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

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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 valour 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
\( \vartheta \) profiles from radiosondes at Achern, 15/7/07

- Blue line: 1000 h
- Red line: 1300 h

Potential Temperature, \( \vartheta \) (K) vs. Height (m)
Integrated Water Vapour

Water Vapour (kg/m²)

Time on 15/07/2007 (UTC)
15 July 2007 11UTC

Fields of view and radar return from 15 July 2007 at 11 UTC. The upper left and upper right plots show the range vs. range for the radar data, with color representing the amplitude of the radar return. The lower left and lower right plots show the wind speed and direction, respectively, as a function of altitude. The color bar represents the amplitude of the radar return, with red indicating higher amplitudes and blue indicating lower amplitudes.
12 August 2007: density current thunderstorm outflow

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

1^\circ C drop in temperature
Condensation
AWS RH almost 100%
Cap cloud
cloud

Liquid Water Path

Time on 12/08/2007 (UTC)
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

Variation of dissipation rate with time during the outflow event, 12-13th August 2007
3 (0230) and 6 (0300) July 2007
30 July 2007

Backscatter

Vertical velocity