Overview and measurement examples from instruments operated by the University of Vienna

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Instrument set-up

The IMGW operated a number of different measurement systems during COPS. Among these are the mesonet in the area of supersite S. 96 AWS (HOBO) were arranged in a raster scheme as depicted in Fig. 1. The spacing of the stations is approximately 1 km. Furthermore four sonic anemometers, together with a temperature sensor and a raingauge were deployed in the Teinach-Valley in addition to 4 AWS at the plateaus. Finally two high quality AWS (MAWS) were operated at the supersite S and at Lerchenberg and 10 high quality precipitation systems complemented the mesonet. The AWS were equipped with a wind speed and direction sensor at 3m height, temperature and humidity sensor at 2m and pressure sensor in the data loggerbox at 1.5m above ground . The rain gauge was installed on a wooden pole at 1m height in a distance of 2-3 meters fronm the AWS. Measurement interval was one minute to cover the evolution of e.g. gusts. The stations were time synchronized in UTC and were visited regularly in a two to three week interval for data download and maintenance. Figs.2 und 3 give an indication of the performance of the HOBO mesonet.

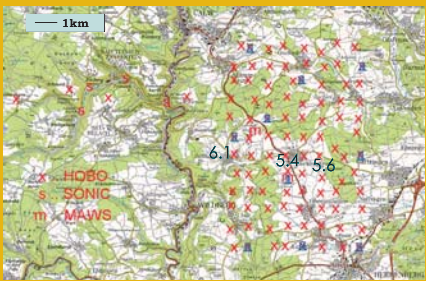


Fig. 1: Exact location of the mesonet stations. The symbol indicates the location of the high quality precipitation stations operated by University of Frankfurt. 5.4, 5.6 and 6.1 indicate locations of Hobo stations discussed in Figs. 8 and 9.

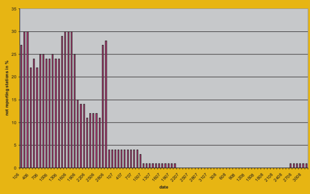


Fig. 2: Number of not reporting Hobo stations (parameters: T, q, 2D-wind and pressure) during the COPS period June to August.

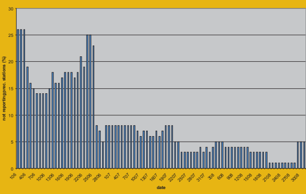


Fig. 3: Number of not reporting Hobo stations (parameter: precipitation) during the COPS period June to August.

Case study: IOP 4b (June 20, 2007)

The synoptic situation is characterised by a typical convective situation for the COPS area. A southwesterly flow advects moist and unstable air masses from the Mediterranean (Fig. 4). This favours the development of convective cells and MCSs (Fig. 5).

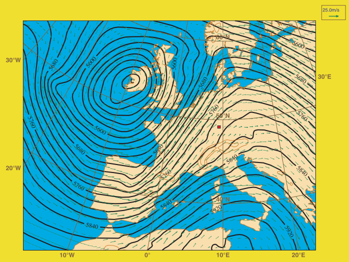


Fig. 4: ECMWF analysis of 500 hPa Geopotential and 2D wind for June 20, 2007, 18 UTC. Between a pronounced low over Ireland and a ridge over Central Europe the COPS area is embedded in a south-westerly flow. Within this flow small scale short wave troughs are passing the area and initiate or enhance convective developments. The red square indicates the approximate position of the supersite S.

Fig. 5: IR-image for June 20, 2007, 20 UTC. A number of convective elements can be localised north of the Alps. The COPS area (supersite S marked by a red square) is well within such a development.

In the following some selected results from the measurements are presented to give a first indication of the convective situation.

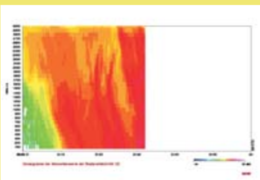


Fig. 6: Radar reflectivities for June 20, 2007 from 21h00 to 21h34 UTC, afterwards no data due to a power failure at the supersite after a lightning stroke. The picture shows clearly the onset of precipitation at 21h10 by strong reflectivities of up to about 40 dBZ which last only for 2-3 minutes.

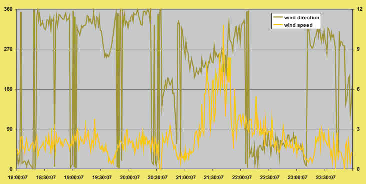


Fig. 7: Wind direction and wind speed for June 20, from 18h00 to 24h00 UTC (MAWS-data). The supersite was not hit by a convective cell directly but systems moving close by (one to the west and one to the east) affected the windfield at the supersite considerably.

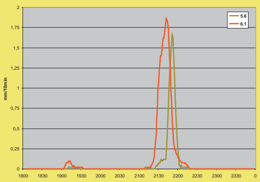


Fig. 8: Precipitation for June 20, from 18h00 to 24h00 UTC (Hobo-data) in mm/10min (gliding mean). The two stations (about 5 km apart) are affected by different cells (see also Fig 10). The total sum for station 6.1 is 40,4mm/6h with a peak of up to 30mm/20min.

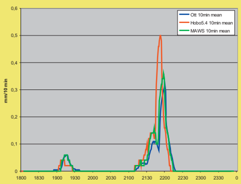


Fig. 9: Comparison of different precipitation measurement systems for June 20, from 18h00 to 24h00 UTC. MAWS and Ott(high precision prec. measurement system) are located at the supersite, Hobo5.4 is located about 200m to the north.

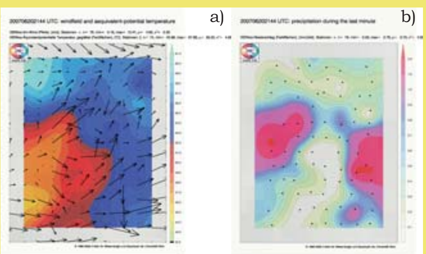
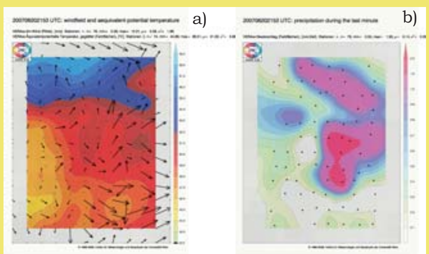


Fig. 10: VERA analyses of equivalent potential temperature and wind (left a) and precipitation (left b, mm/1min) for June 20, 21h44 UTC. The western cell produces a cold air outbreak which is not visible in the eastern cell (the younger one).

Fig. 11: VERA analyses of equivalent potential temperature and wind (right a) and precipitation (right b, mm/1min) for June 20, 21h53 UTC. The western cell weakens. The eastern cell starts to produce a weak cold air outbreak.



Outlook:
The convective situation will be analysed in more detail by including additional data like airborne data and WTR data to gain more information about the vertical structure of the system. In a next step NWP models will be tested if they can simulate the case in an adequate way.

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