Combined use of Raman lidar and DIAL measurements and MESO-NH model simulations for the characterization of complex water vapour field structures and their genesis:

Water vapour mixing ratio: ΔT=5 min; Δz =30 m

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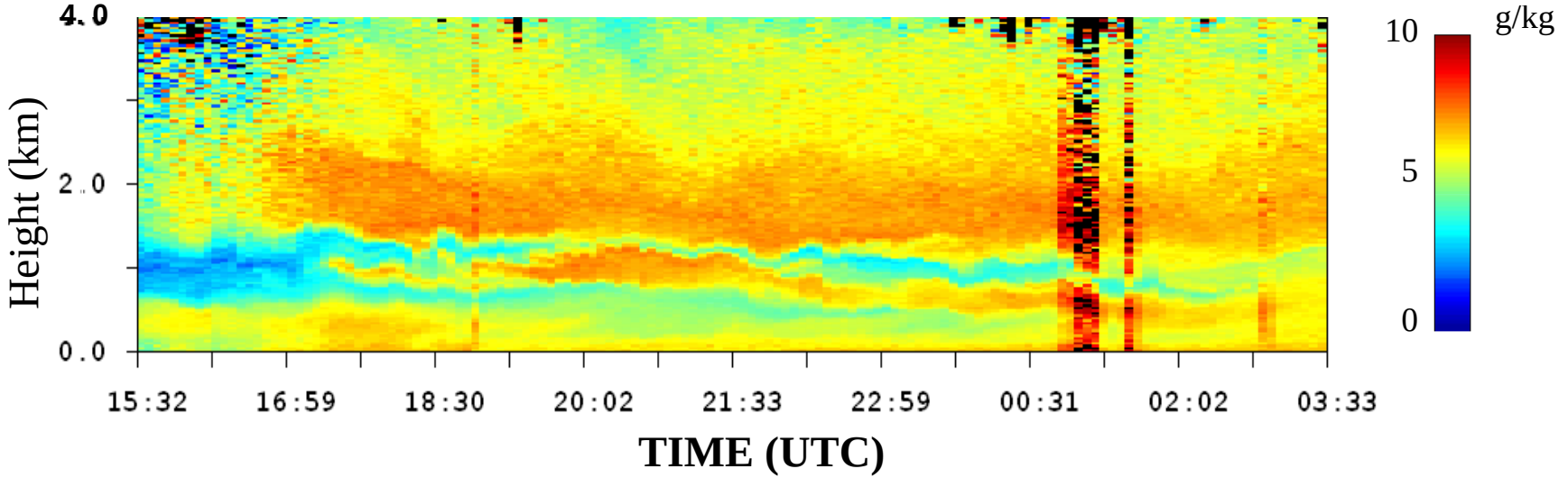
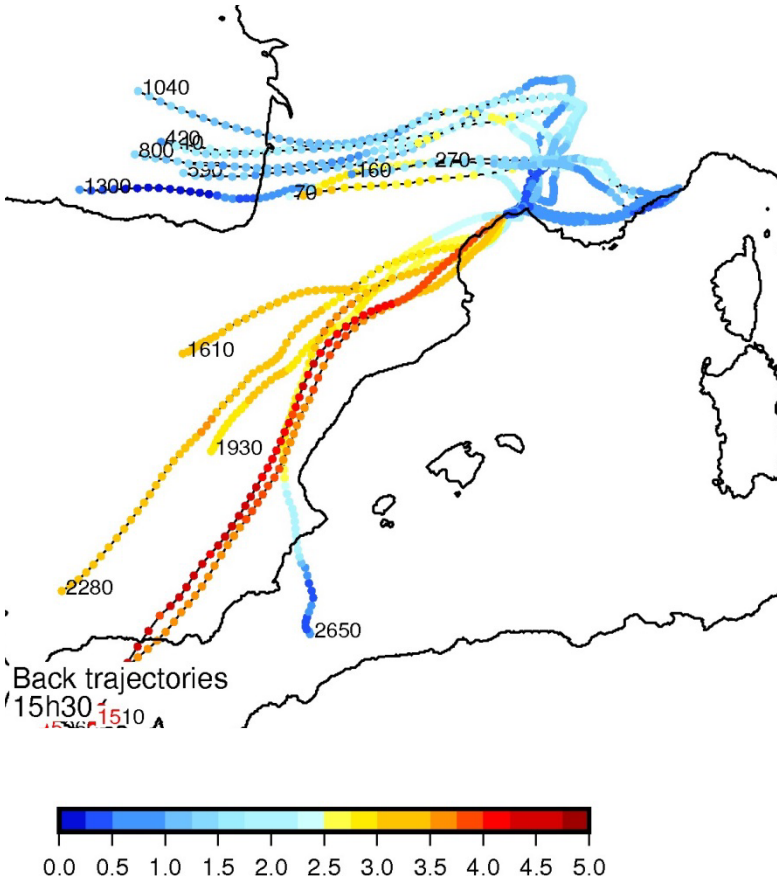
IOP 8 - BASIL, Candillargues, 43°36'40.10"N ; 4° 4'15.80"E, 28-29 September 2012



Measurements carried out by BASIL on 28 September 2012 reveal a water vapour field characterized by a quite complex vertical structure.

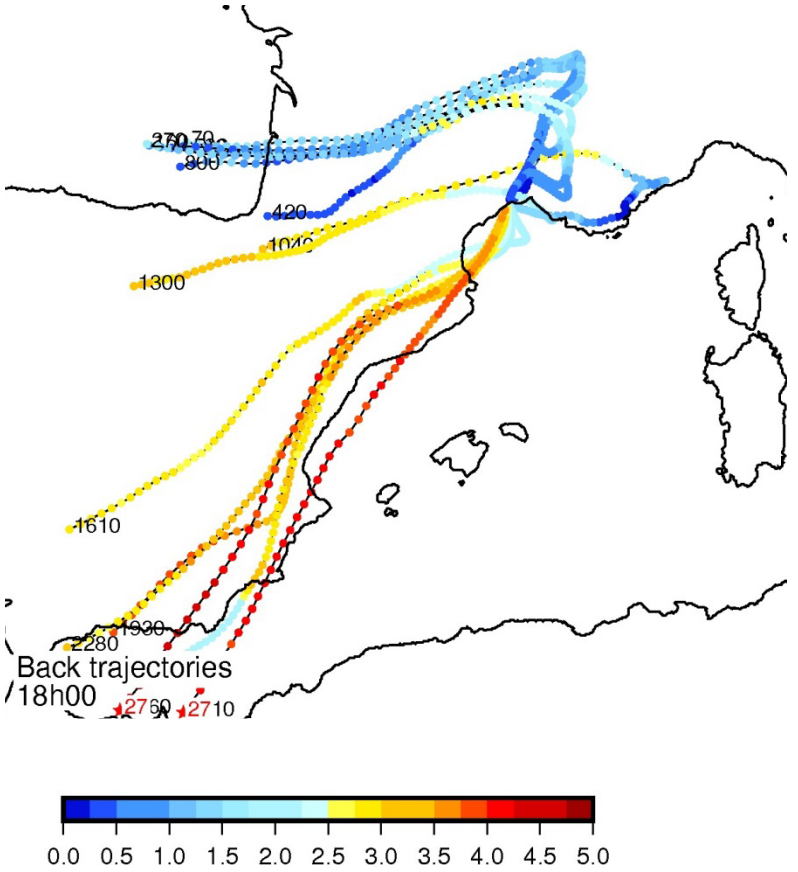
Goal: Assess the origin and transport path of the different humidity filaments observed by BASIL on this day based on the comparison with data from MESO-NH model.



Air masses within the lower of the two upper layers are found to overpass Southern Spain and Marocco, descending from an elevation of 2-3.5 km, while air masses within the uppermost layer (up to 4 km) are not tracked by MESO-NH.

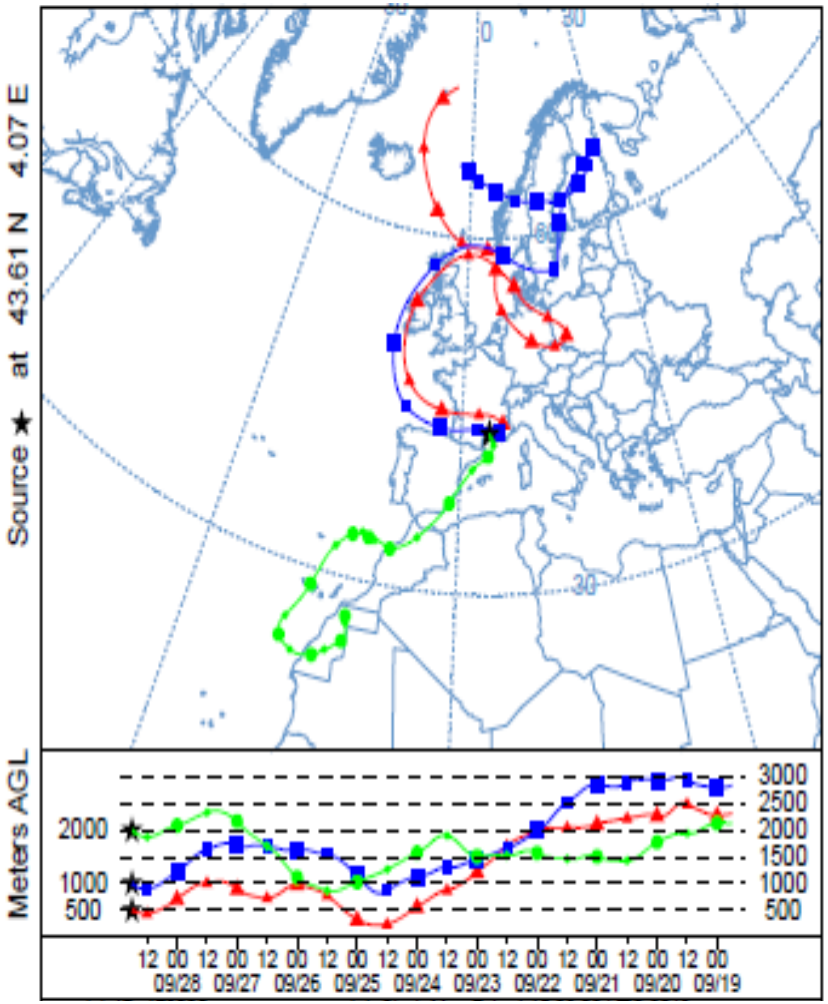
MESO-NH back-trajectory analysis reveals that:

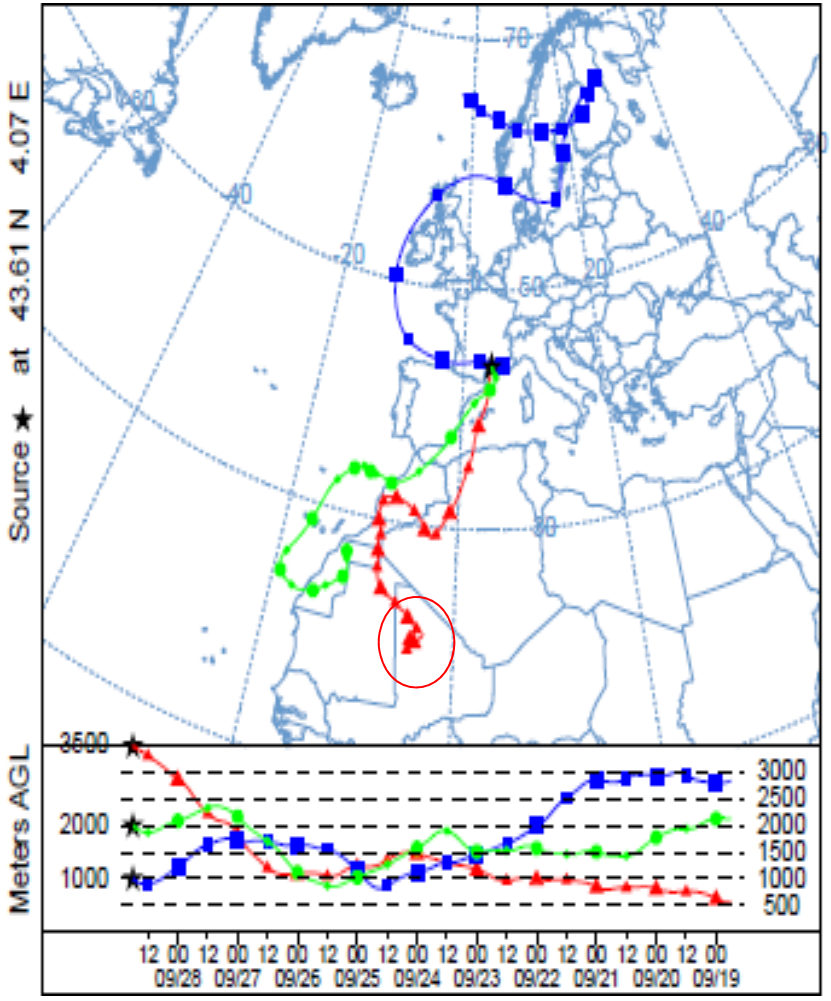
- air masses within the surface humidity layer originated over the Atlantic Ocean,
- air masses within the elevated filamentary humidity layer also originated over the Atlantic Ocean, overpassing the sea stretch North of Spain and Southern France at an altitude of ~1 km.



Back-trajectory analysis from HYSPLIT extended further back in time (10 days)

Back-traject. analysis from HYSPLIT ending in Candillargues at the altitudes of the observed humidity layers a 18:00 UTC on 28 Sept. 2012 and starting 240 hours (10 days) earlier (18 Sept. 2012).





The back-trajectory extended back in time by 240 hours (10 days) reveals that air masses in the:

- the surface layer and the filamentary elevated structure originated over the North Atlantic;
- the lower of the two upper layers originated in tropical Atlantic area;
- uppermost humid layer, overpassed Algeria, originated over Central Africa (Mali).