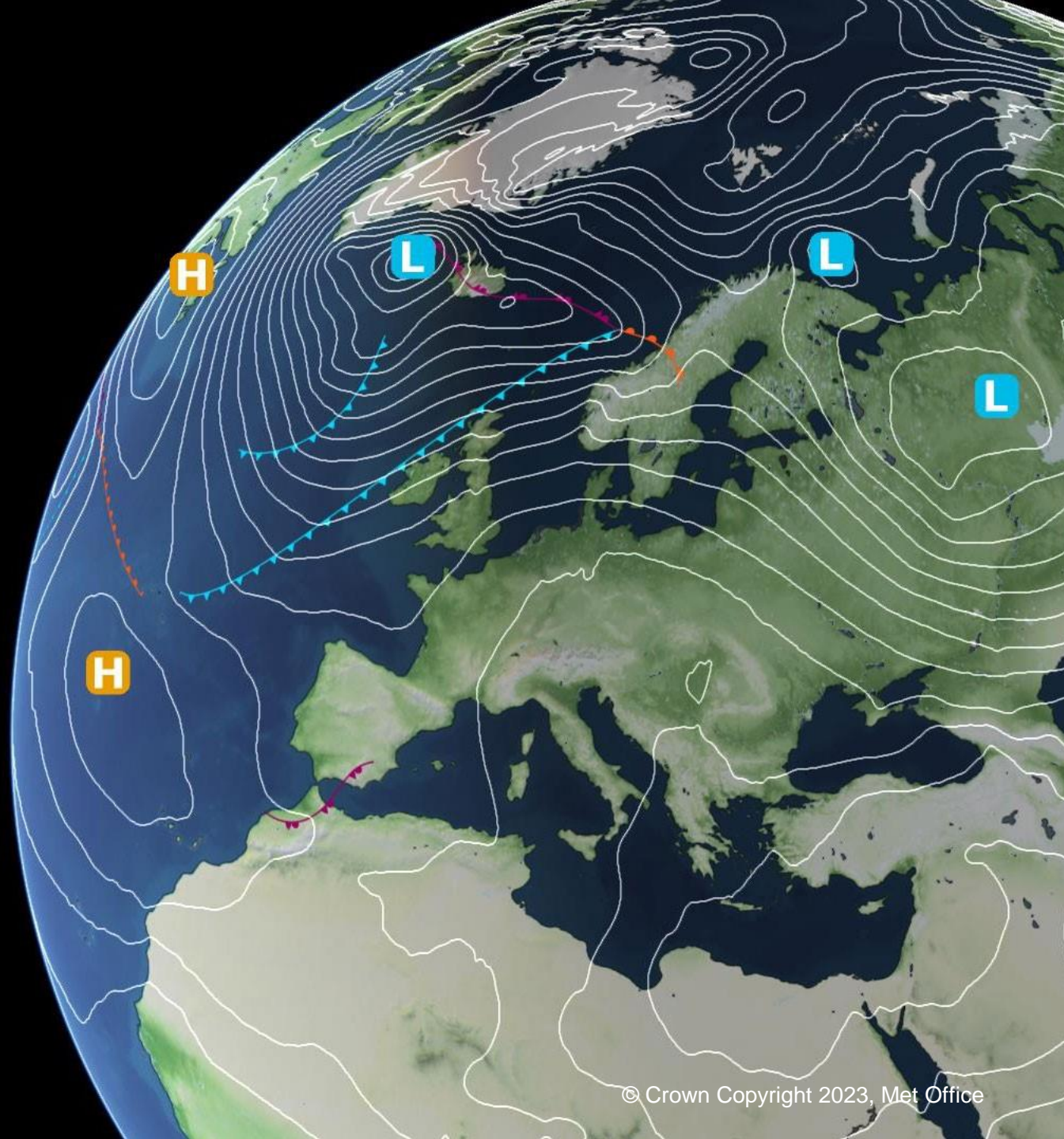


The Wessex Convection Experiment (WesCon/WOEST)

Humphrey Lean
MetOffice@Reading
Reading UK.

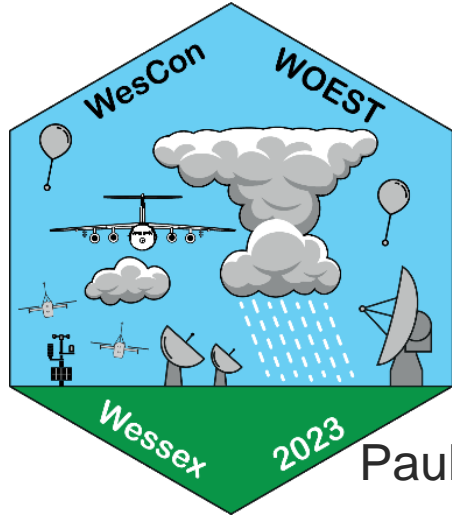
**Including work of whole WesCon
team.**

Hectometric Workshop, DWD, Feb 2024.



WesCon – WOEST 2023

Wessex UK Summertime Convection Experiment 2023



Paul Barrett

Steve Abel

Jeremy Price

Simon Osborne

Humphrey Lean

Alison Stirling (Met Office)

Ryan Neely (University of Leeds)

Thorwald Stein (University of Reading)

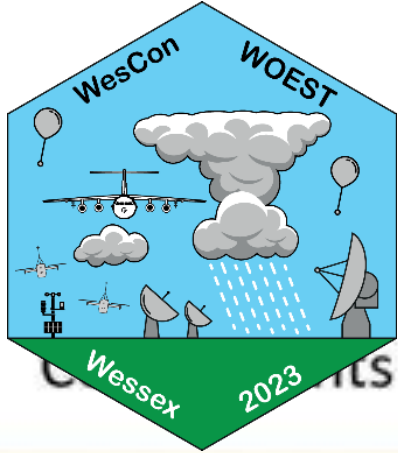


Photo: J Kent



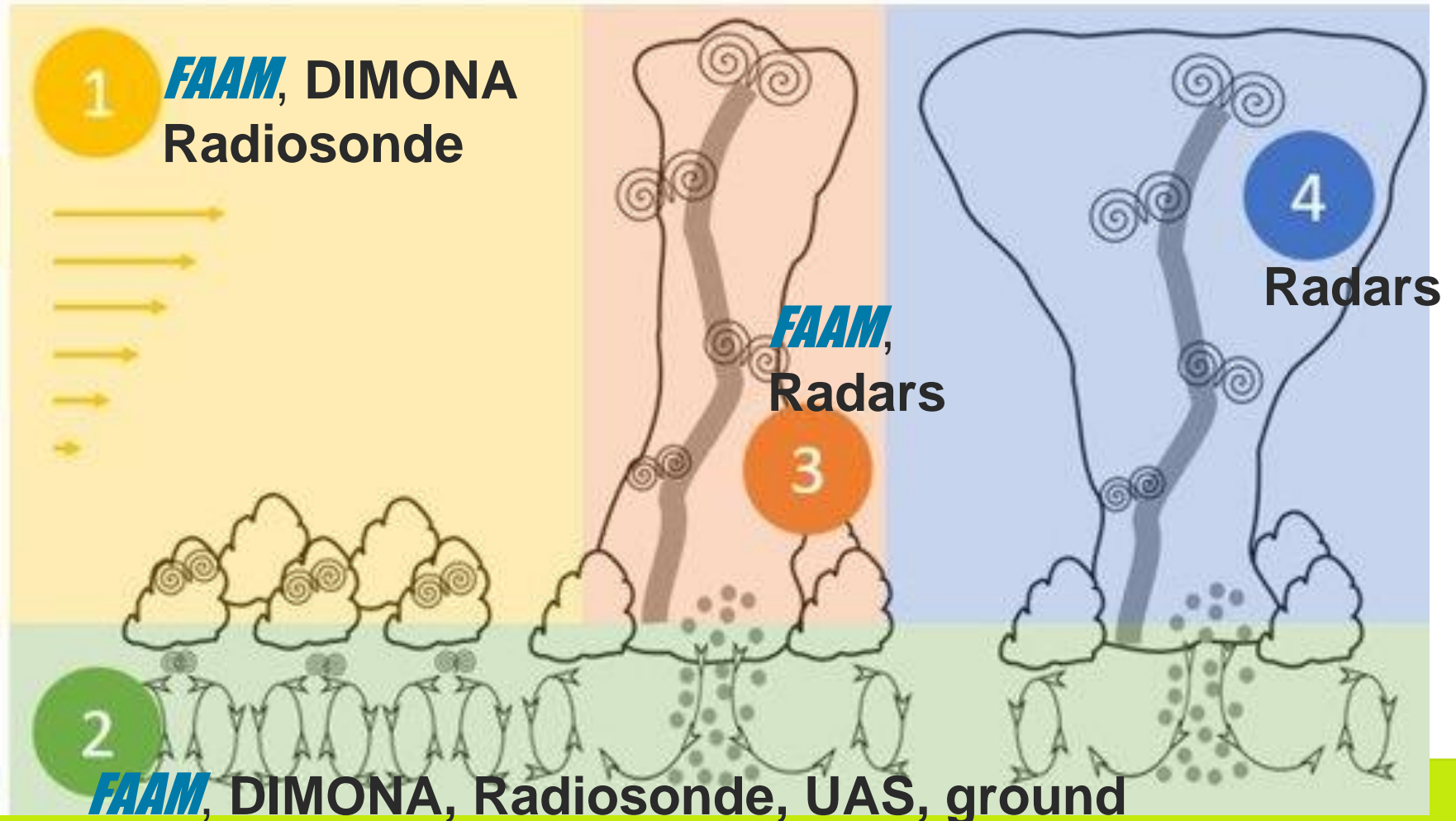
- Provide observational data to help improve convection in km and sub-km models.
- Particular emphasis on developing scale aware convection and turbulence parameterisations (ParaChute project).

WesCon/WOEST observational priorities



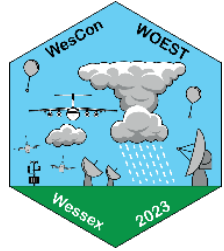
- 1. Pre-convective and cloud-free environment (including regimes)
- 2. Boundary-layer variability (including cold pools)
- 3. Turbulence budget in convection (production, advection, buoyancy, destruction)
- 4. Generation and maintenance of stratiform cloud and precipitation

Figure: Thorwald Stein



Met Office WesCon 2023

June 5th to August 25th

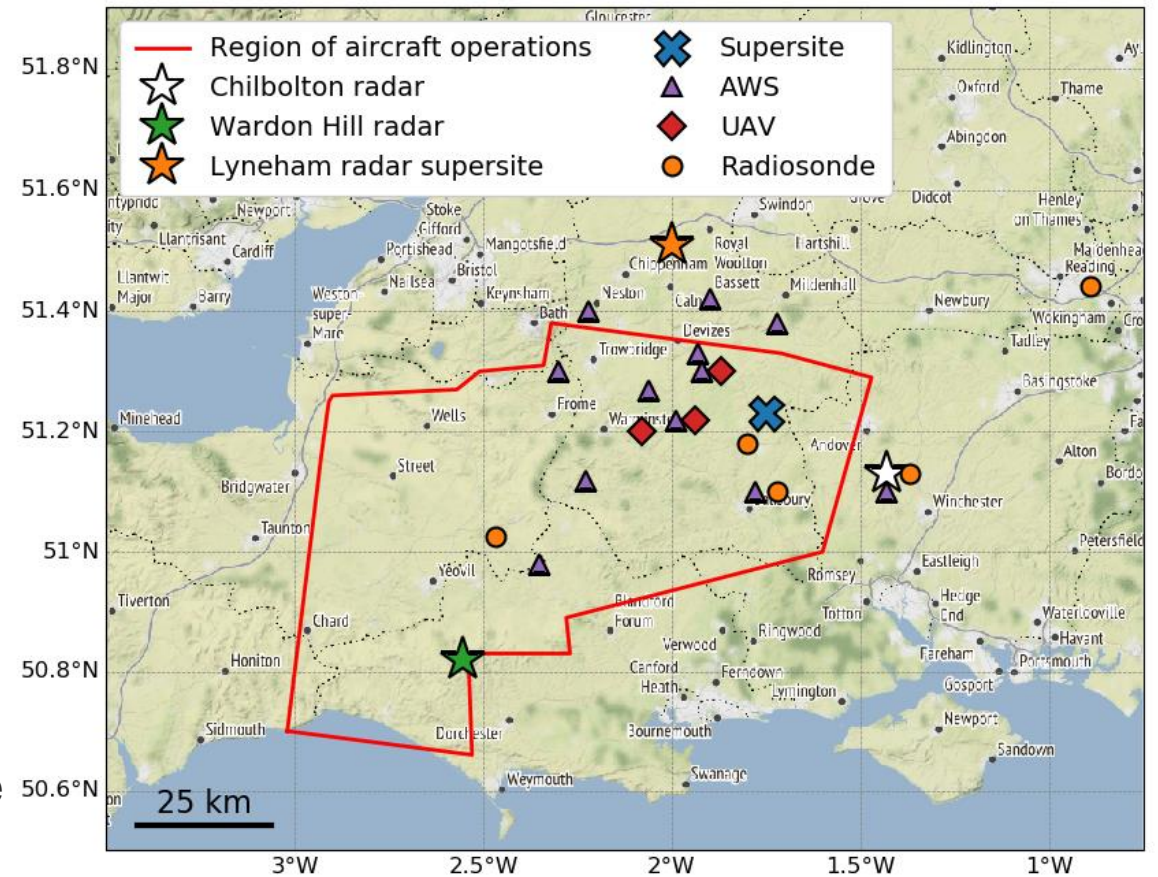


Ground Based field observations:

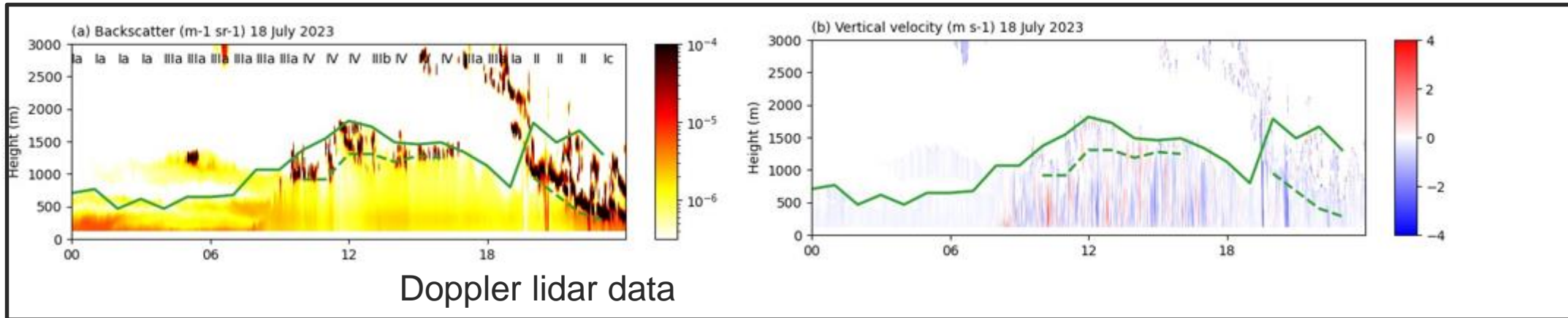
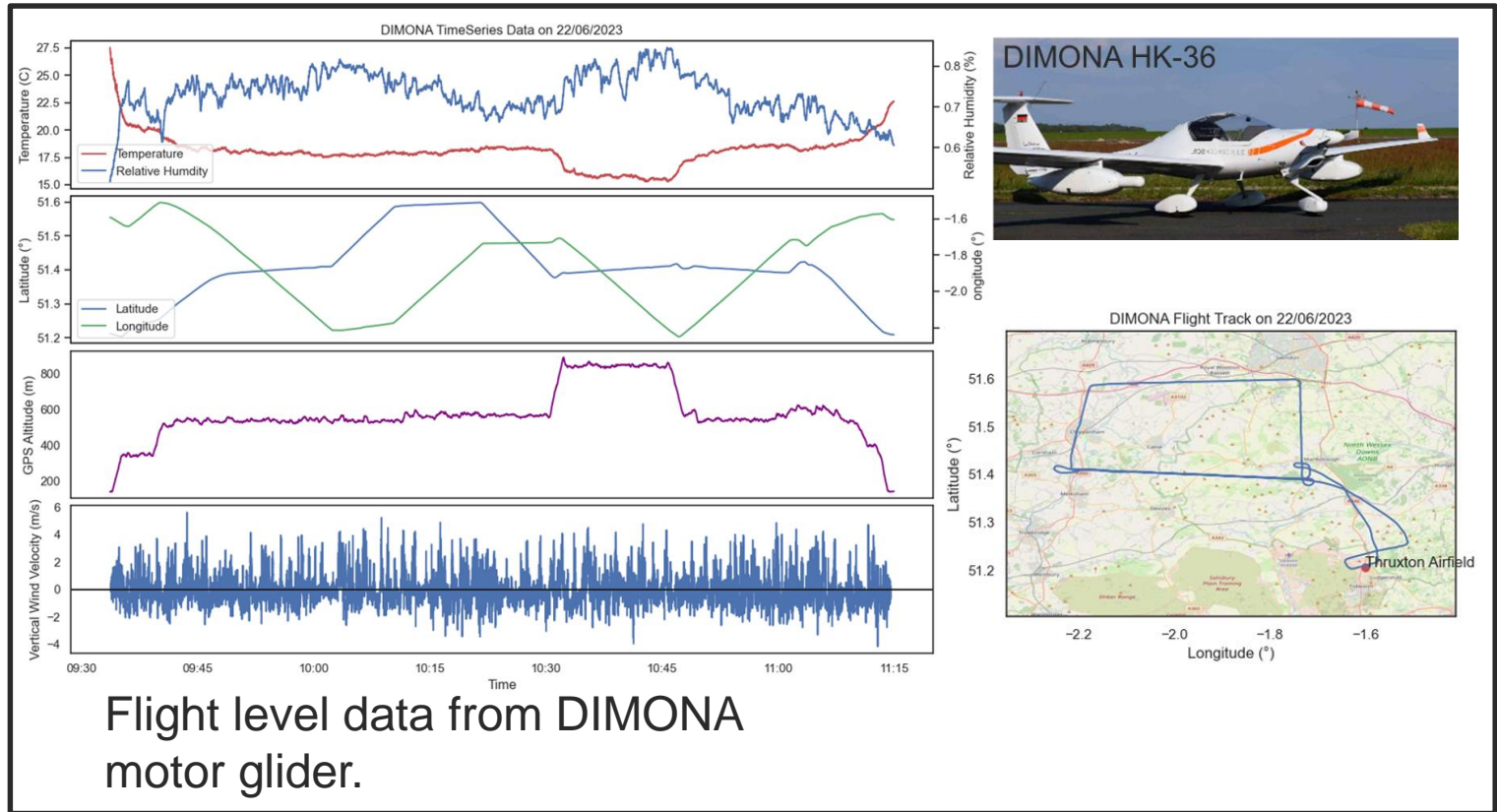
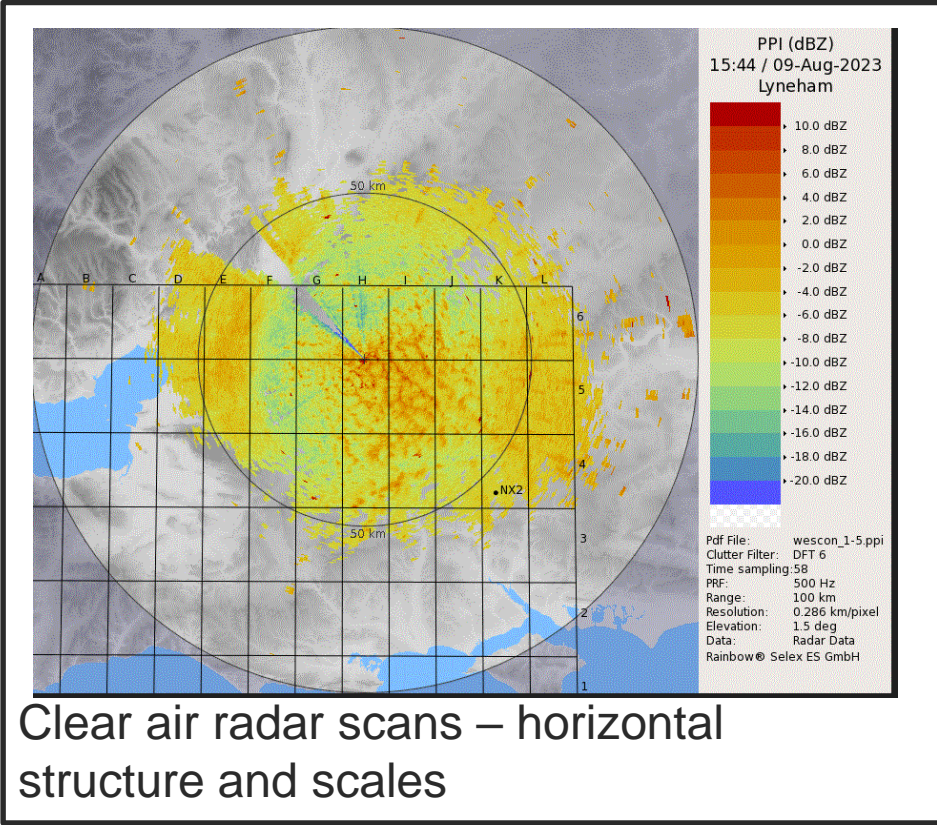
- Netheravon: Ground based supersite with 15m mast, Doppler Lidar, microwave radiometer, fluxes, aerosol, etc.
- Radars Supersites: Chilbolton, Lyneham
- Automatic Weather Stations - 14 remote sites: longer term.

Intense Observations Periods (IOP) - during convective episodes

- 12-15 FAAM flights (80 hours) - in situ cloud and turbulence measurements
- Radiosondes – multiple sites, up to hourly
- UAVs
- DIMONA motor-glider from JADE University (Germany) Hours (TBC) pre-convective environment (7 week deployment)



Boundary Layer obs



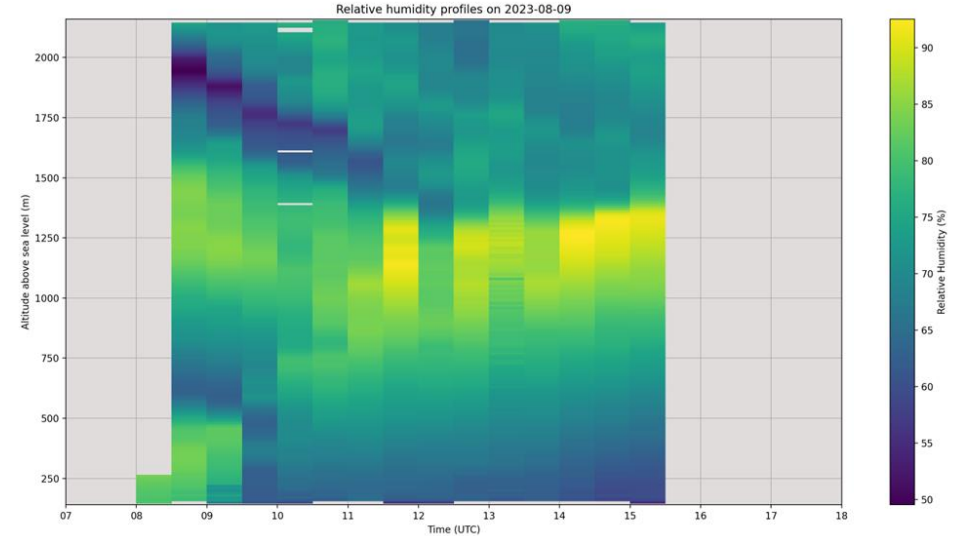


Photos: Humphrey Lean

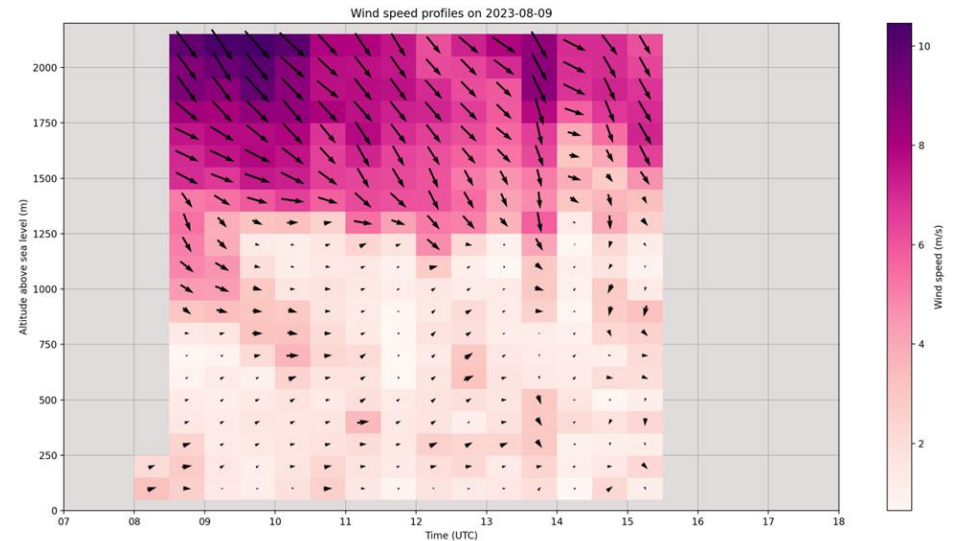
4 UAVS provided by Menapia

Two modes of operation:

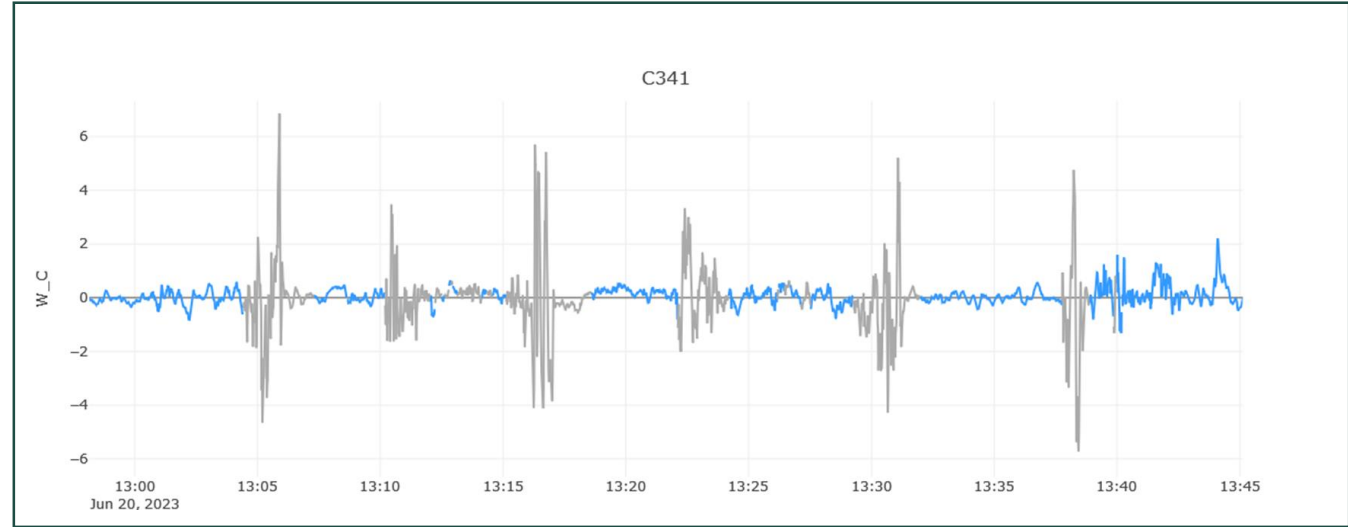
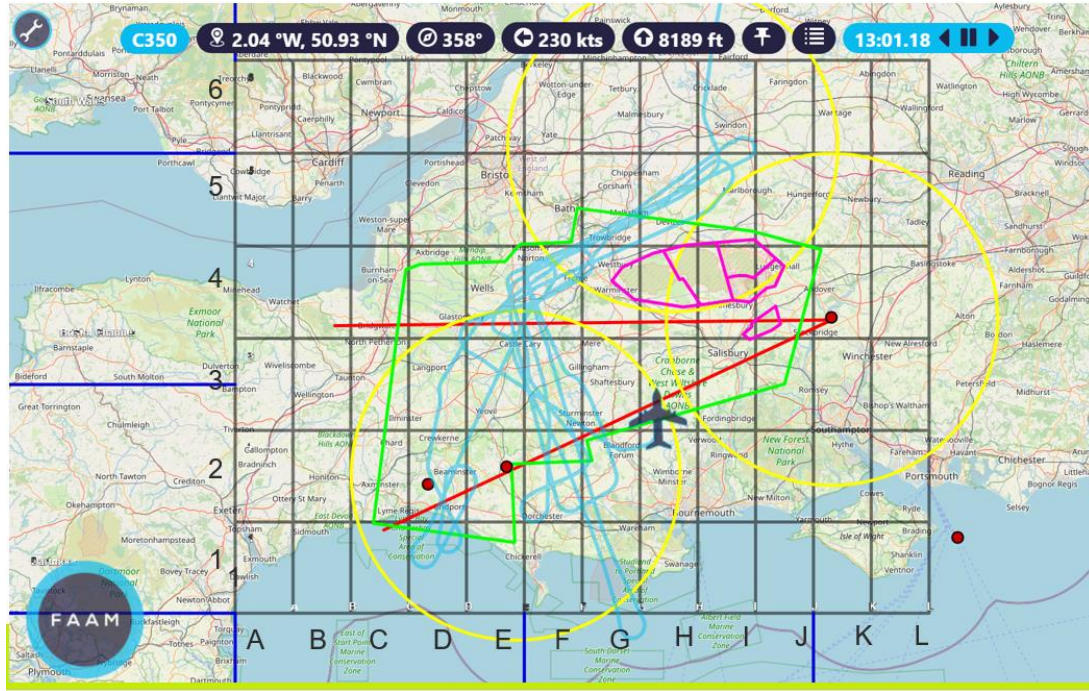
- a) “Constant presence” using two UAVS to keep a constant presence at a height for many hours. Potentially able to measure fluxes.
- b) 2km profiles every 30 mins (BVLOS permission in military areas).



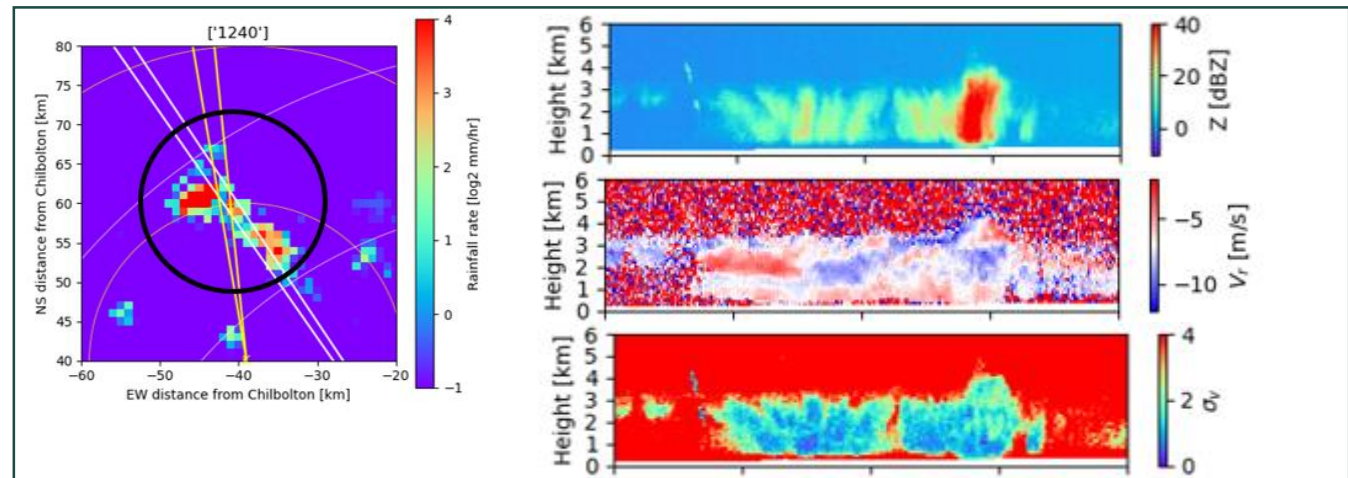
Relative Humidity



Wind speed/direction

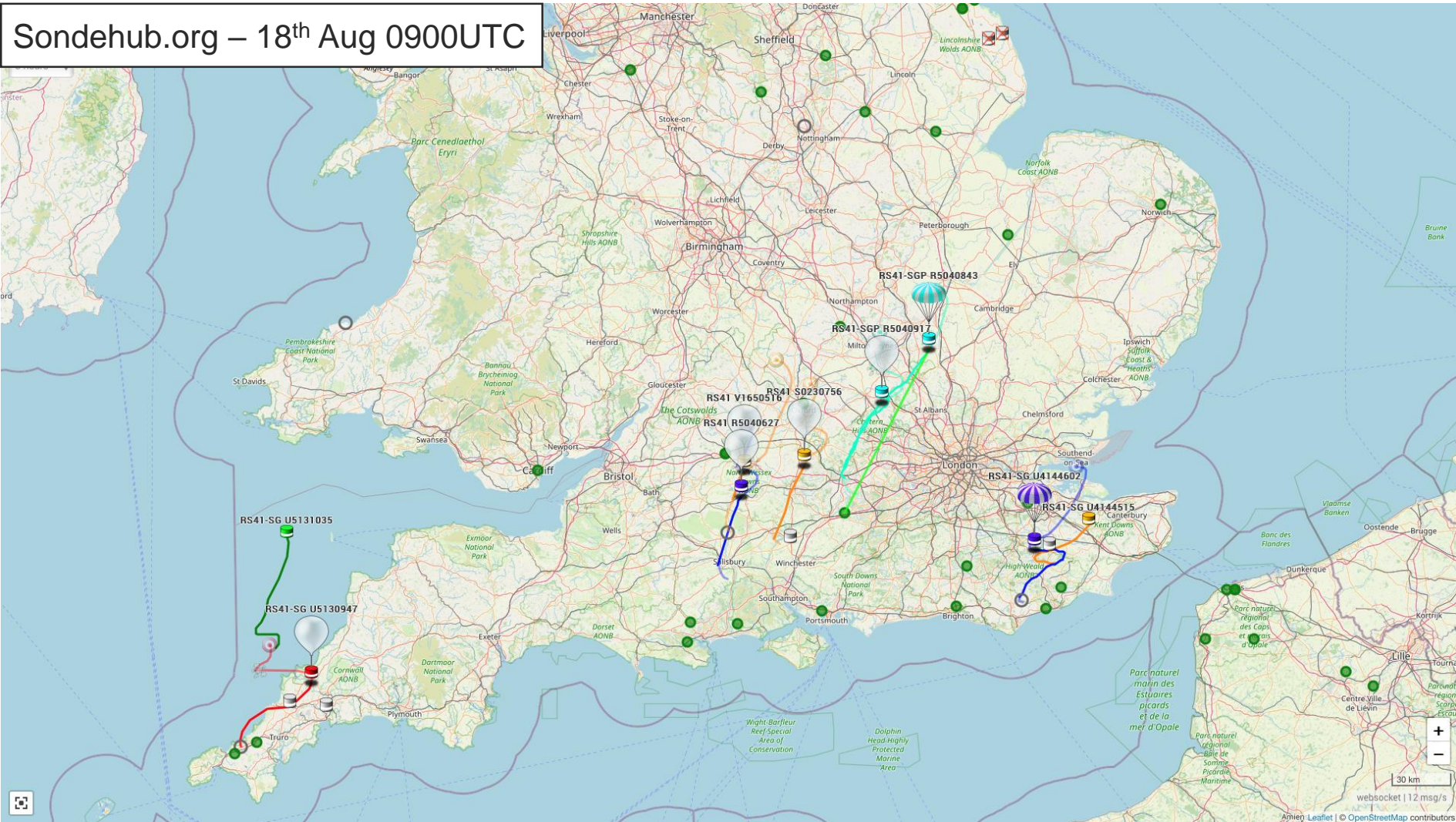


Flight level sampling of vertical velocity, turbulence, hydrometeors



Radar scans through same clouds

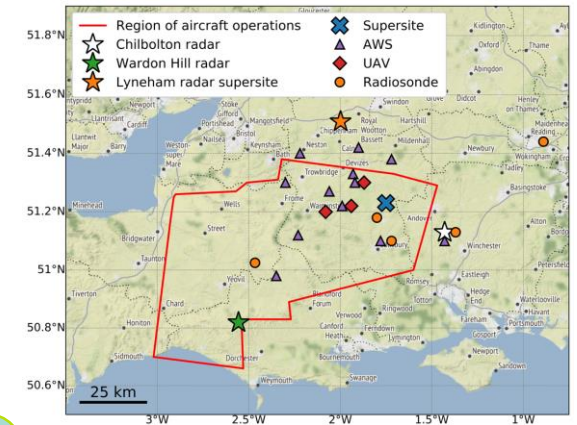

Pre-convective environment



Sonde launching at Reading University 21 Aug 2023




WesCon WOEST. 5th June - 25th August 2023

Aircraft

- FAAM - 12 flights, >70 hours
- DIMONA - 16 Flights, >45 hours




Radars

- CAMRa, Kepler, NXPol1 & 2,
- Chilbolton, Lyneham, Wardon Hill
- 25+ Days scanning



Radiosonde

- Larkhill, Chilbolton, Ash Farm, Spire View, Reading.
- Extras: Camborne, Herstmonceux, Aberporth
- >350 in total.



WxUAS

- Breach Hill, Heytesbury, Chilbolton, Wherwell Forest.
- ~120 flight hours.
- ~700 flights.
- First 2 km BVLOS.

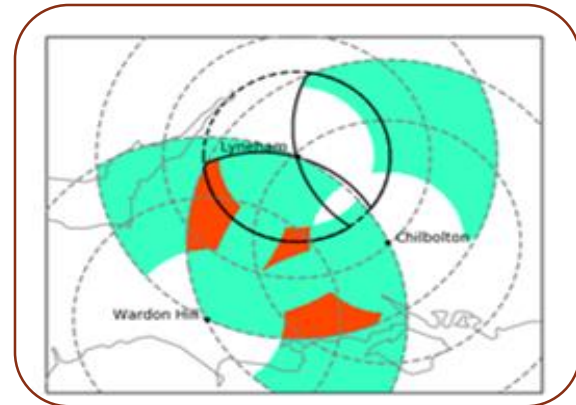


Supersites

- Netheravon, Lyneham, Chilbolton
- Lidars,
- wind profilers,
- microwave radiometers,
- stereo cameras
- Masts

AWS sites

- 12 stations 24/7 operation



Doppler Radar network
Lyneham, Chilbolton, Wardon Hill

