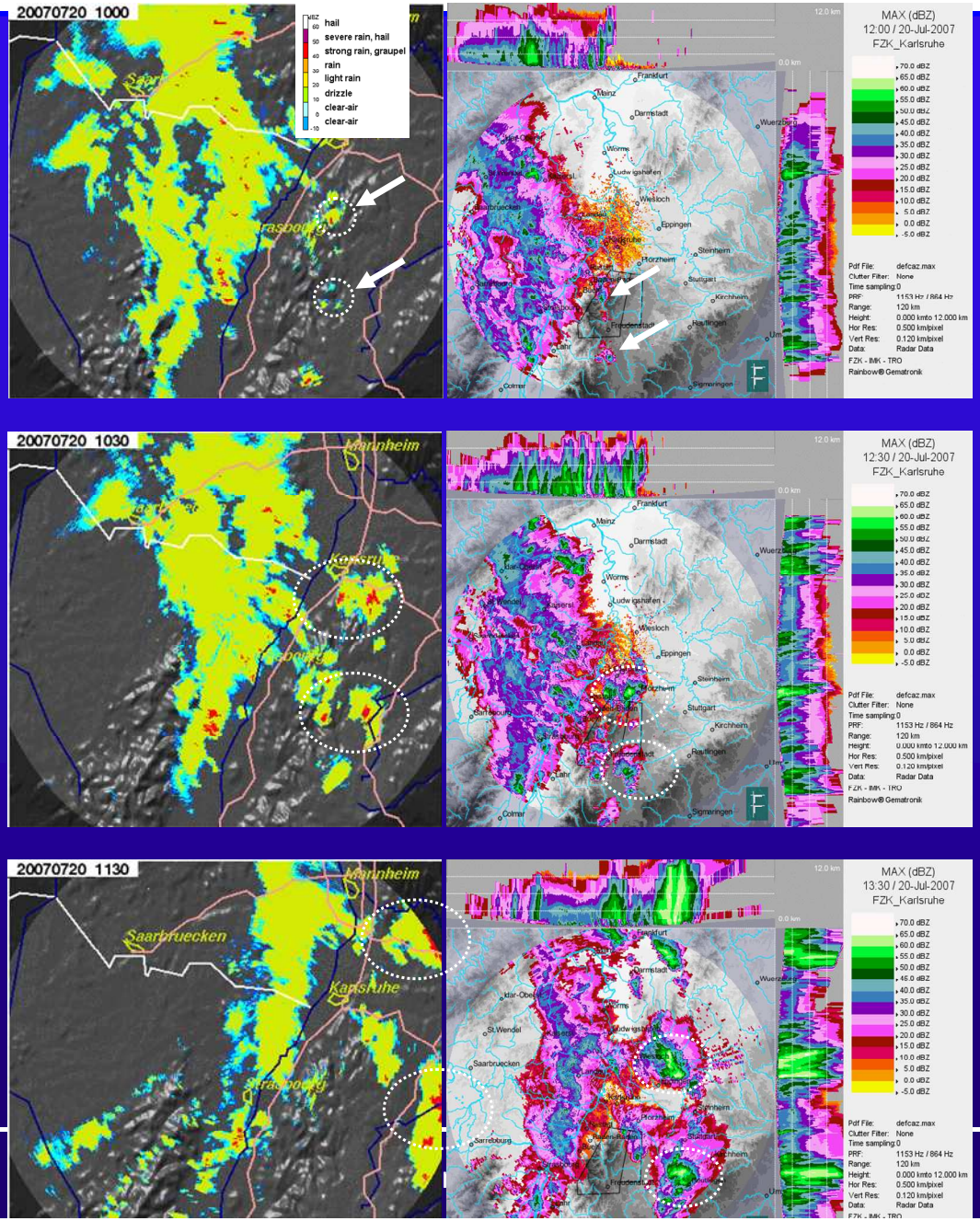
IOP 9c: MSG Multi-Channel Composite & DWD Radar



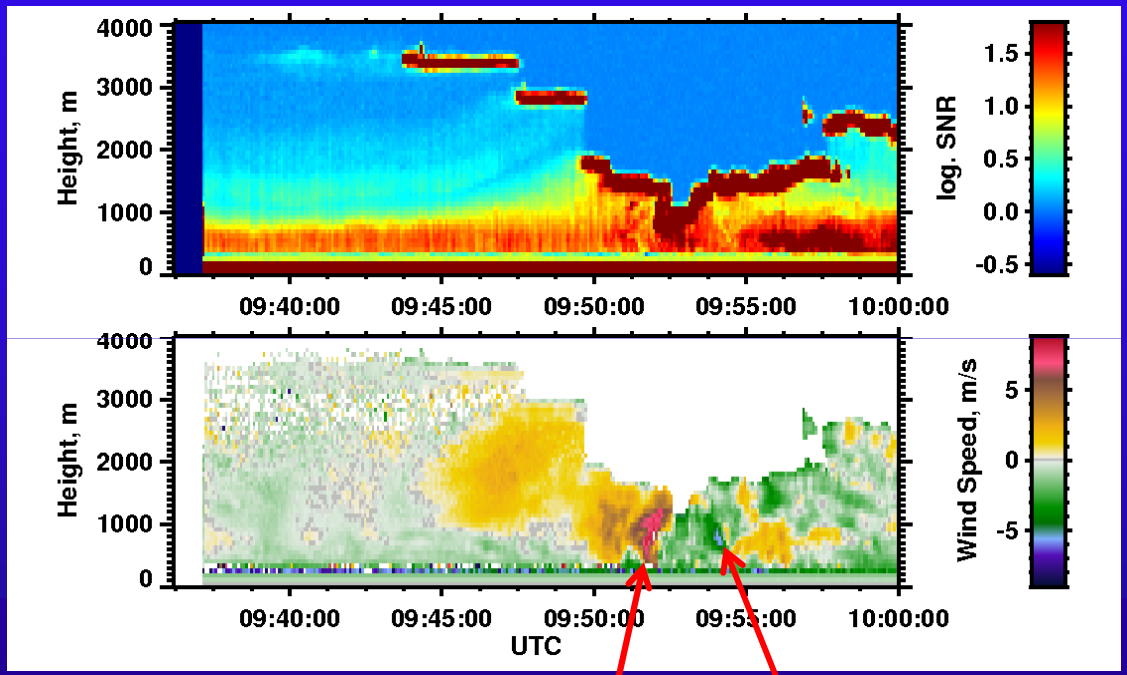
IOP 9c: MSG Multi-Channel Composite & DWD Radar

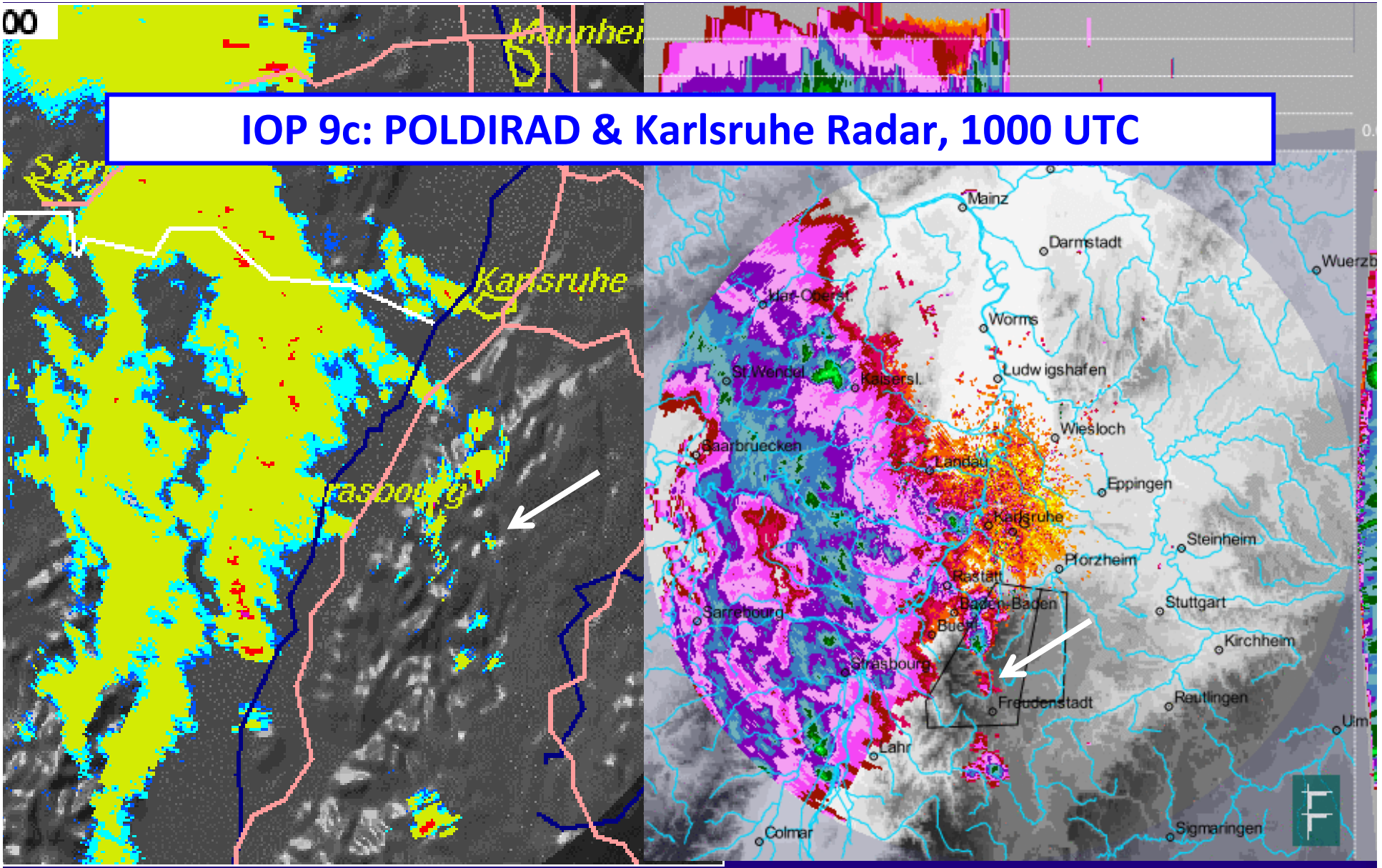


IOP 9c: POLDIRAD & Karlsruhe Radar



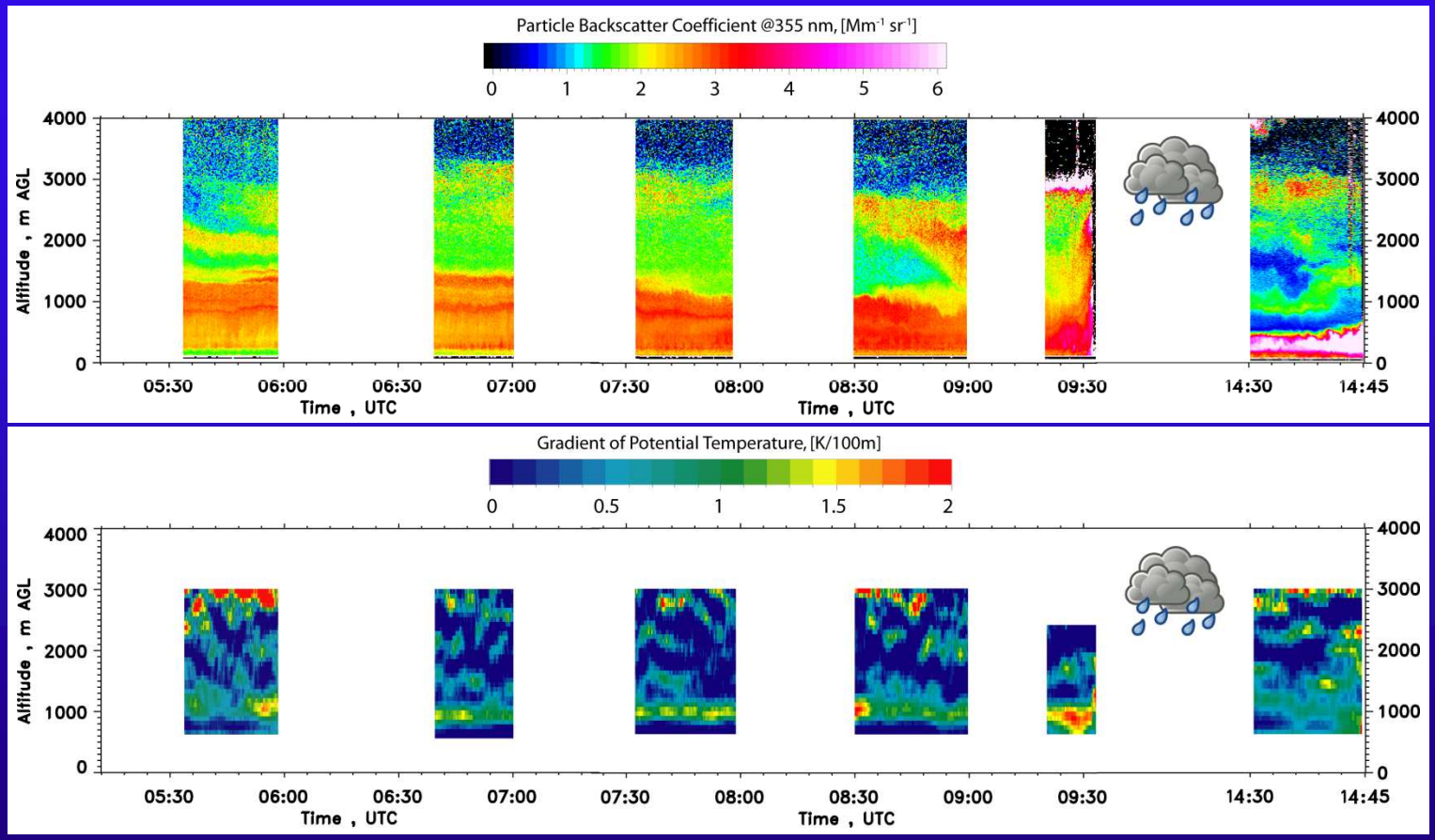
IOP 9c: WiLi at Susi M



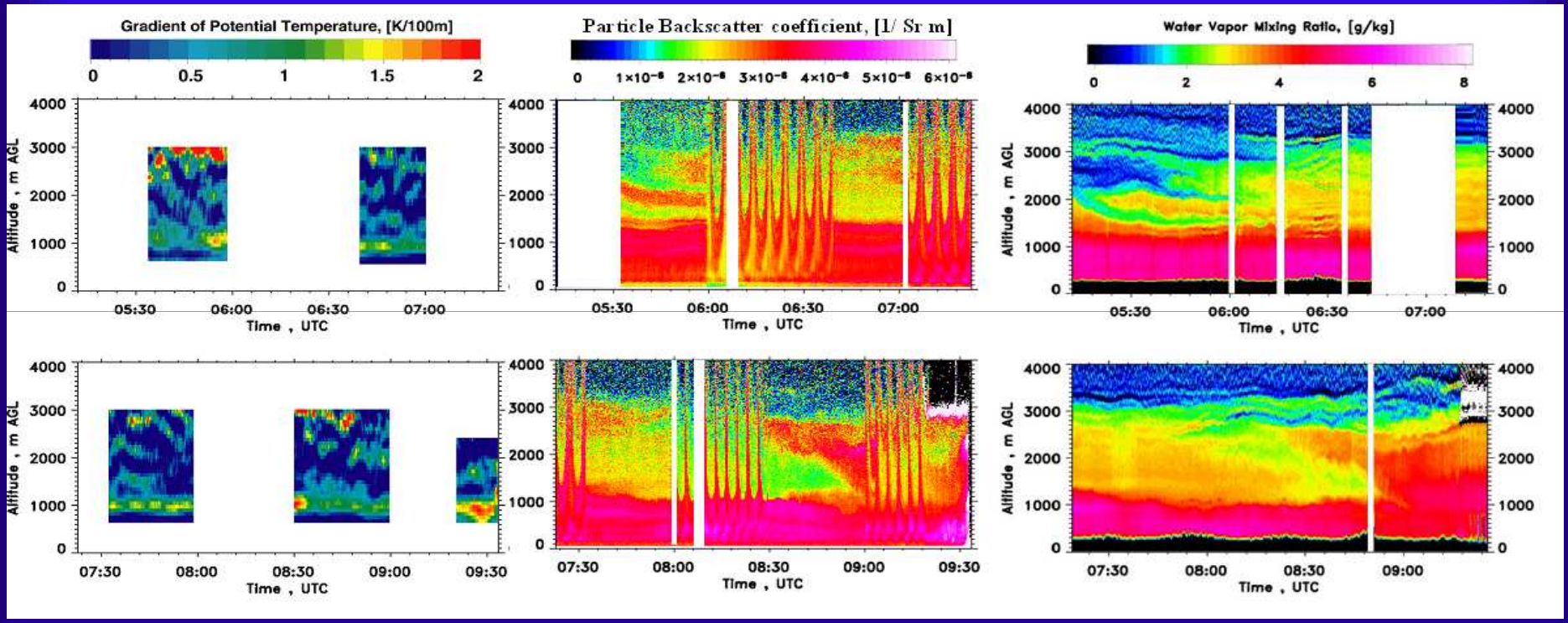


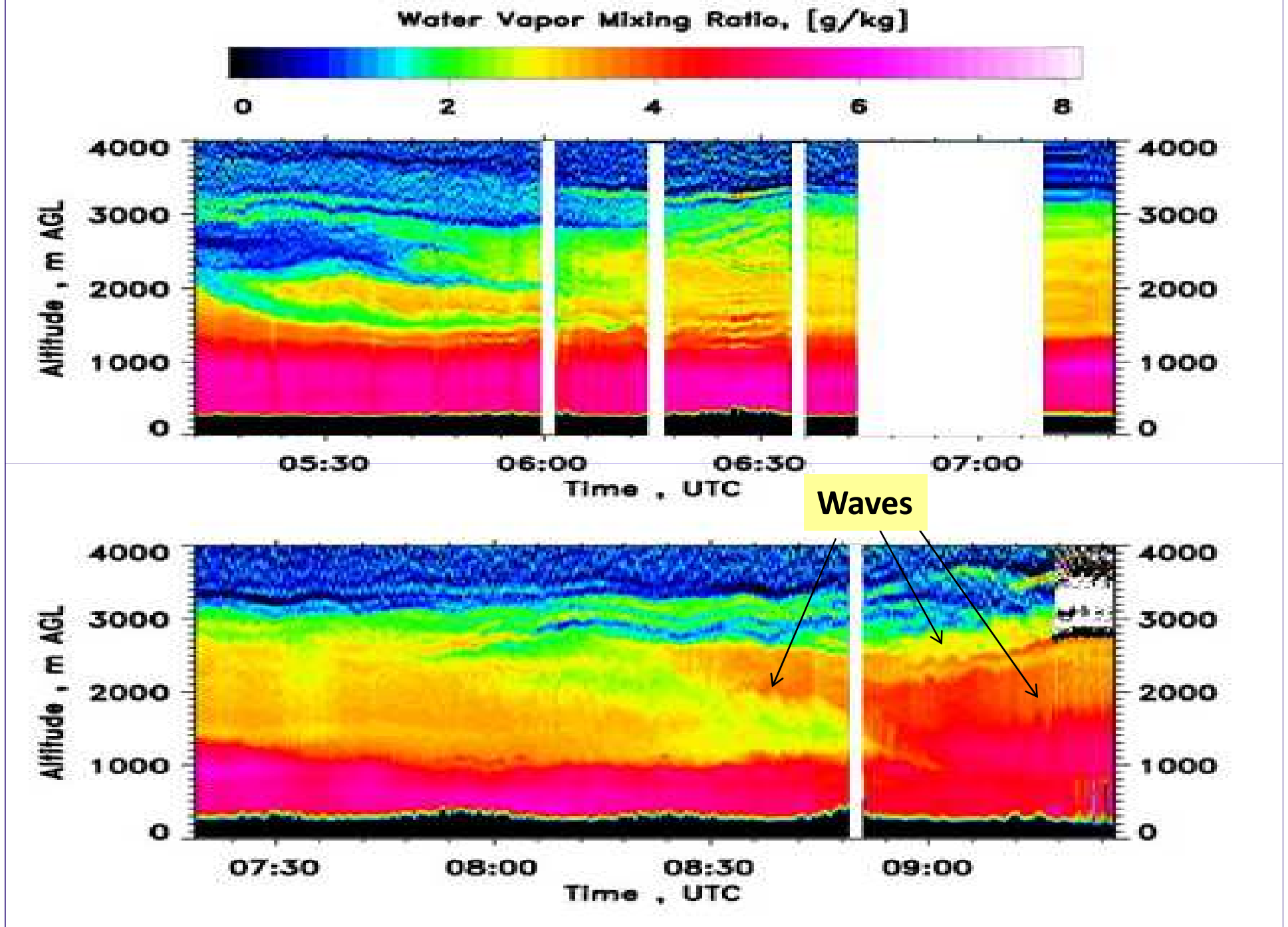
IOP 9c: POLDIRAD & Karlsruhe Radar, 1000 UTC

IOP 9c: UHOH RRL

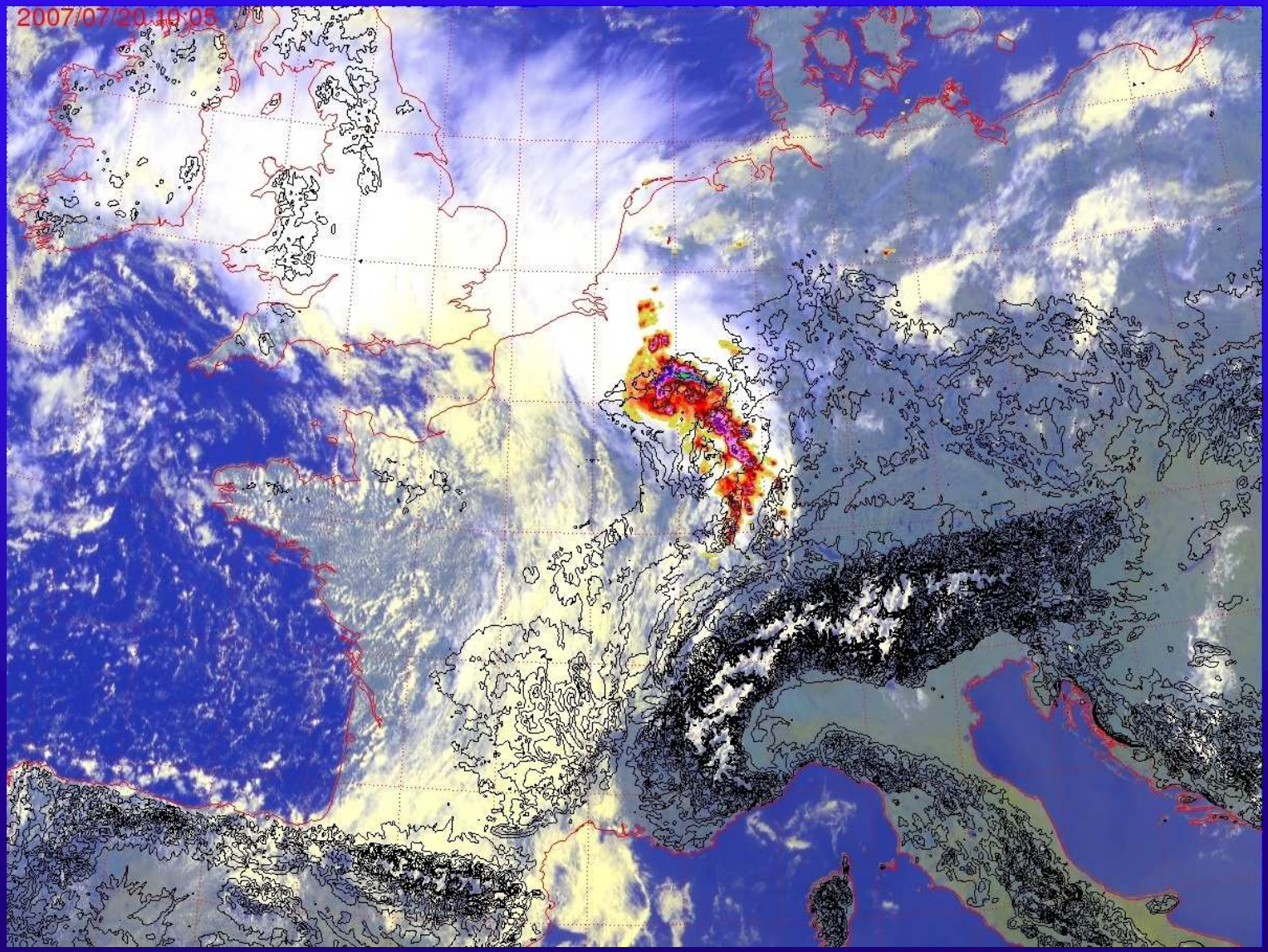


IOP 9c: UHOH RRL & DIAL

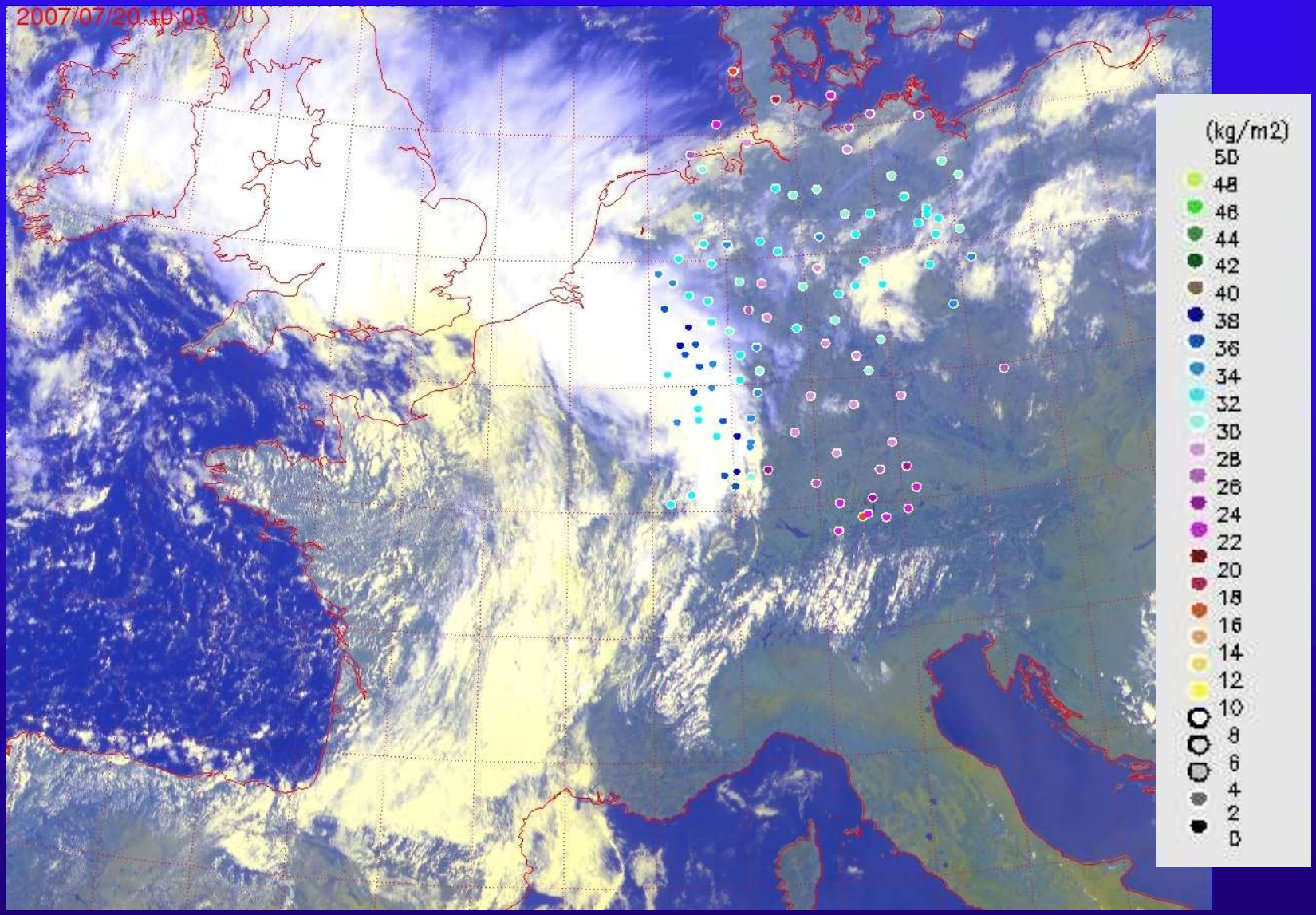



Water Vapor Mixing Ratio, [g/kg]
0
2
4
6
8
Altitude , m AGL
4000
3000
2000
1000
0
05:30
06:00
06:30
07:00
Time , UTC
Waves
07:30
08:00
08:30
09:00

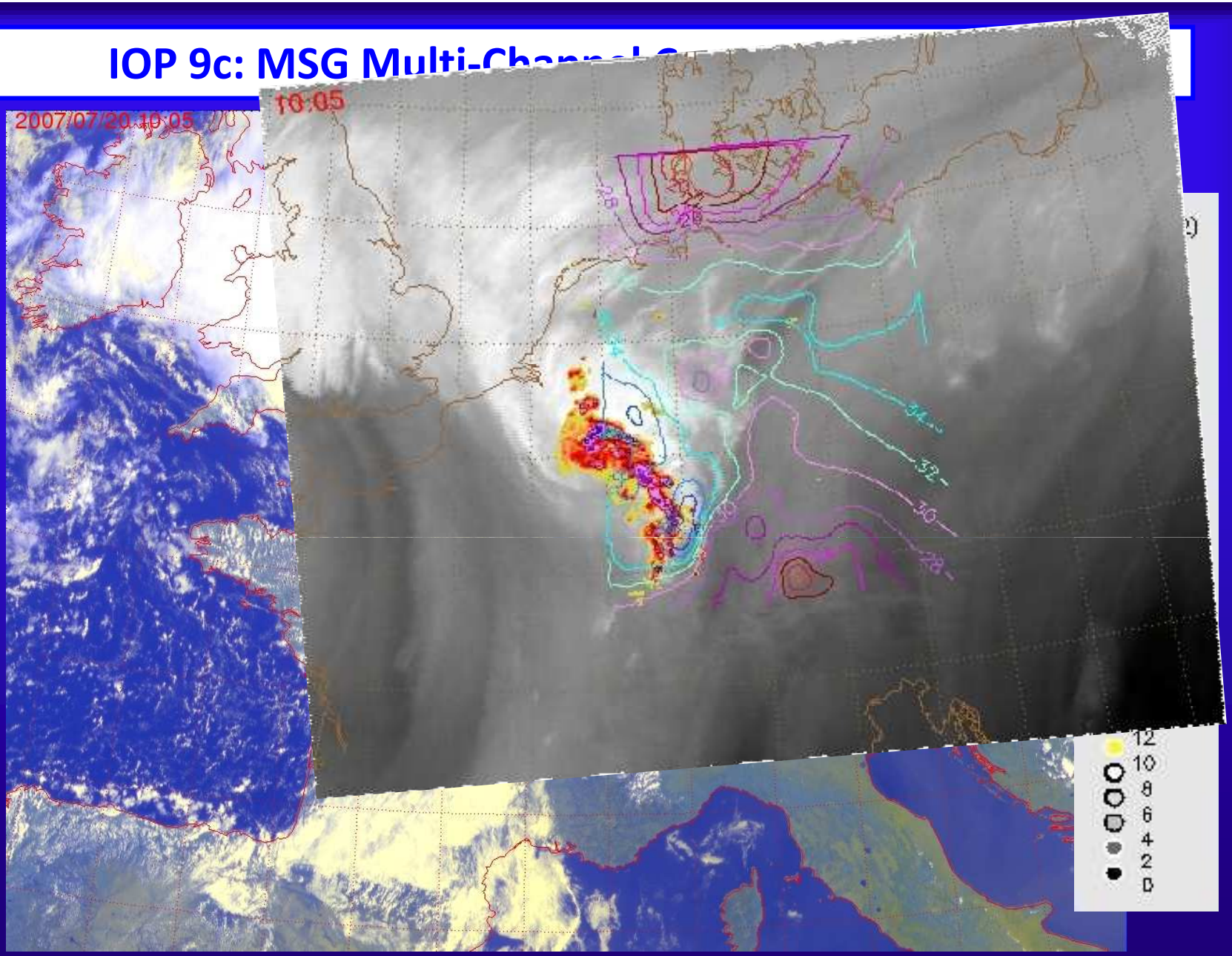
IOP 9c: MSG Multi-Channel Compisite + DWD Radar



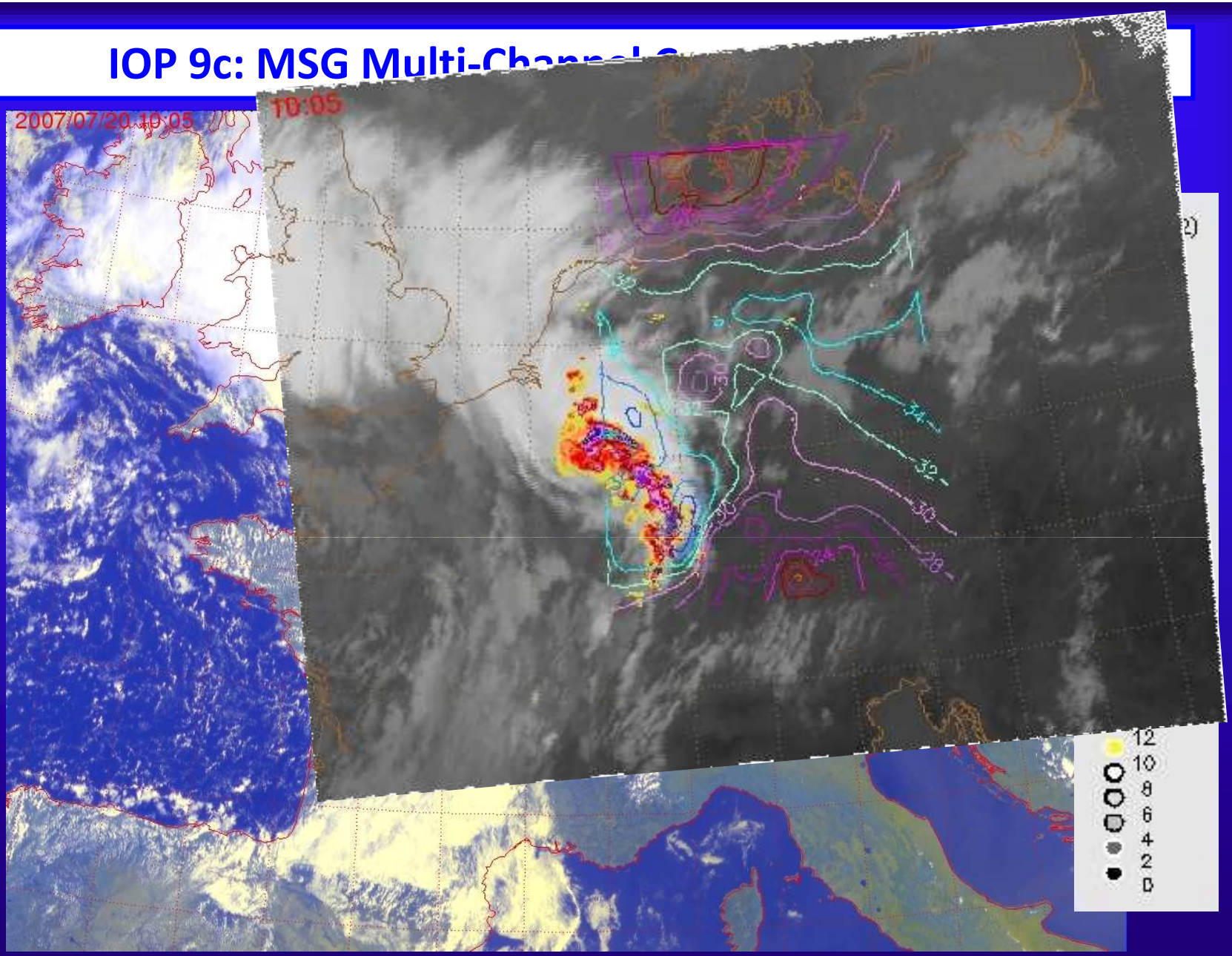
IOP 9c: MSG Multi-Channel Compisite + GPS IWV



IOP 9c: MSG Multi-Channel C



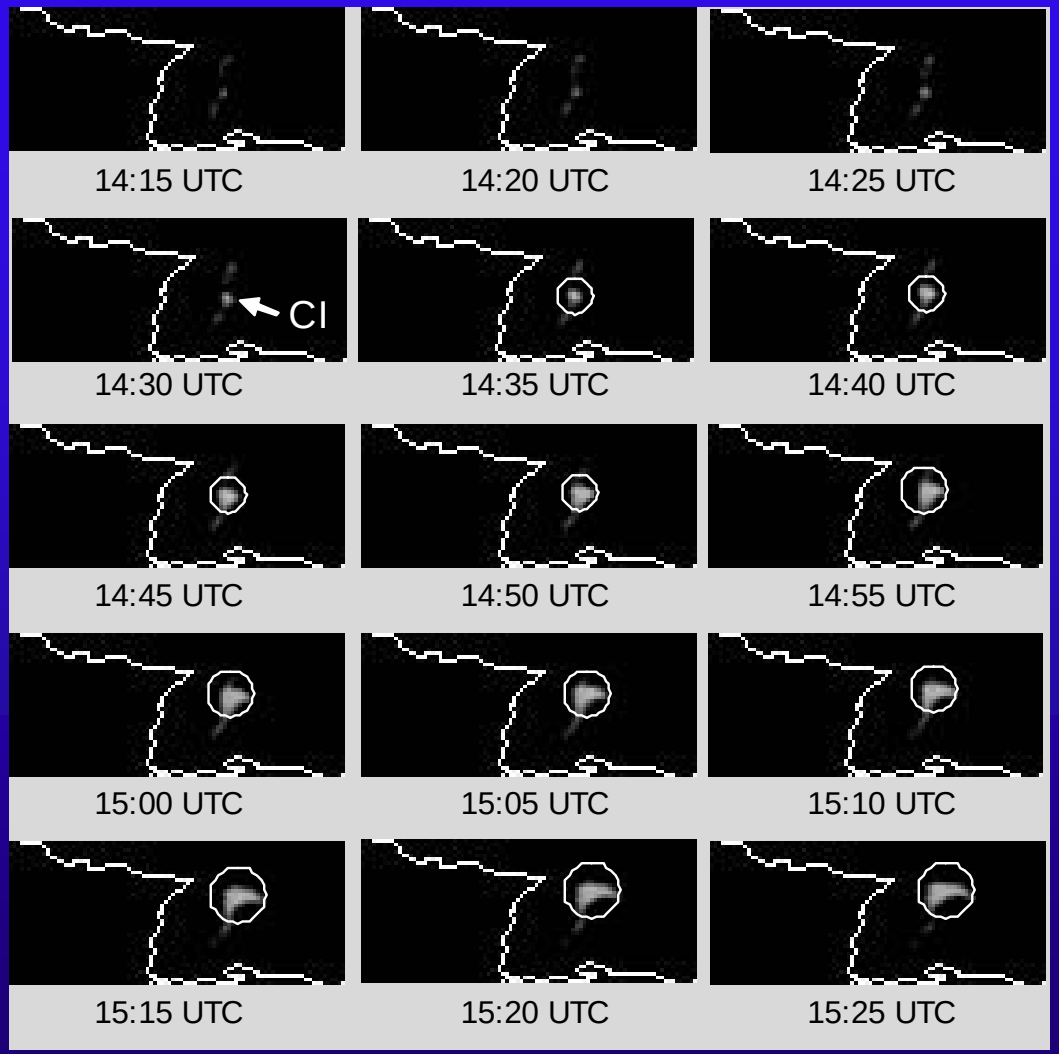
IOP 9c: MSG Multi-Channel C



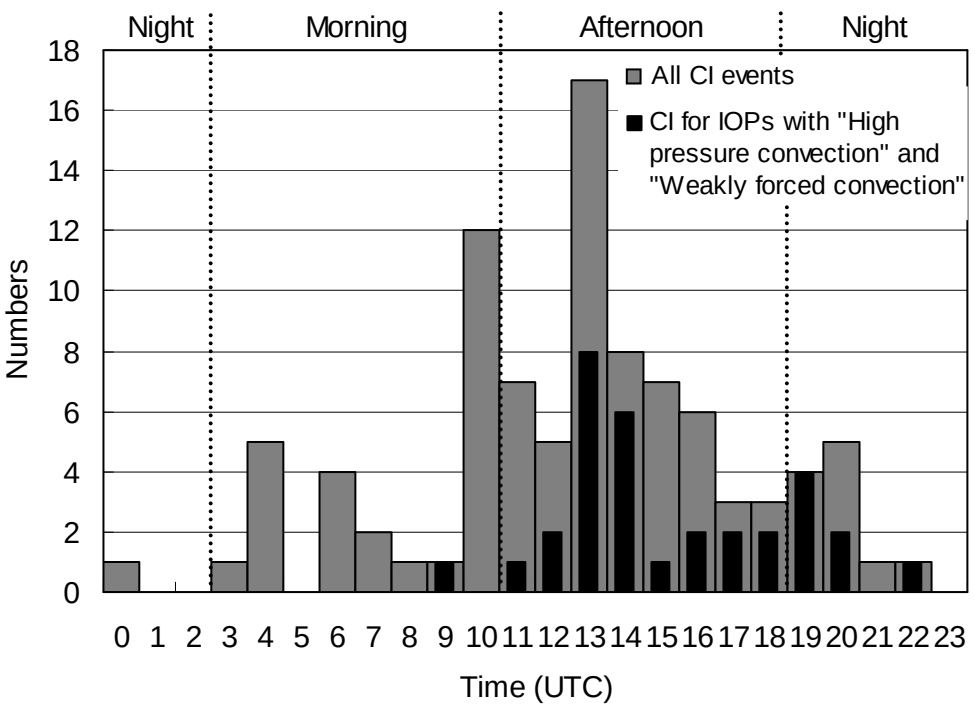
IOP 8b, 15 July 2007

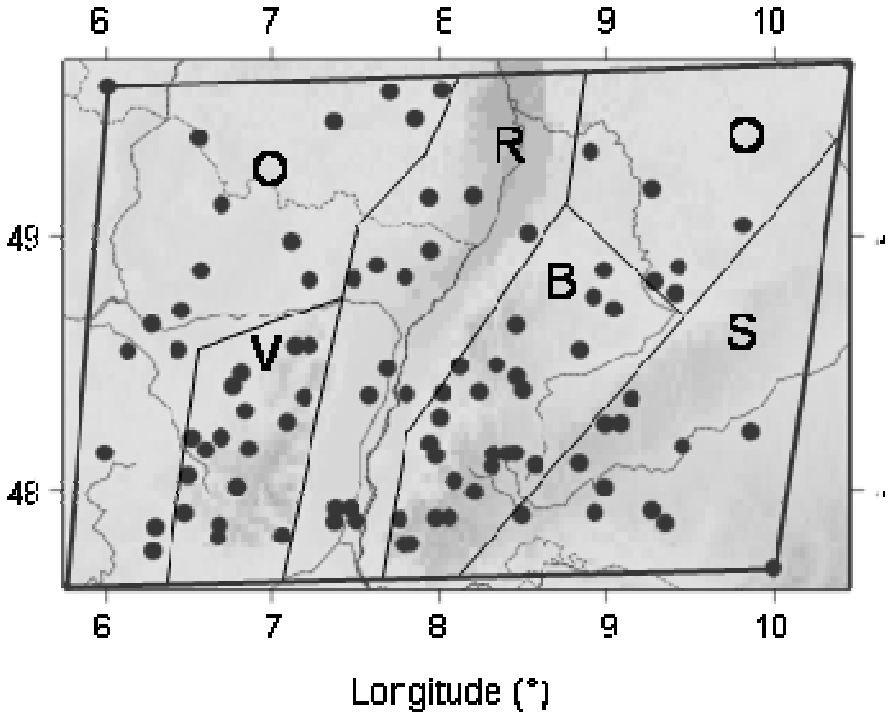
IOP 8b: MSG Rapid Scan Data

10.8-µm Channel



CI Statistics by MSG Rapid Scan Data

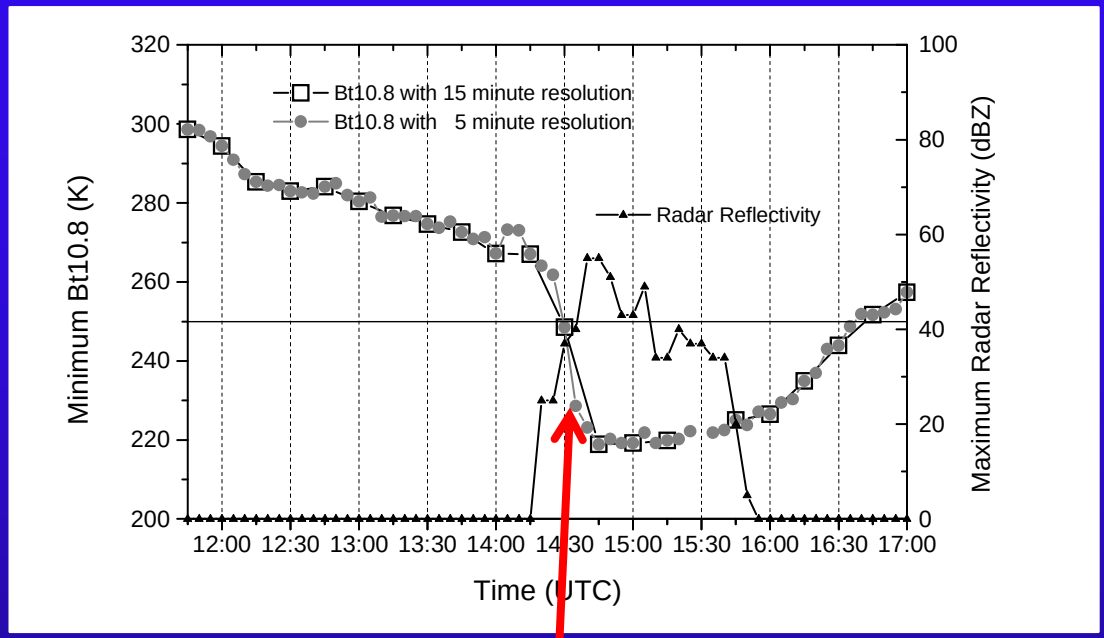




94 CI events on 30 analysed IOP days.

Aoshima et al., Meteorol. Z., November 2008.

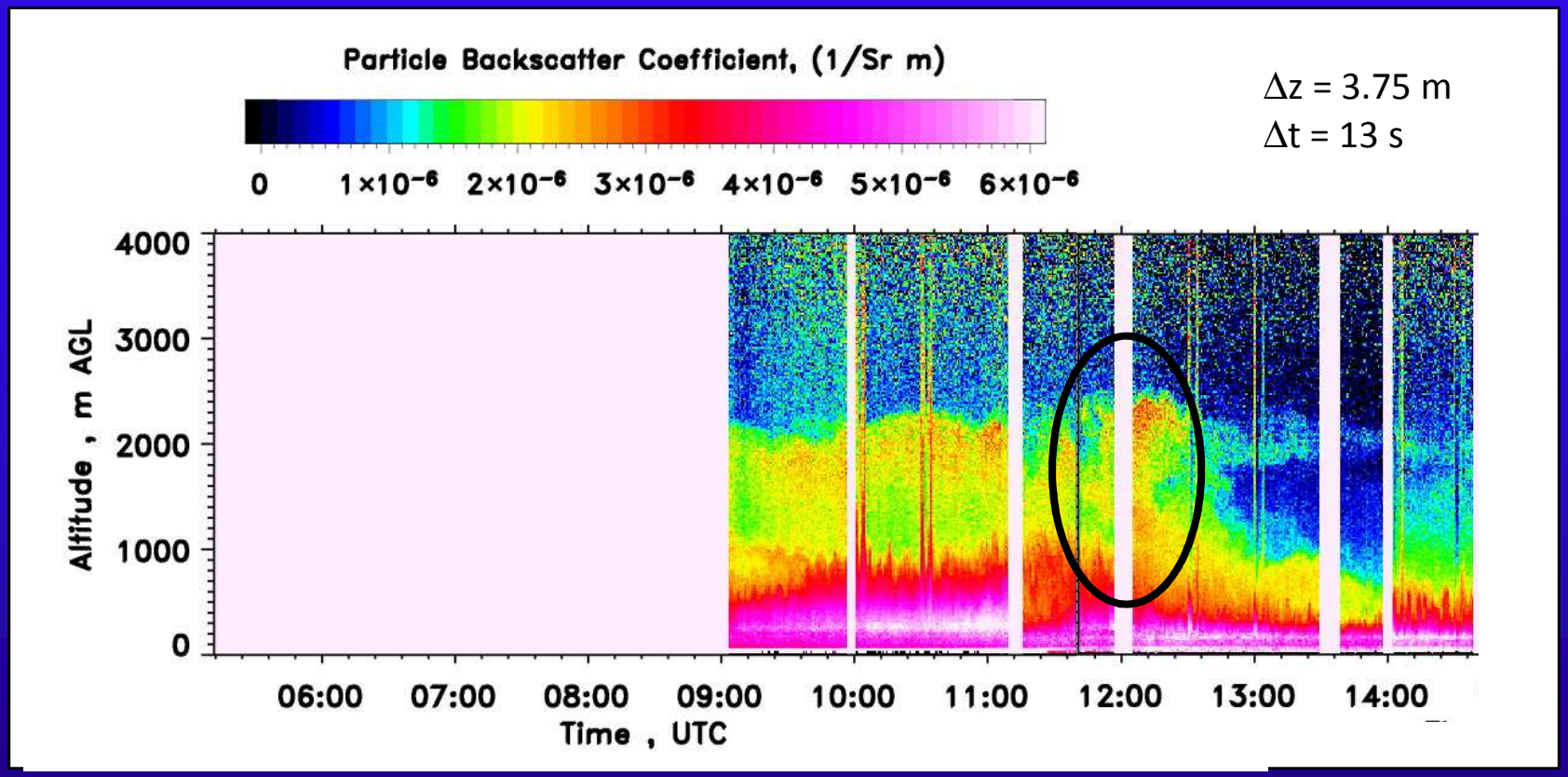
IOP 8b: MSG Rapid Scan Data



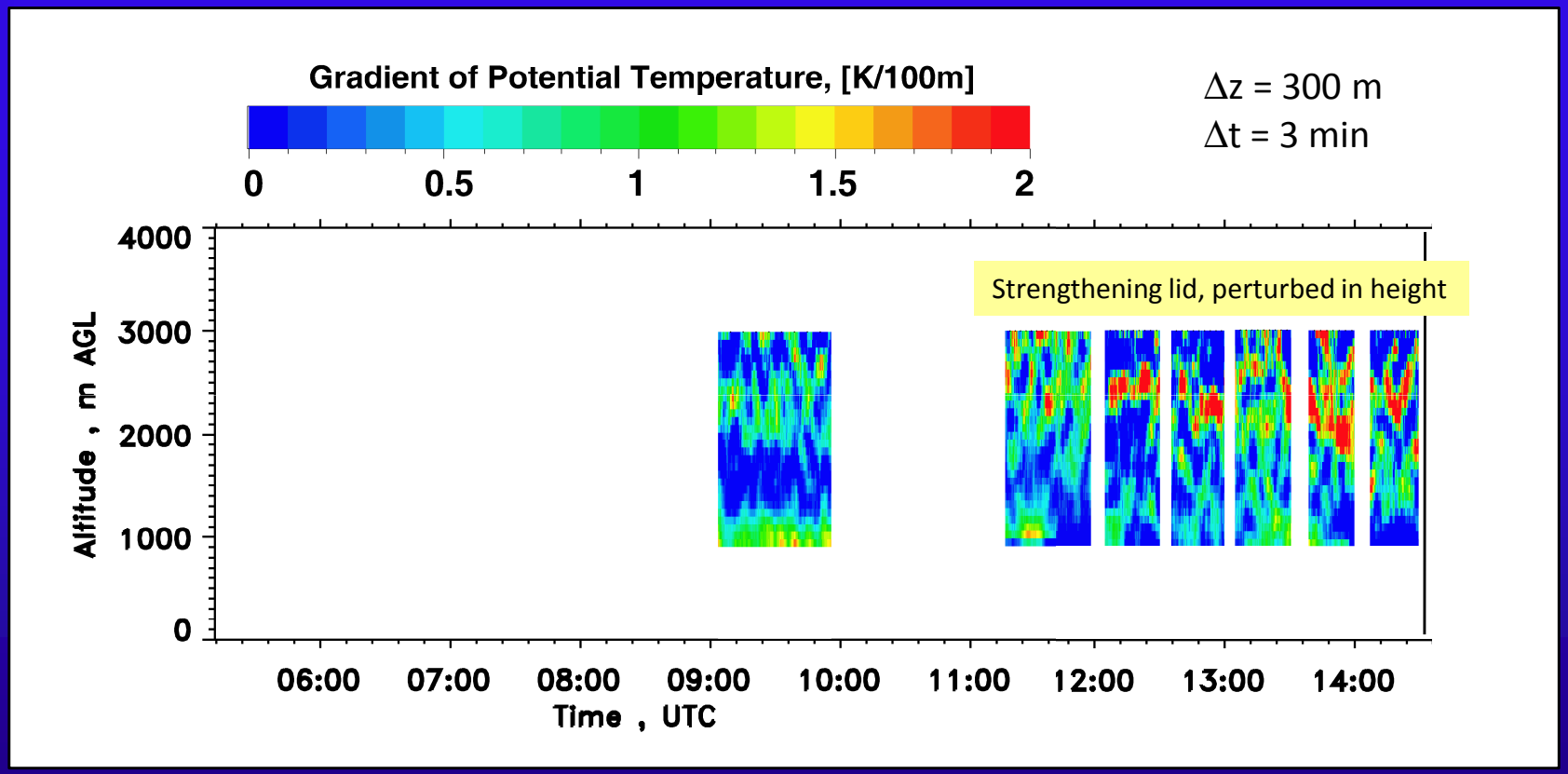
-4.0 K/minute

Aoshima et al., Meteorol. Z., November 2008.

IOP 8b: UHOH RRL

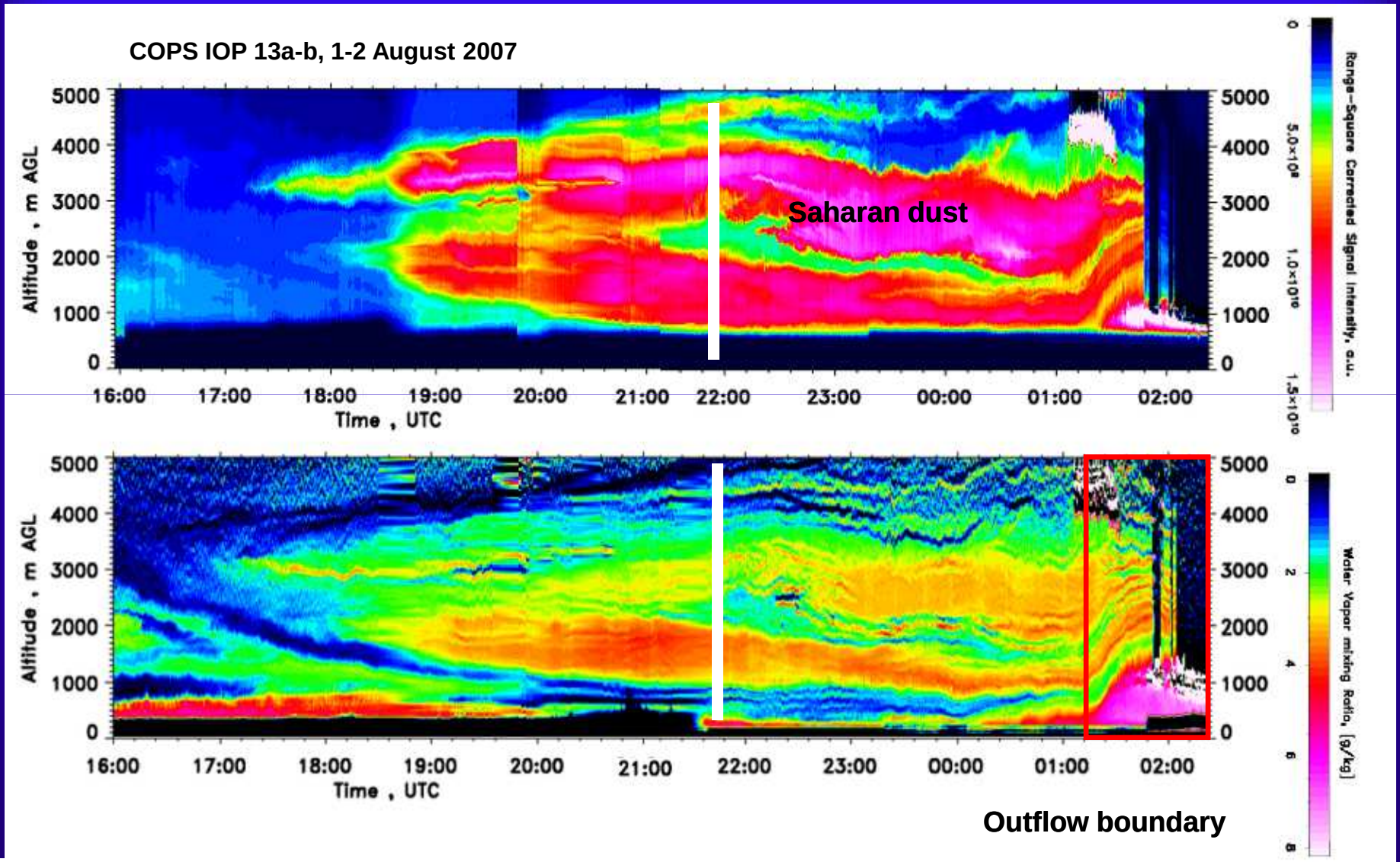


IOP 8b: UHOH RRL

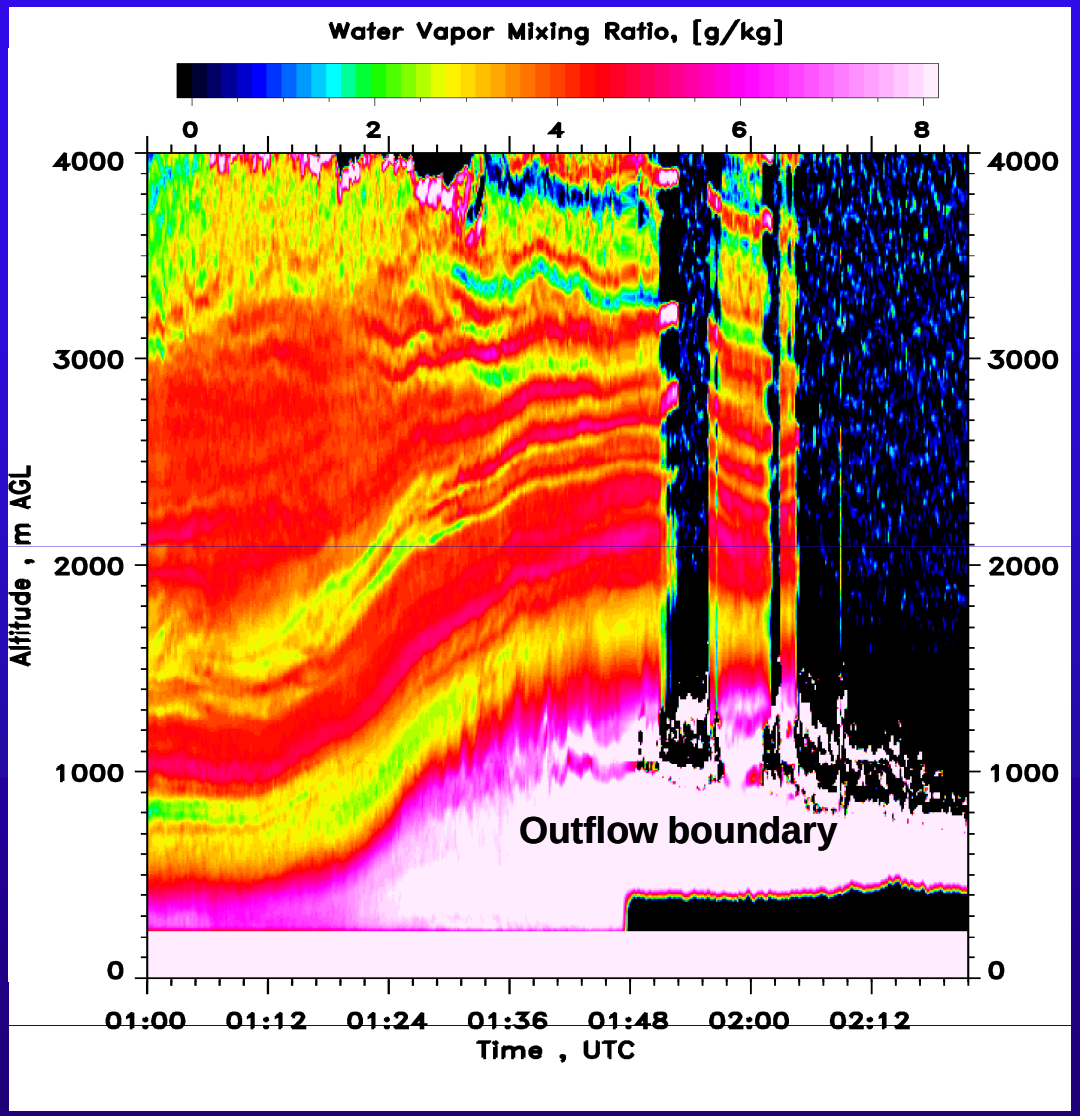


IOP 13a/b, 1/2 August 2007

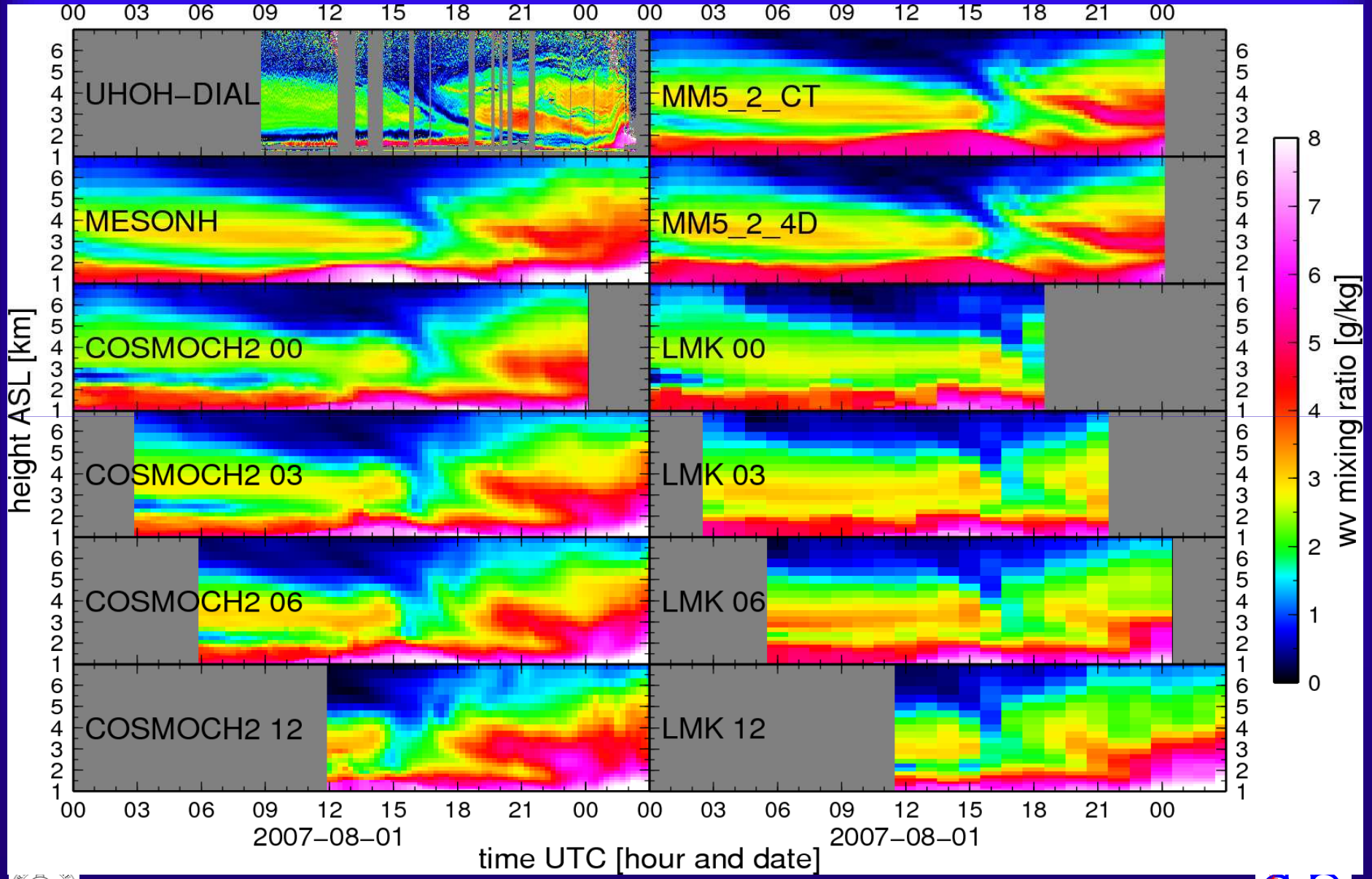
IOP 13a/b: UHOH DIAL



IOP 13a/b: UHOH DIAL



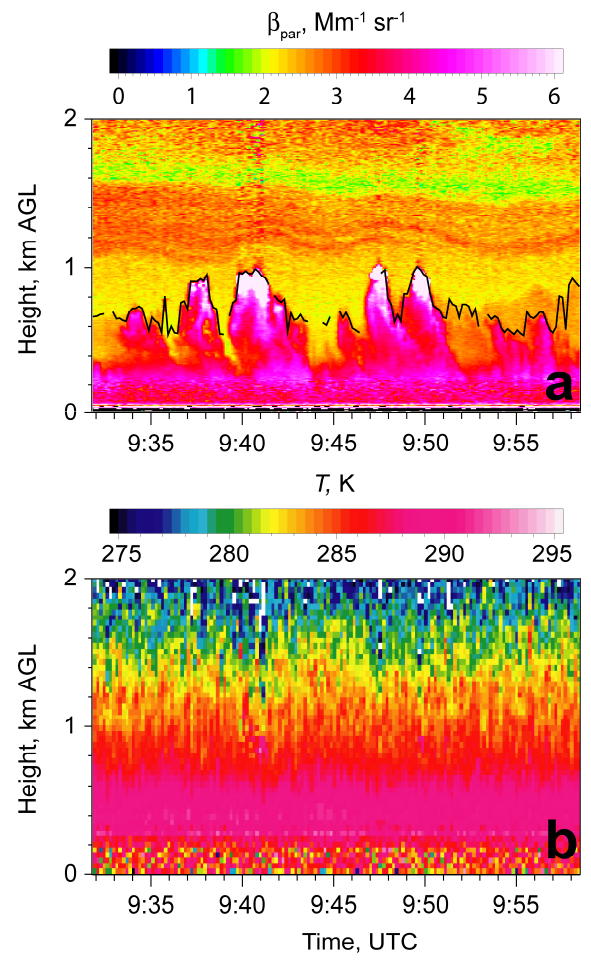
IOP 13 a/b: Comparison of UHOH DIAL and Mesoscale Models

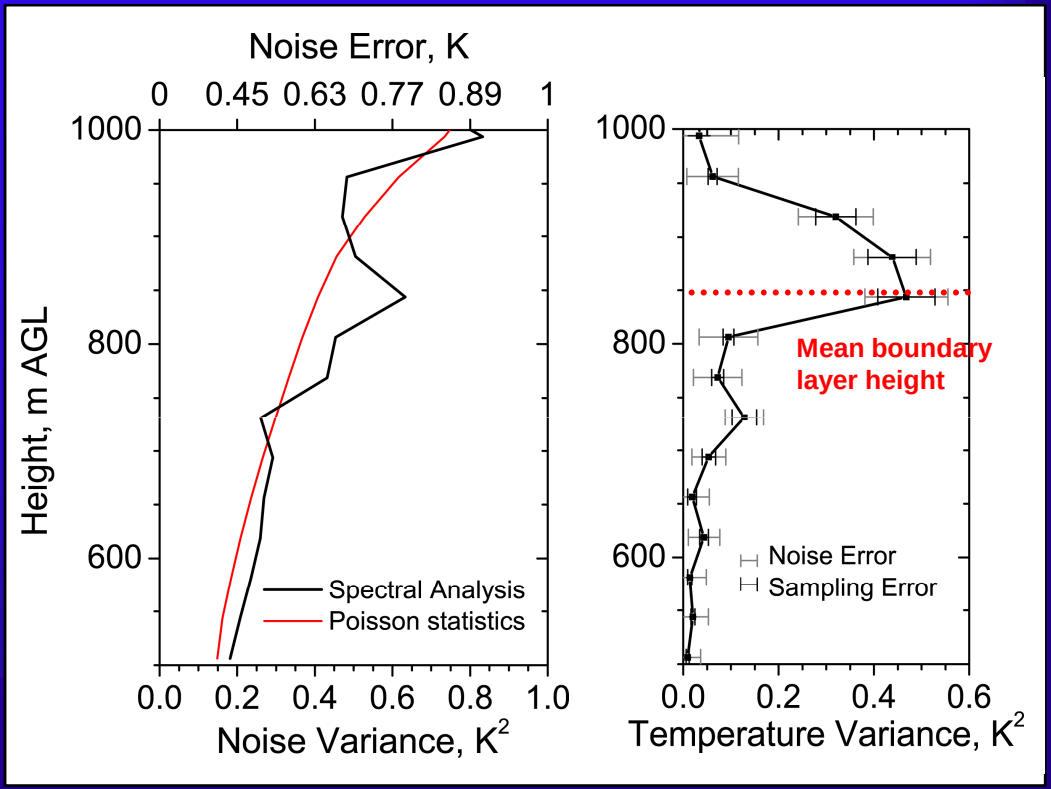


IOP 3a, 14 June (weakly forced convection): UHOH RRL

Δt = 10 s
Δr = 3.75 m

Δt = 10 s
Δr = 37.5 m
(75 m gl. av.)





IOP 9c

- Composite plots, CI sites, WiLi, BL Hornisgrinde: DIAL & RRL,
- Highlights for overview paper of COPS field phase

IOP 3a

- Temperature variance profile

IOP 8b

- CI locations of COPS, cloud top cooling rate

IOP 13a

- DIAL data versus D-PHASE models

Outlook

- Synergetic lidar data products: Latent & sensible heat fluxes, buoyancy, …

Composite plots (MSG, Radar, GPS IWV): Poster **C4**, Fumiko Aoshima et al.

UHOH DIAL: Poster **C6**, Sandip Pal et al.

UHOH RRL: Poster **C10**, Marcus Radlach et al.