



University of Salford
A Greater Manchester University



Characteristics of thermals as identified using Doppler lidar and microwave radiometer data

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Halo Photonics Doppler lidar and Radiometer Physics GmbH radiometer

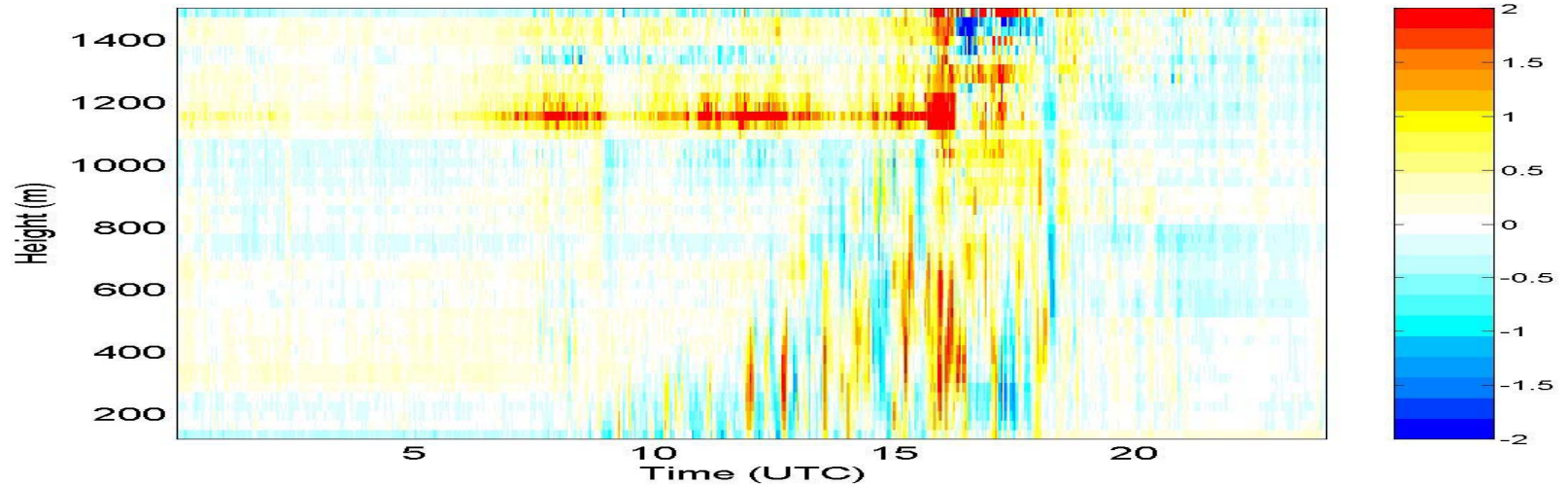


Data availability

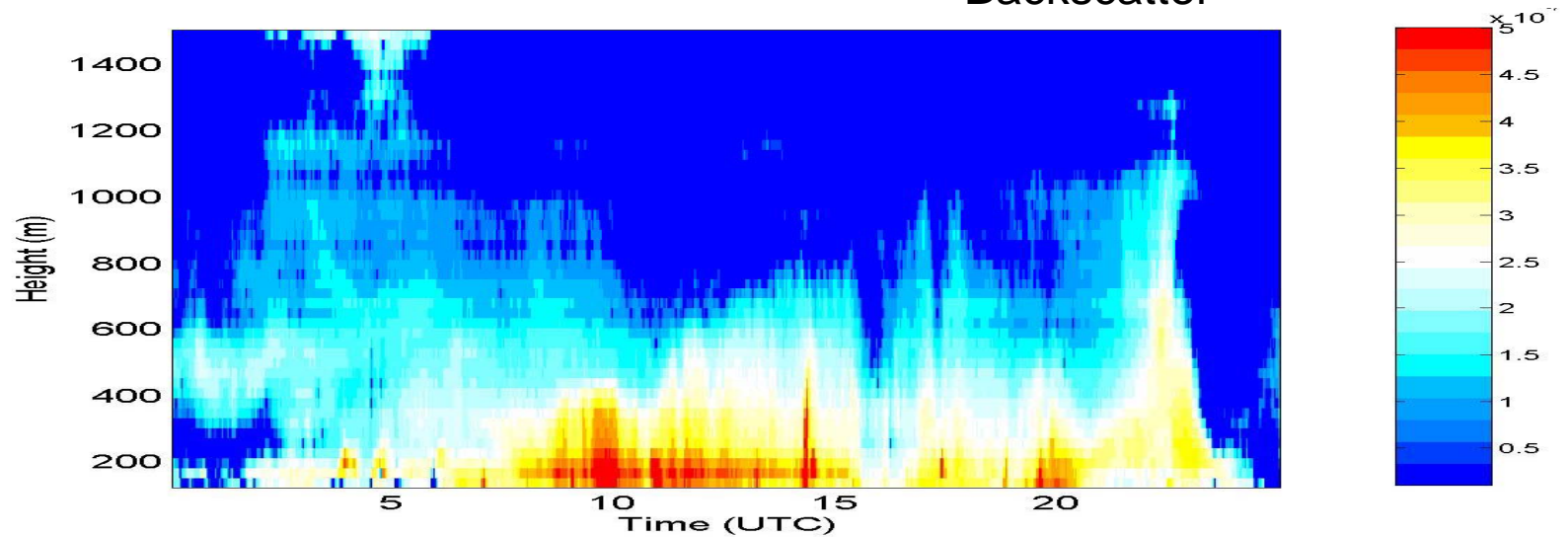
- **University of Salford Doppler Lidar**
- Switched On: 13/06/2007 at 14:30 UTC
- Switched Off: 16/08/2007 at 09:00 UTC
- **Non Functional :**
- From 14:00 UTC on 25/06/2007 to 00:00 on 26/06/2007. Then vertically pointing only from 00:00 to 14:00 on 26/06/2007: because of lightening strike.
- From 15:00 to 17:00 on 28/06/2007 due to problems with electronic interference with power supply.
- From 9:00 on 29/06/2007 to 21:00 on 30/06/2007 due to problems with electronic interference with power supply *as previous day*.
- From: 3:00 UTC on 09/08/2007 to 16:00 UTC on 11/08/2007 due power failure leading to software problem;
- **University of Salford RPG Microwave Radiometer**
- Switched On: 13/06/2007 at 10:30 UTC
- Switched Off: 15/08/2007 at 23:00 UTC
- No gaps in data but initial analysis shows some problems with excessive condensation on radome screen during the mornings. This was noted on the 28th July and subsequent to this the screen was dried each morning.
- **Data upload:**
- Radiometer intercomparison being done by Susanne Crewell (Uni of Koeln) and water vapour line, oxygen line and boundary layer brightness temp data has been sent to Susanne who will upload these on the database. Other data is not yet in NetCDF format.
- **Data Analysis:**
- Only preliminary quick look done so far.

15 July 2007: development of thermals

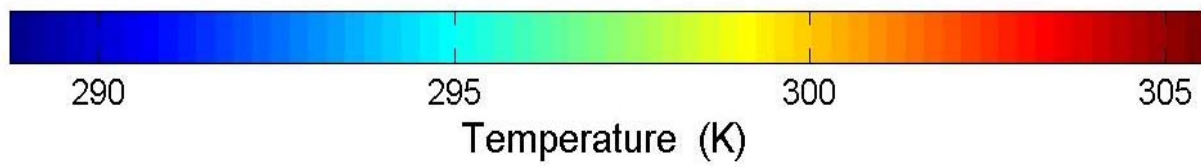
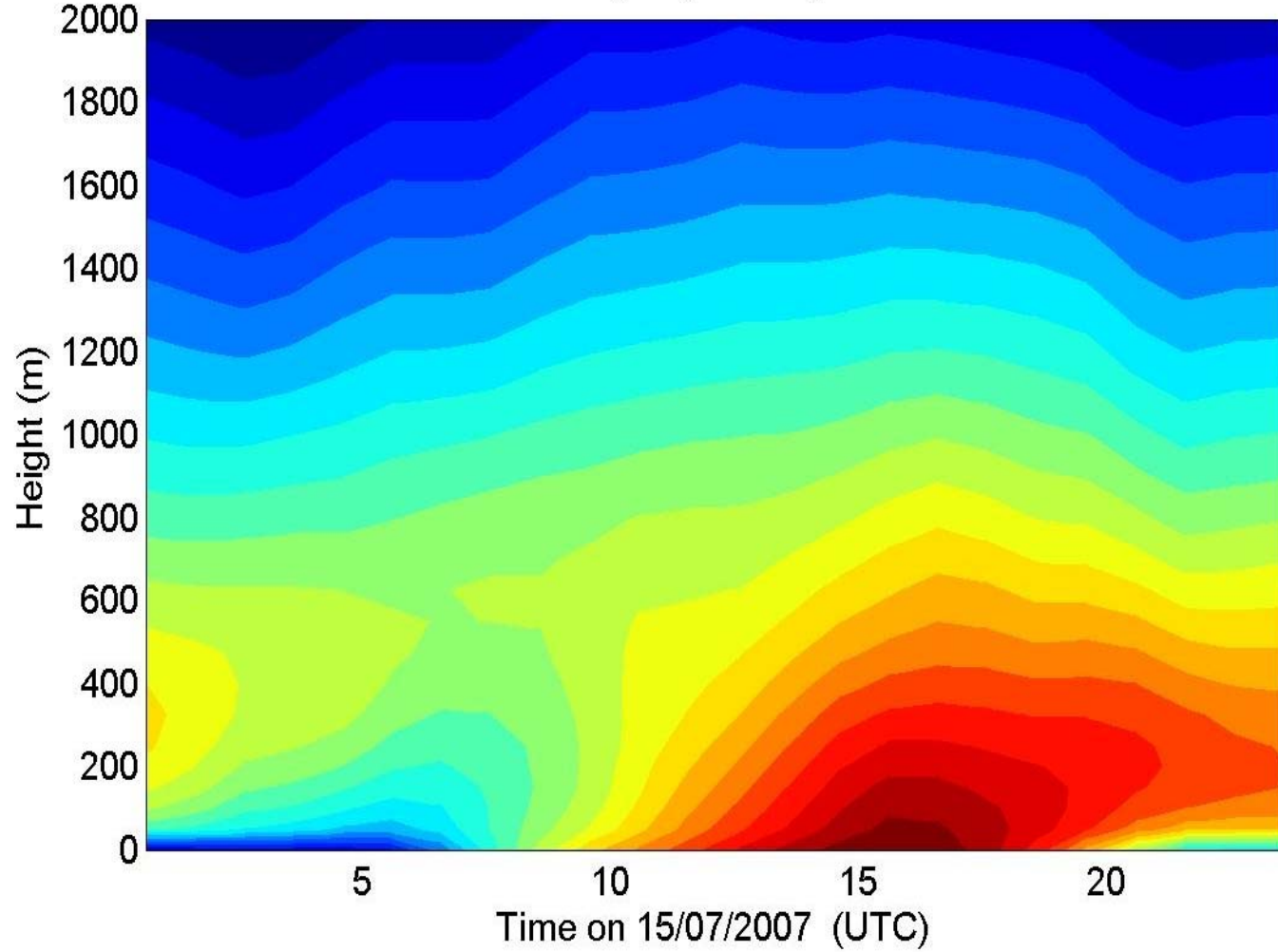
Vertical velocity (m/s)



Backscatter



Boundary Layer Temperature



Achern

1000 UTC

mb 250

KM FT(x1000)

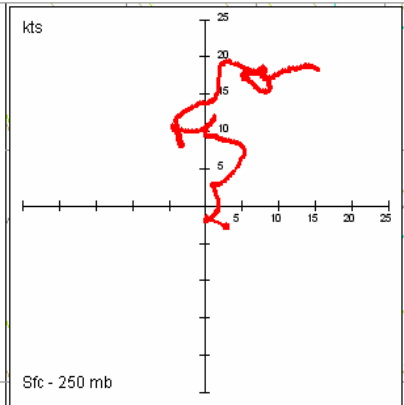
Raob Data

Pres:
Hgt:
(MSL)
±Std:
Temp:
Td:
T-Td:
RH:
PT:
ePT:
Tmax:
Wind:
Hgt:
(MSL)

Diagram Data

Pres:
Hgt:
(MSL)
Temp:
PT:
ePT:
MixR:

Stn Elev. 136 m
QNH = 1015.0 mb
DA: 755 m, ISA

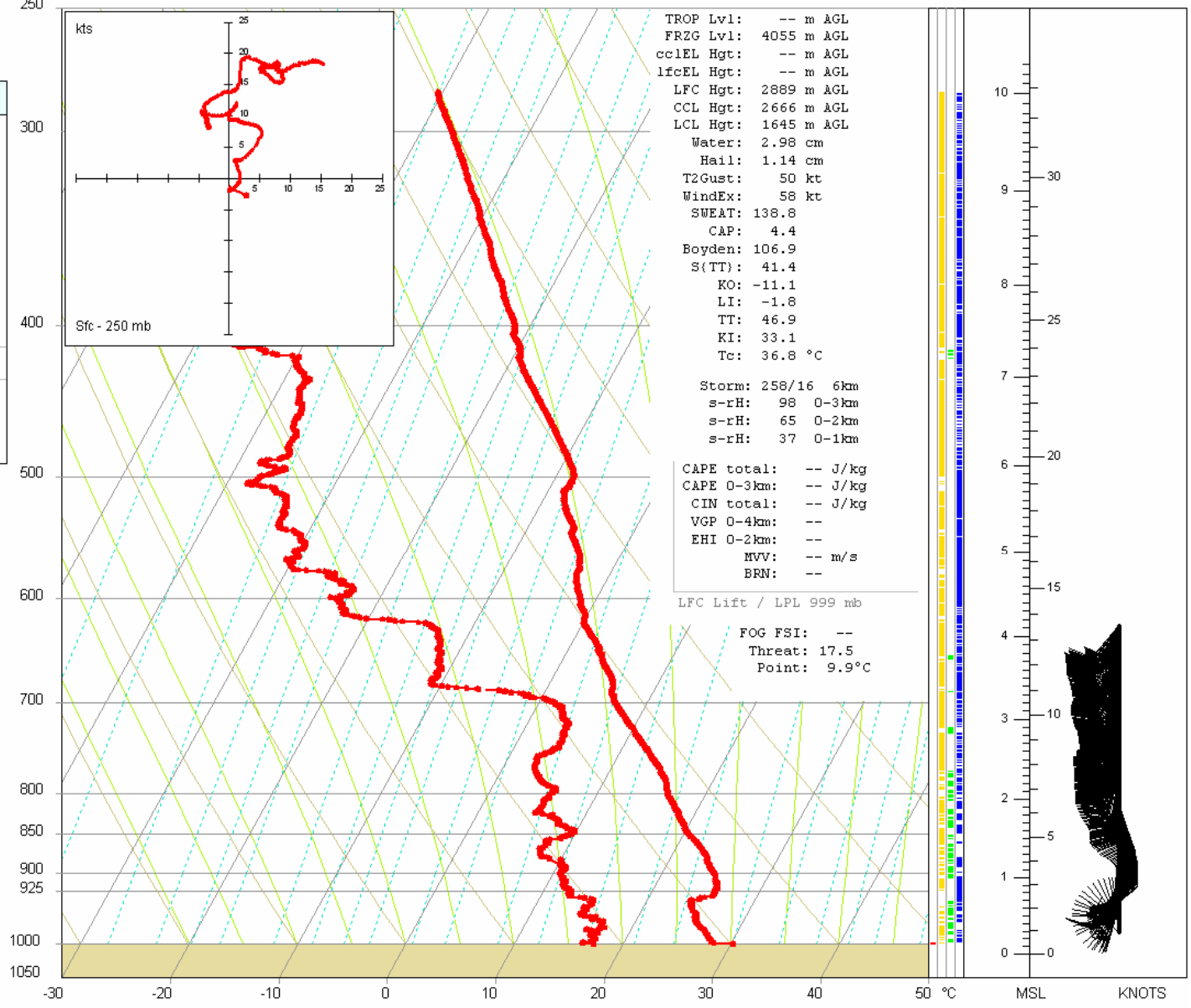


TROP Lvl: -- m AGL
FRZG Lvl: 4055 m AGL
ce1EL Hgt: -- m AGL
lfcEL Hgt: -- m AGL
LFC Hgt: 2889 m AGL
CCL Hgt: 2666 m AGL
LCL Hgt: 1645 m AGL
Water: 2.98 cm
Hail: 1.14 cm
T2Gust: 50 kt
WindEx: 58 kt
SWEAT: 138.8
CAP: 4.4
Boydex: 106.9
S(TT): 41.4
KO: -11.1
LI: -1.8
TT: 46.9
KI: 33.1
Tc: 36.8 °C

Storm: 258/16 6km
s-rH: 98 0-3km
s-rH: 65 0-2km
s-rH: 37 0-1km

CAPE total: -- J/kg
CAPE 0-3km: -- J/kg
CIN total: -- J/kg
VGP 0-4km: --
EHI 0-2km: --
MVV: -- m/s
BRN: --

LFC Lift / LPL 999 mb
FOG FSI: --
Threat: 17.5
Point: 9.9°C



Achern 1300 UTC

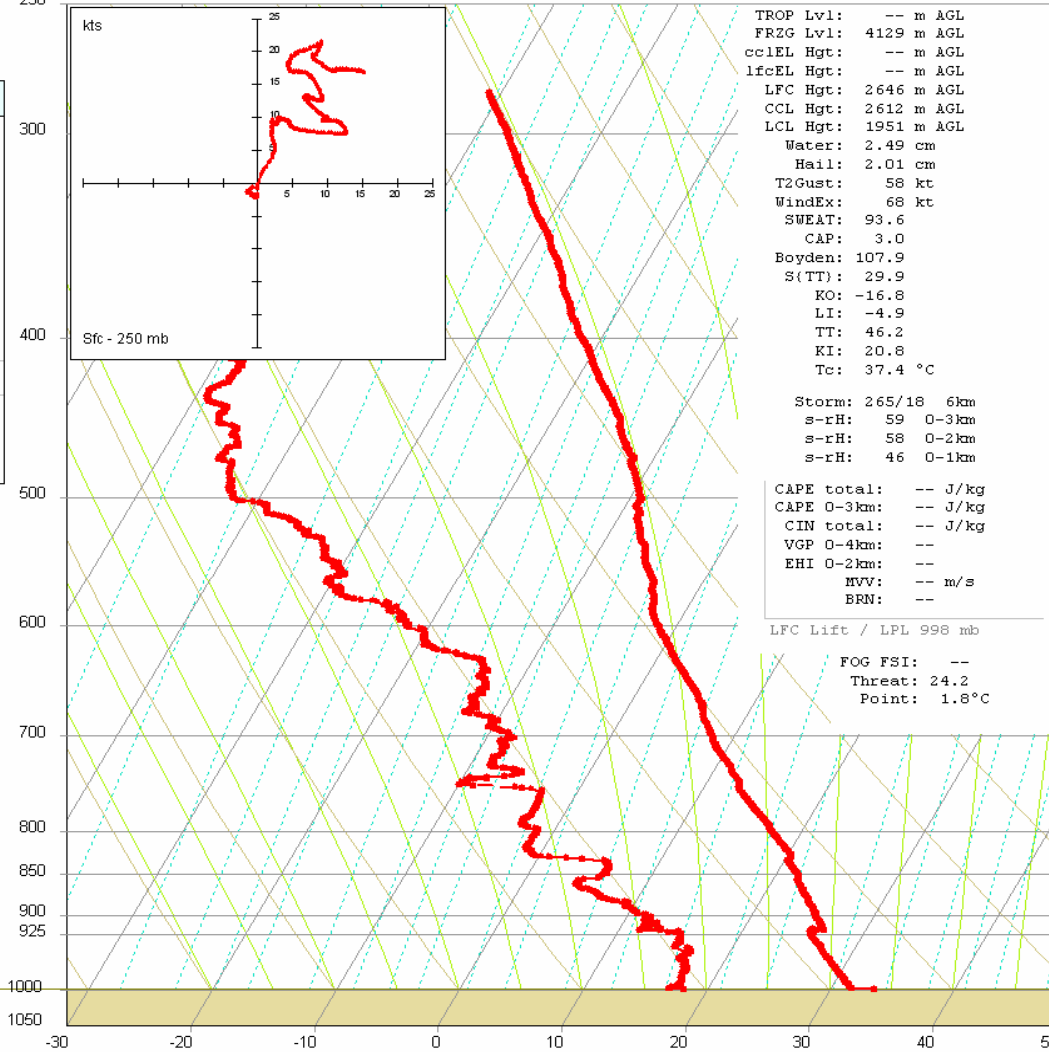
mb 250

KM FT (x1000)

Raob Data	
Pres:	
Hgt:	
(MSL)	
±Std:	
Temp:	
Td:	
T-Td:	
RH:	
PT:	
ePT:	
Tmax:	
Wind:	
Hgt:	
(MSL)	

Diagram Data	
Pres:	
Hgt:	
(MSL)	
Temp:	
PT:	
ePT:	
MixR:	

Stn Elev: 136 m
QNH = 1013.9 mb
DA: 880 m, ISA



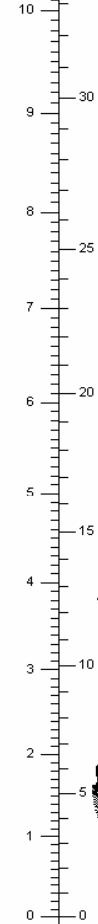
TROP Lvl: -- m AGL
FRZG Lvl: 4129 m AGL
cc1EL Hgt: -- m AGL
lfcEL Hgt: -- m AGL
LFC Hgt: 2646 m AGL
CCL Hgt: 2612 m AGL
LCL Hgt: 1951 m AGL
Water: 2.49 cm
Hail: 2.01 cm
T2Gust: 58 kt
WindEx: 68 kt
SWEAT: 93.6
CAP: 3.0
Boydex: 107.9
S(TT): 29.9
KO: -16.8
LI: -4.9
TT: 46.2
KI: 20.8
Tc: 37.4 °C

Storm: 265/18 6km
s-rH: 59 0-3km
s-rH: 58 0-2km
s-rH: 46 0-1km

CAPE total: -- J/kg
CAPE 0-3km: -- J/kg
CIN total: -- J/kg
VGP 0-4km: --
EHI 0-2km: --
MVV: -- m/s
BRN: --

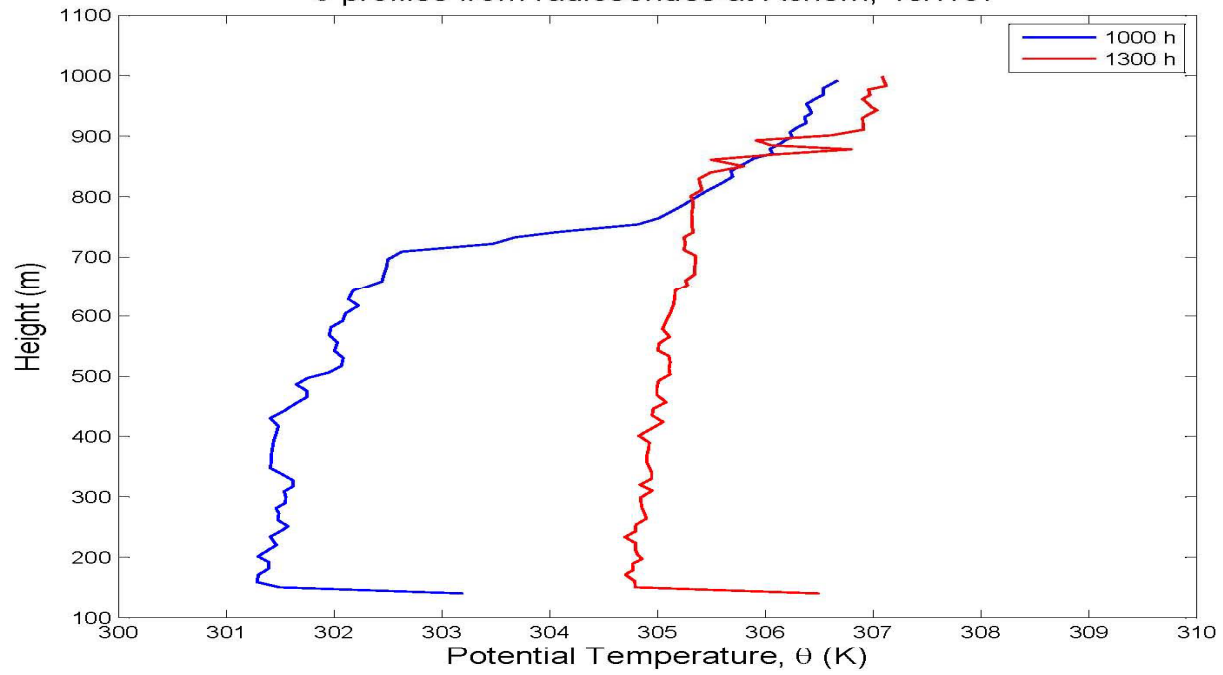
LFC Lift / LPL 998 mb

FOG FSI: --
Threat: 24.2
Point: 1.8 °C

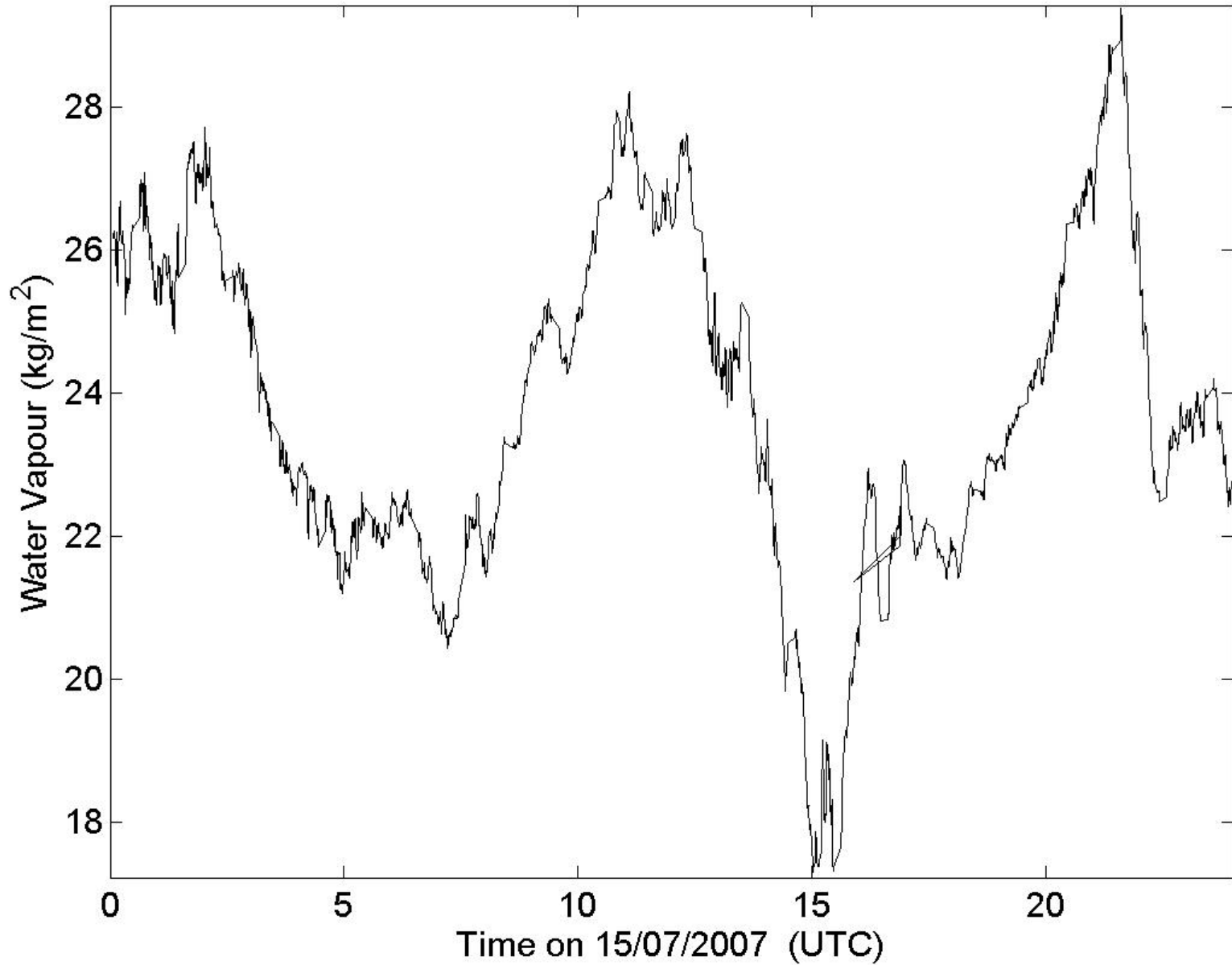


-30 -20 -10 0 10 20 30 40 50 °C MSL KNOTS

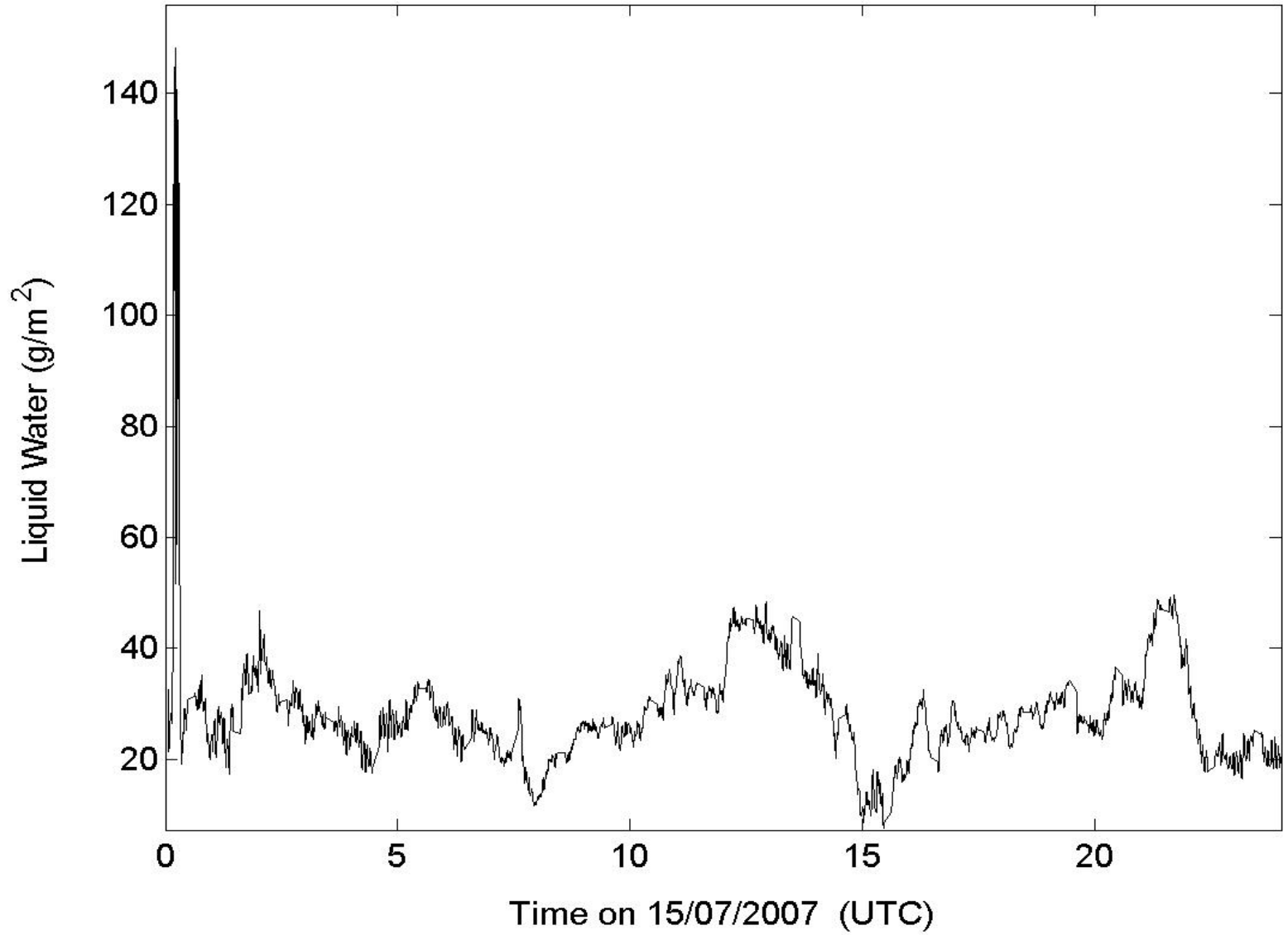
θ profiles from radiosondes at Achern, 15/7/07



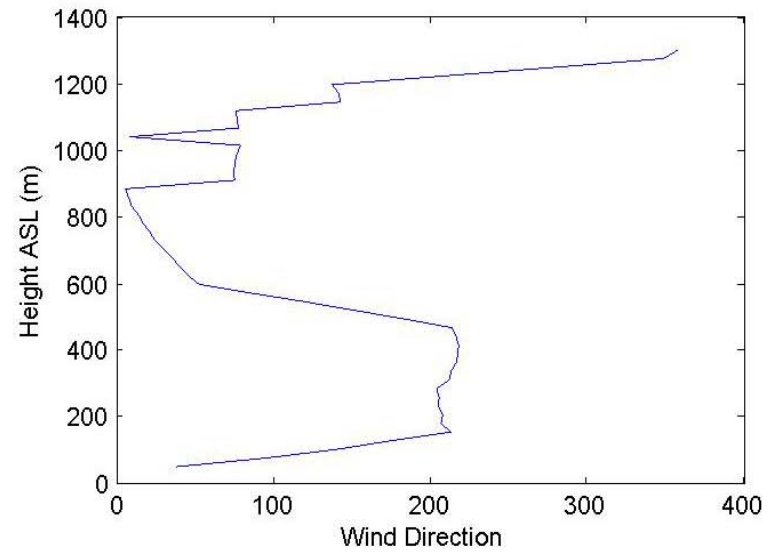
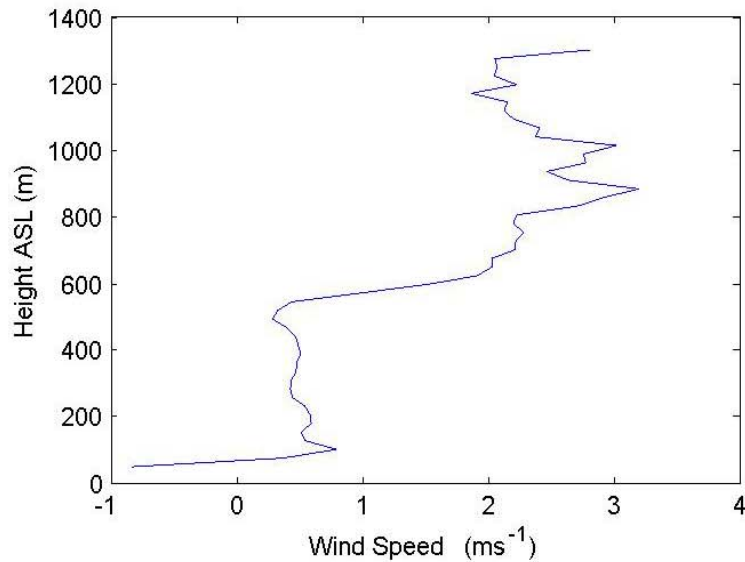
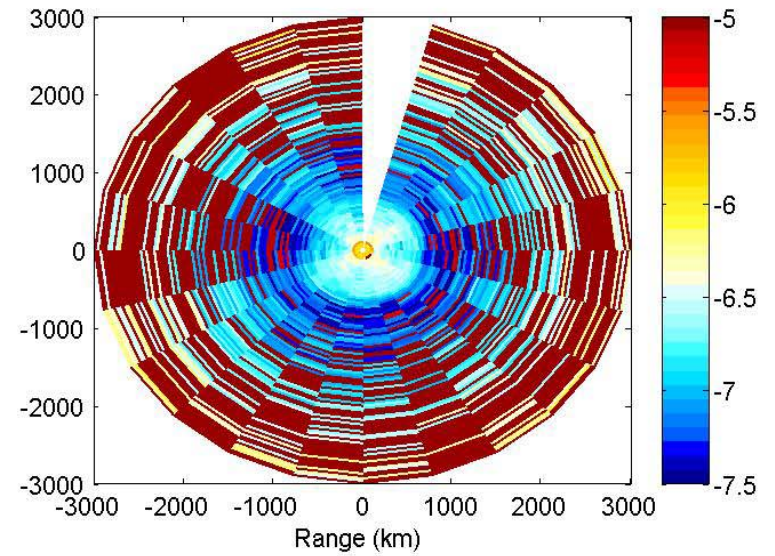
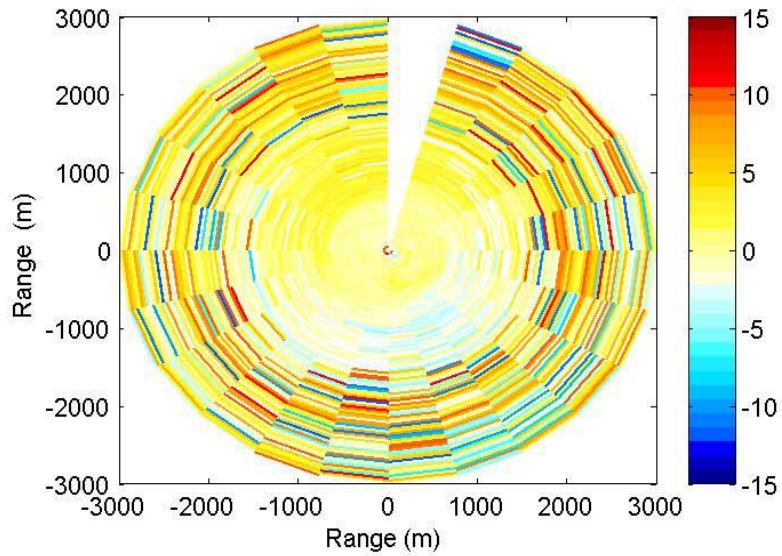
Integrated Water Vapour



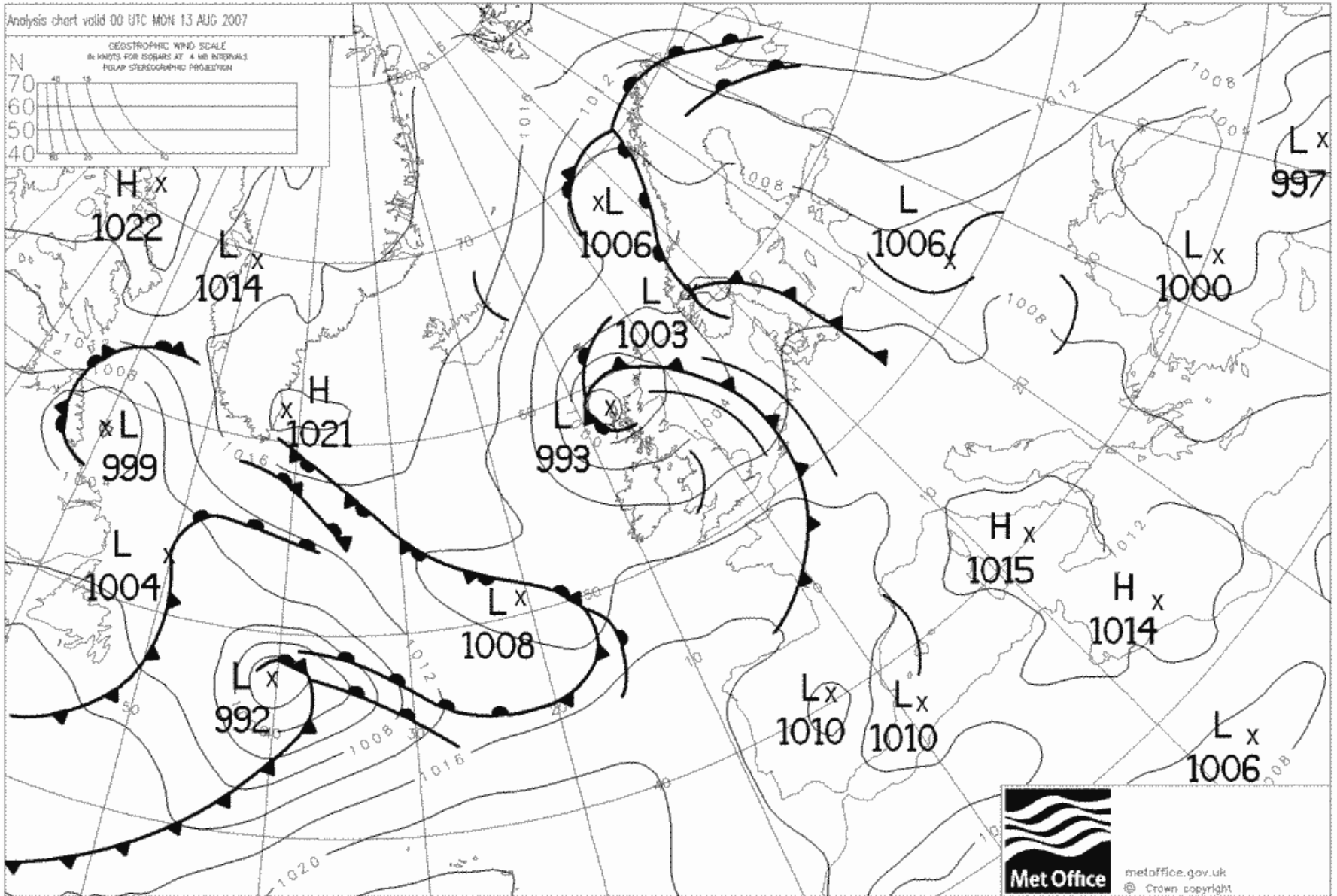
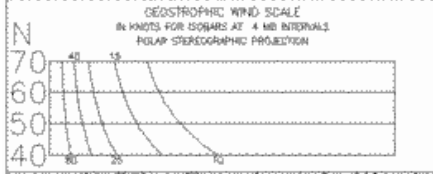
Liquid Water Path



15 July 2007 11UTC



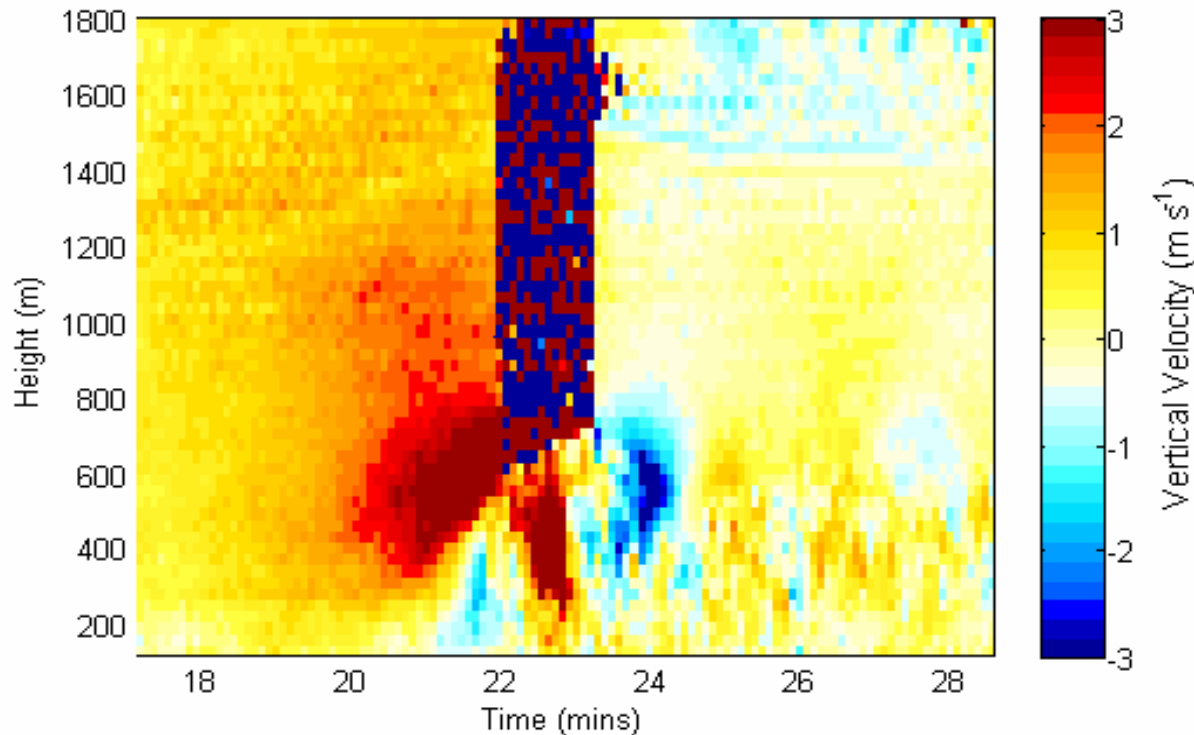
Analysis chart valid 00 UTC MON 13 AUG 2007



metoffice.gov.uk
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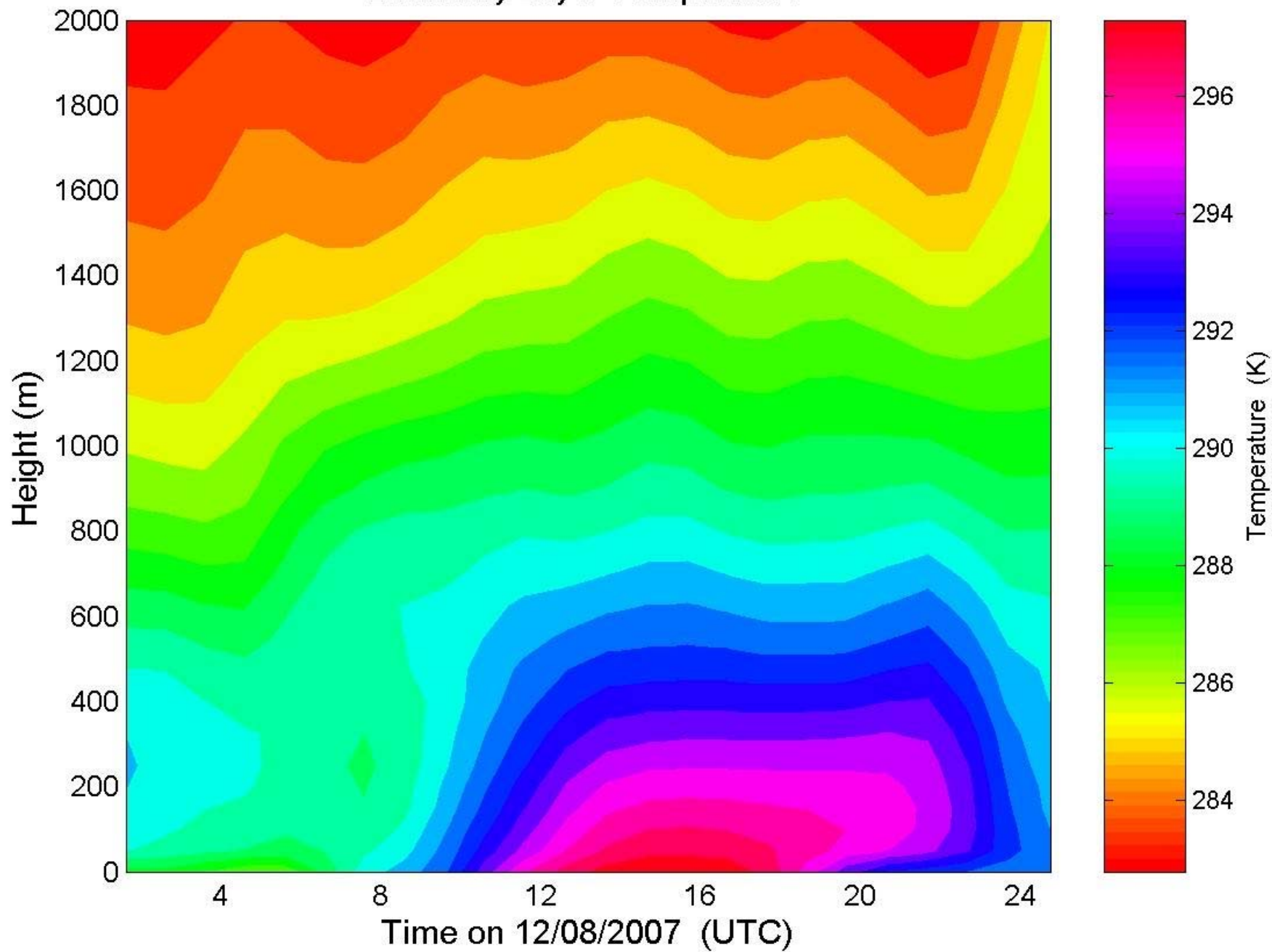
12 August 2007: density current thunderstorm outflow

Vertical Velocity (m s^{-1}) taken on
12:08:2007
at
23:04:59

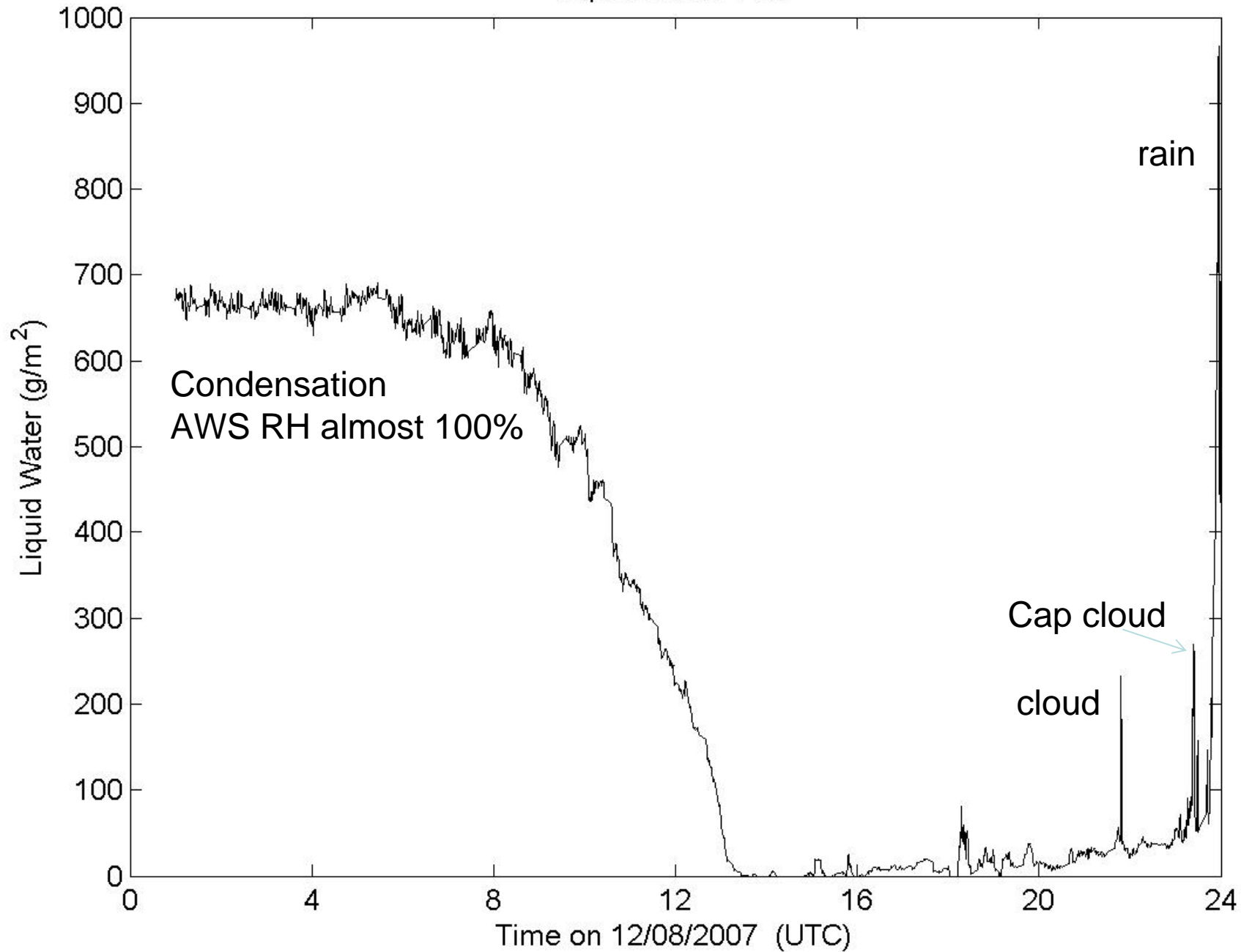


1°C drop in temperature

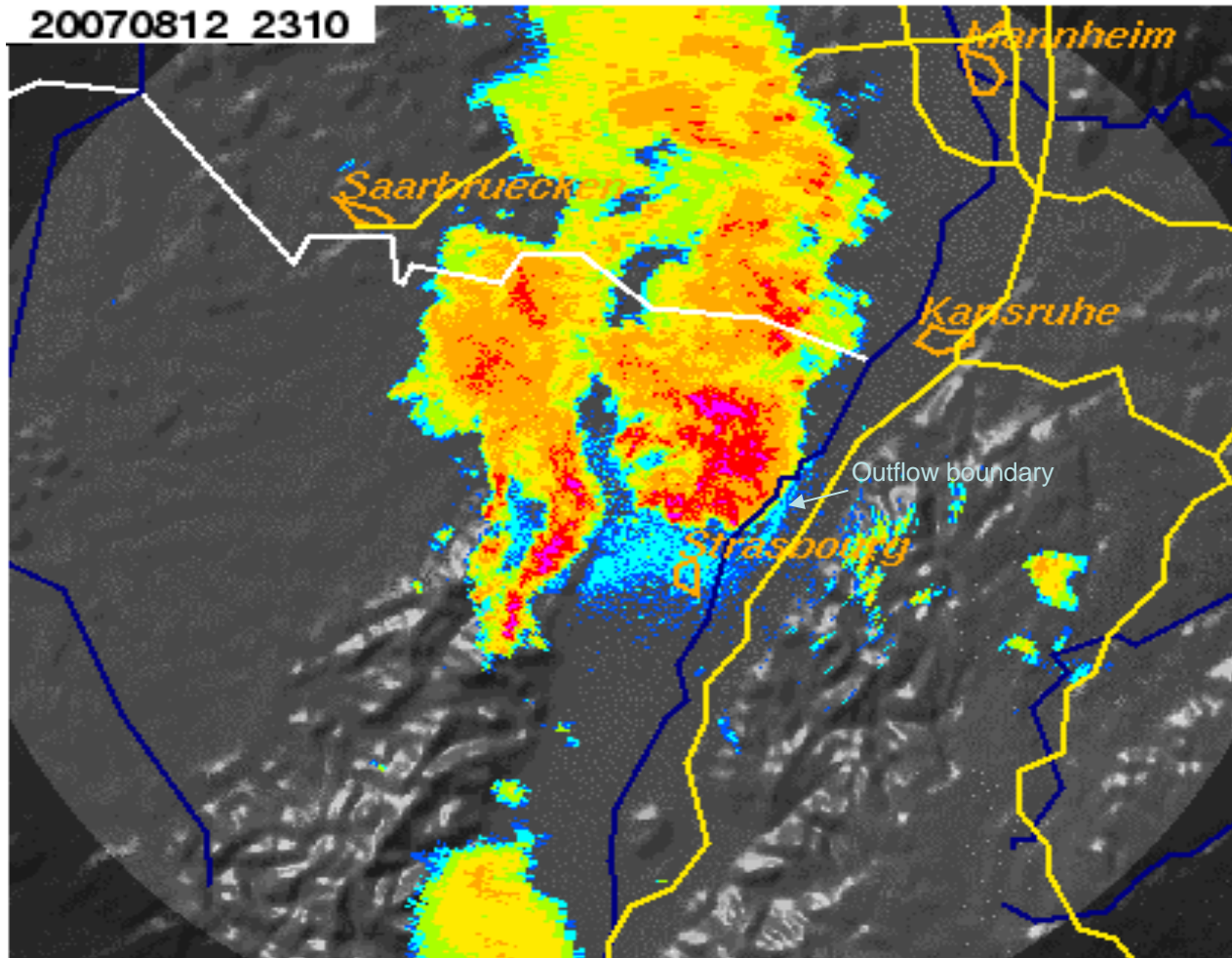
Boundary Layer Temperature



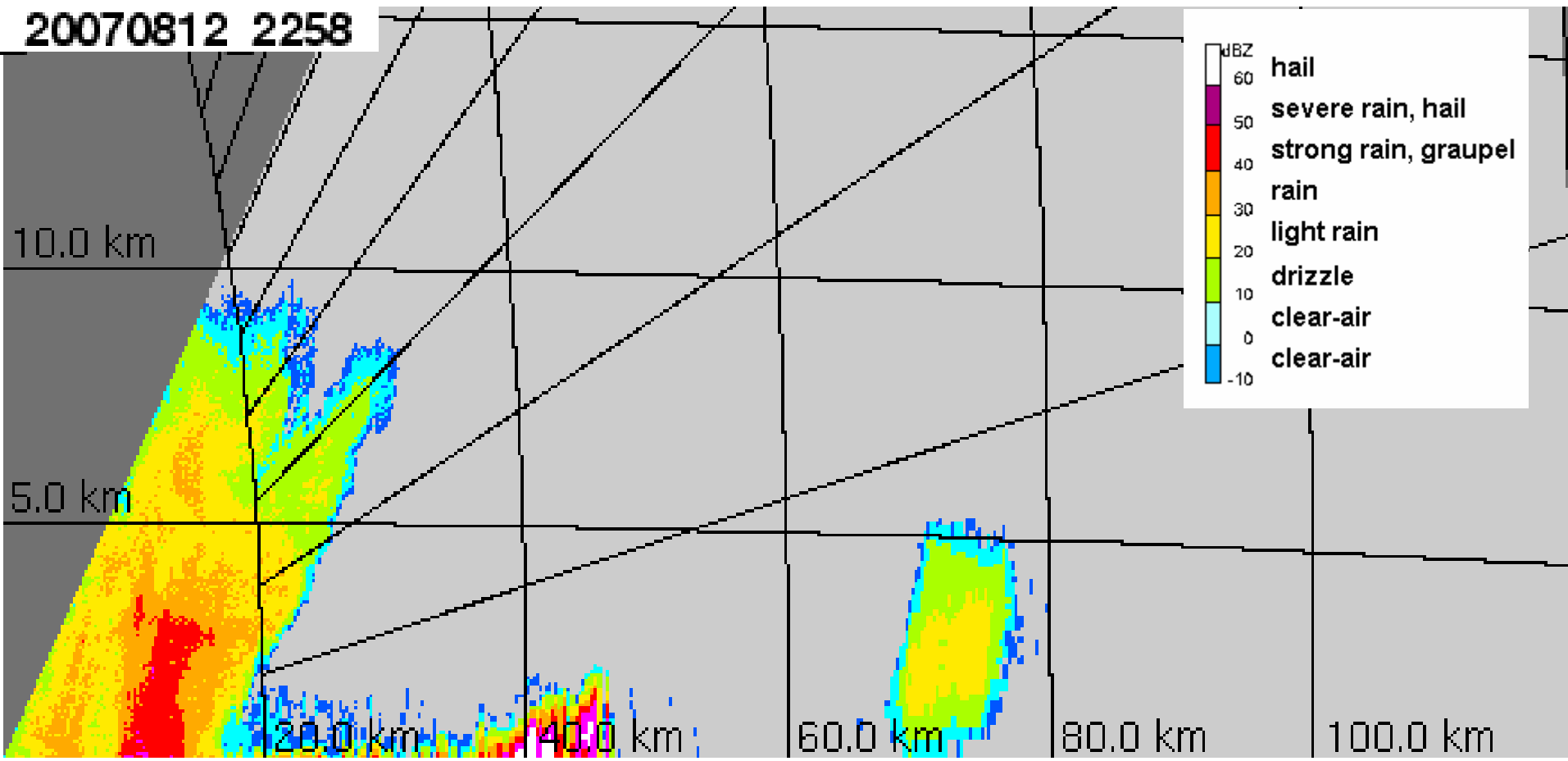
Liquid Water Path



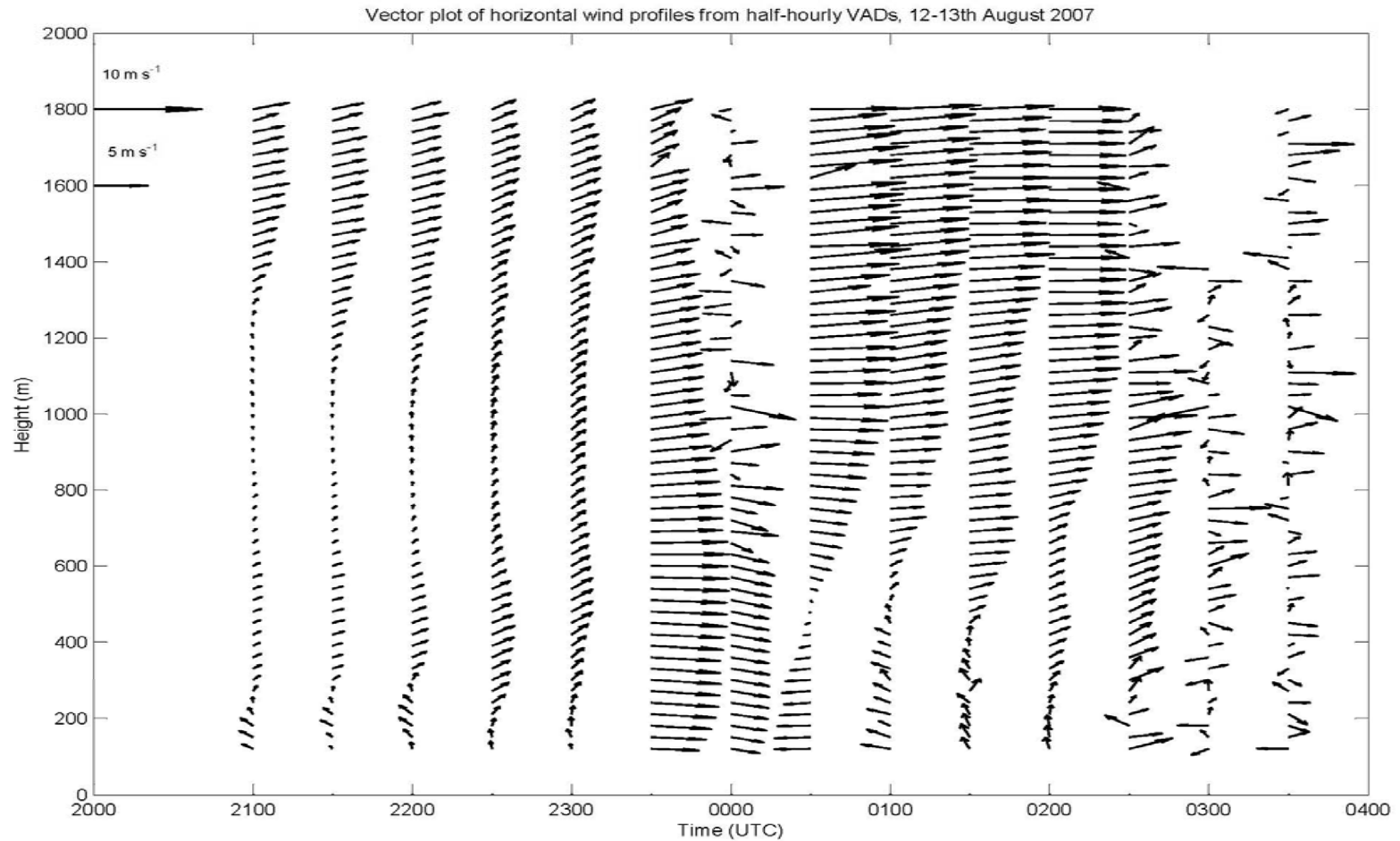
POLDIRAD polarisation diversity Doppler C-band radar



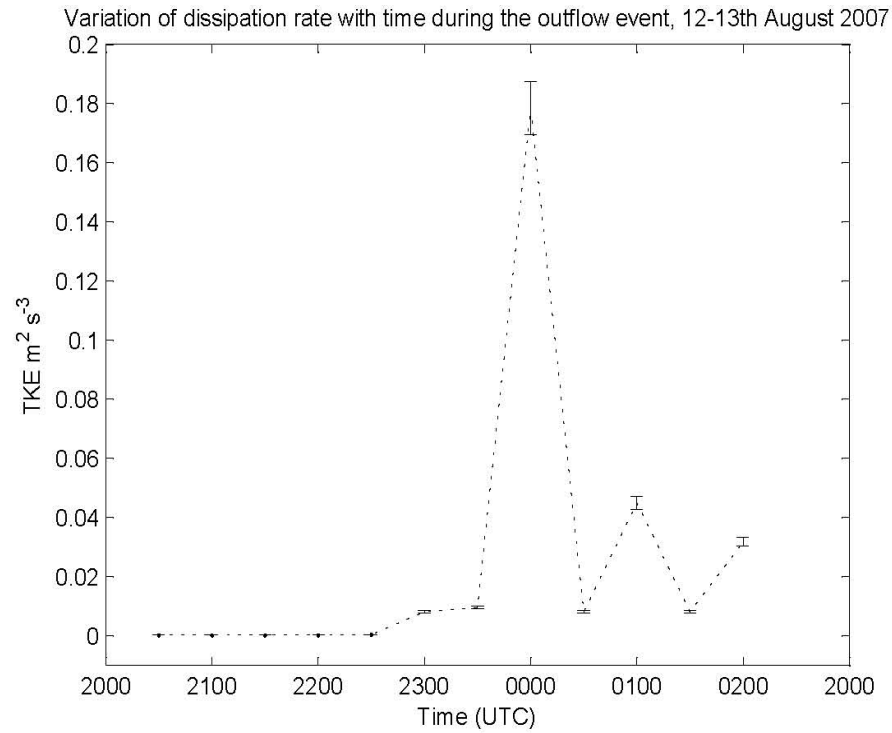
**DLR Poldirad (Waltenheim-sur-zorn) - RHI towards the Supersites
Achern (36 km), Hornisgrinde (46 km) and AMF (62 km).**



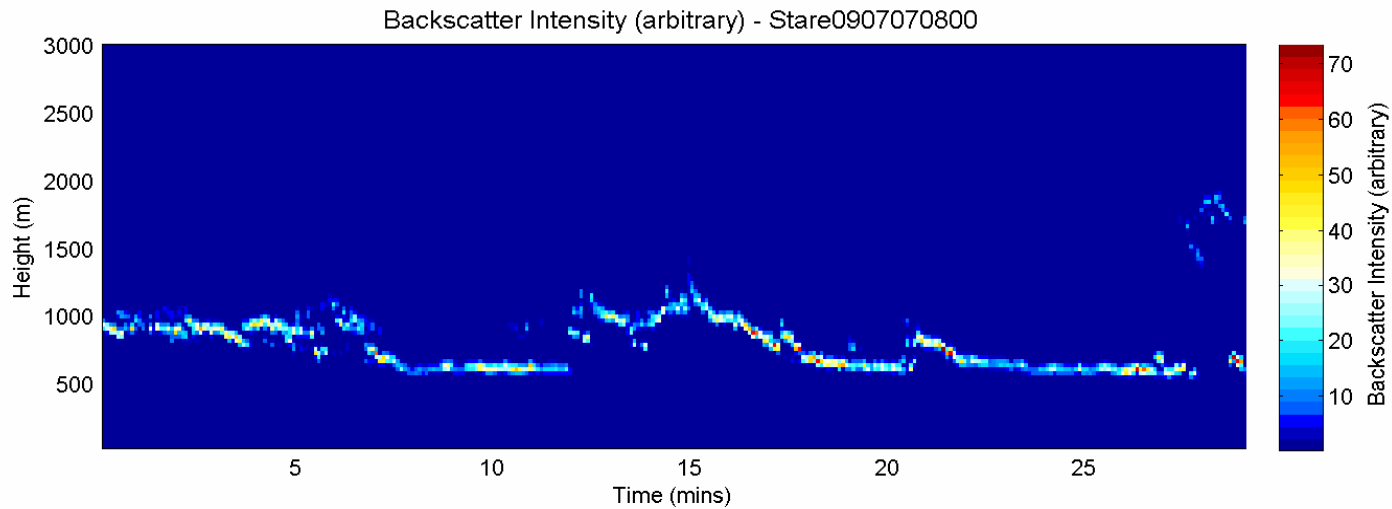
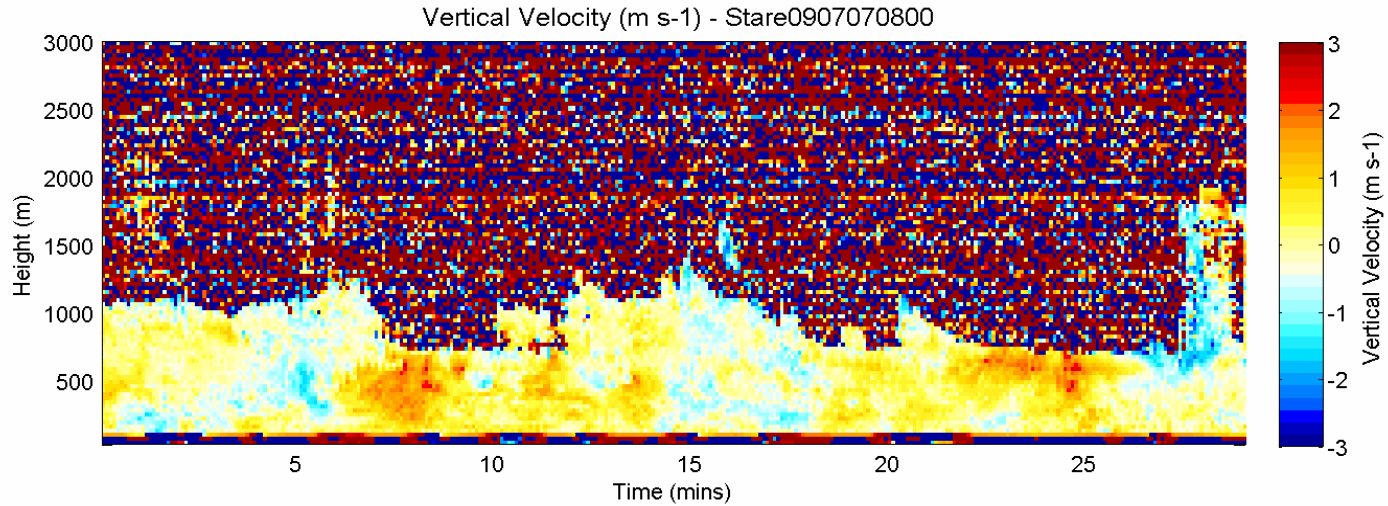
Vertical profiles of horizontal wind velocity before, during and after the passage of the thunderstorm outflow derived from Doppler lidar



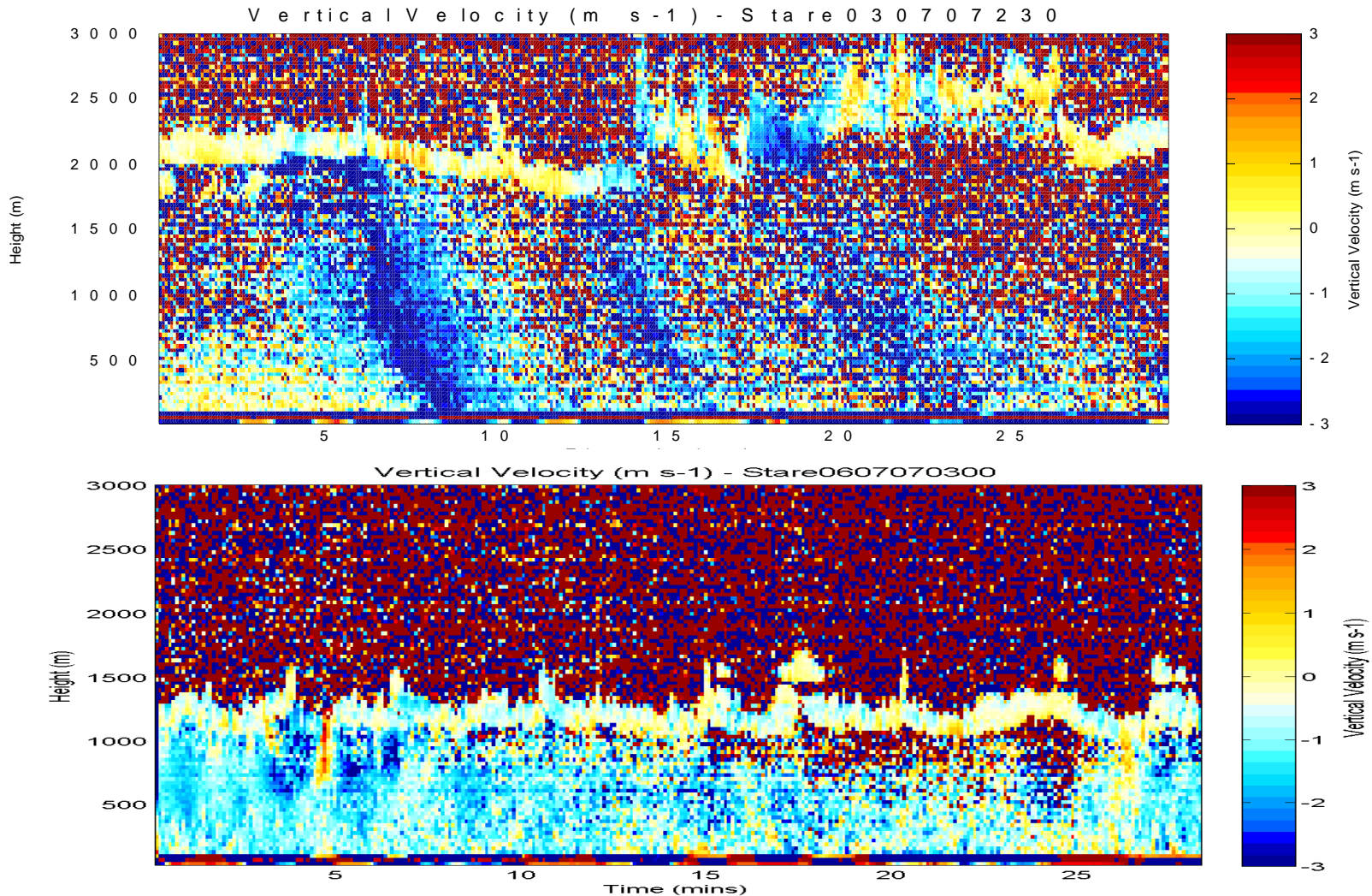
Turbulent kinetic energy dissipation rate



8 July 2007 08 UTC



3 (0230) and 6 (0300) July 2007



30 July 2007

