An additional comparison to investigate the ERA5 dry bias is shown in Figure S1, where the RH measured by regular upper-air sounding balloons at Trapani Birgi RDS station (WIGOS ID: 0-20001-0-16429; 37.9142°N, 12.4914°E, 7.3 m asl) performed twice per day (00 and 12 UTC) are shown along with the corresponding ERA5 hourly time series from the nearest reanalysis grid point. Focusing on the mid-upper troposphere, the comparison reveals also in this case the presence of a dry bias in ERA5, which may exceed 10% RH, and, for the values between 300 hPa and 500 hPa in June, an overestimation of the RH between 300 and 400 hPa. More generally, the dry bias can be also clearly identified in all the highest RH values found in mid-upper troposphere, due to convection, water vapour fluxes or synoptic instability. It is noteworthy that ERA5 assimilates regular radiosounding data, which may have played a role in reducing the RH bias in Trapani than Soverato site, assuming the same profiles shown in Figure S1 have been part of the ERA5 input data stream.

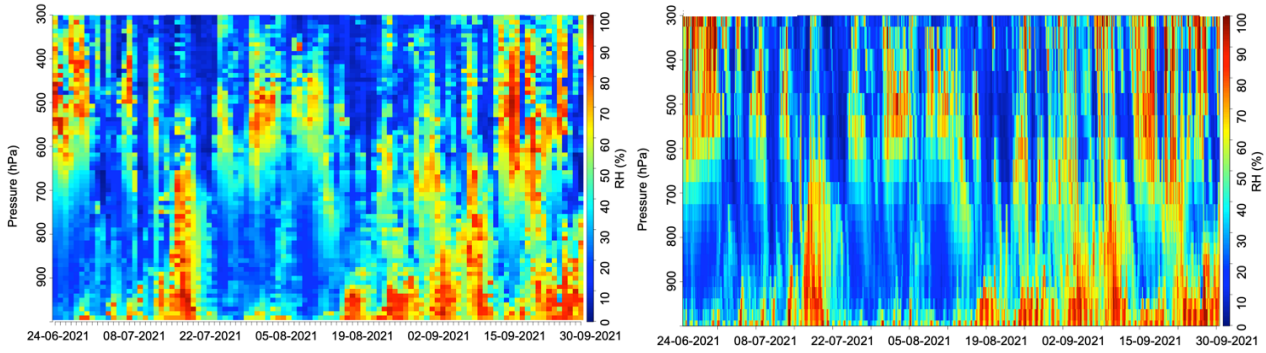

Figure S1: Same as Figure 3 of the main text, but for Trapani and with relative humidity from regular radiosounding measurements on the left panel.