

# Supporting information

Additional plots to support the findings in the manuscript.

## S1 - Setup during IC1, MC and IC2

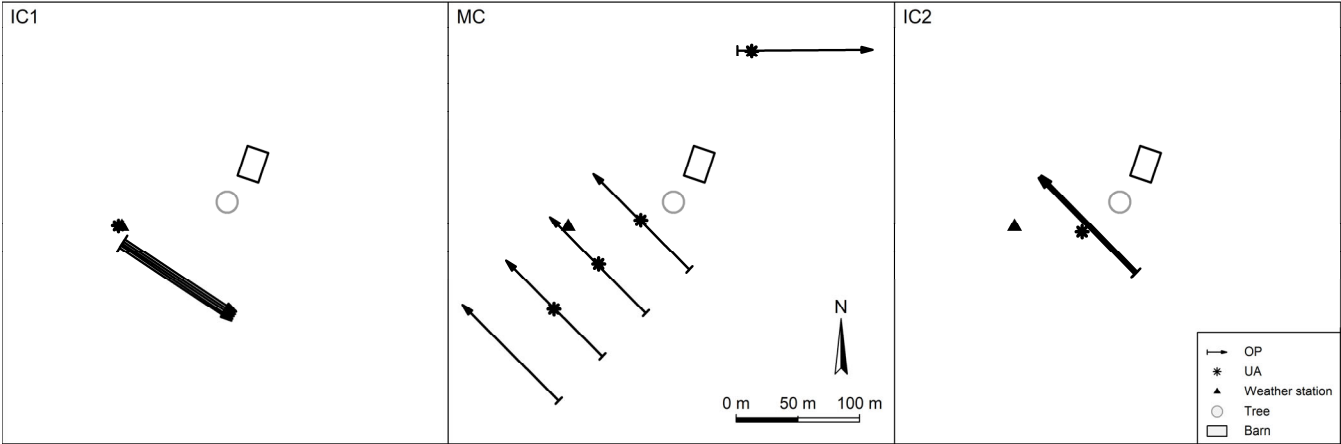
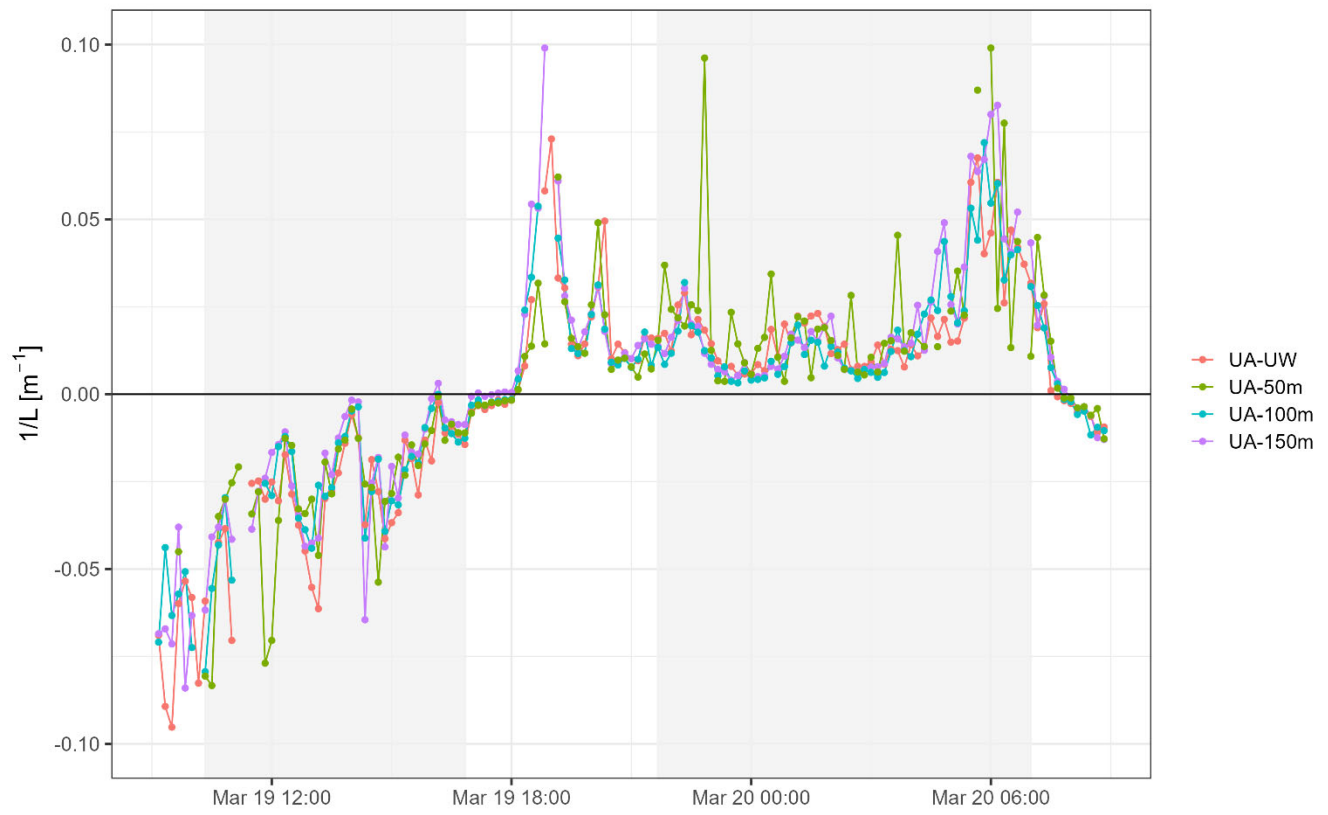


Fig. S1 Experimental setup for IC1, MC and IC2.

## S2 – Atmospheric stability



**Fig. S2 Atmospheric stability during part of the MC plotted as the inverse of L for all 3D ultrasonic anemometers (UA).**

### S3 – Wind direction and friction velocity

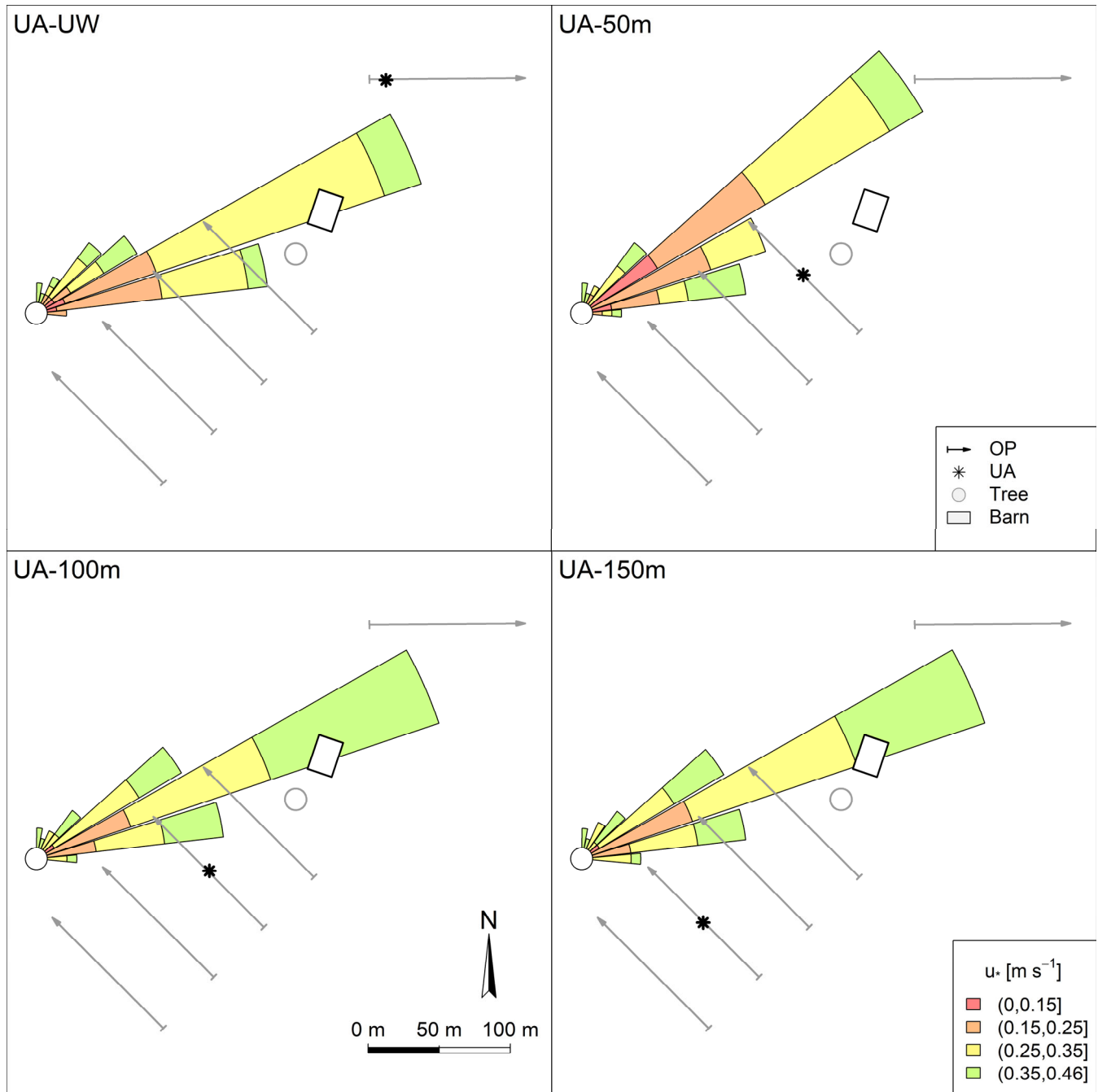
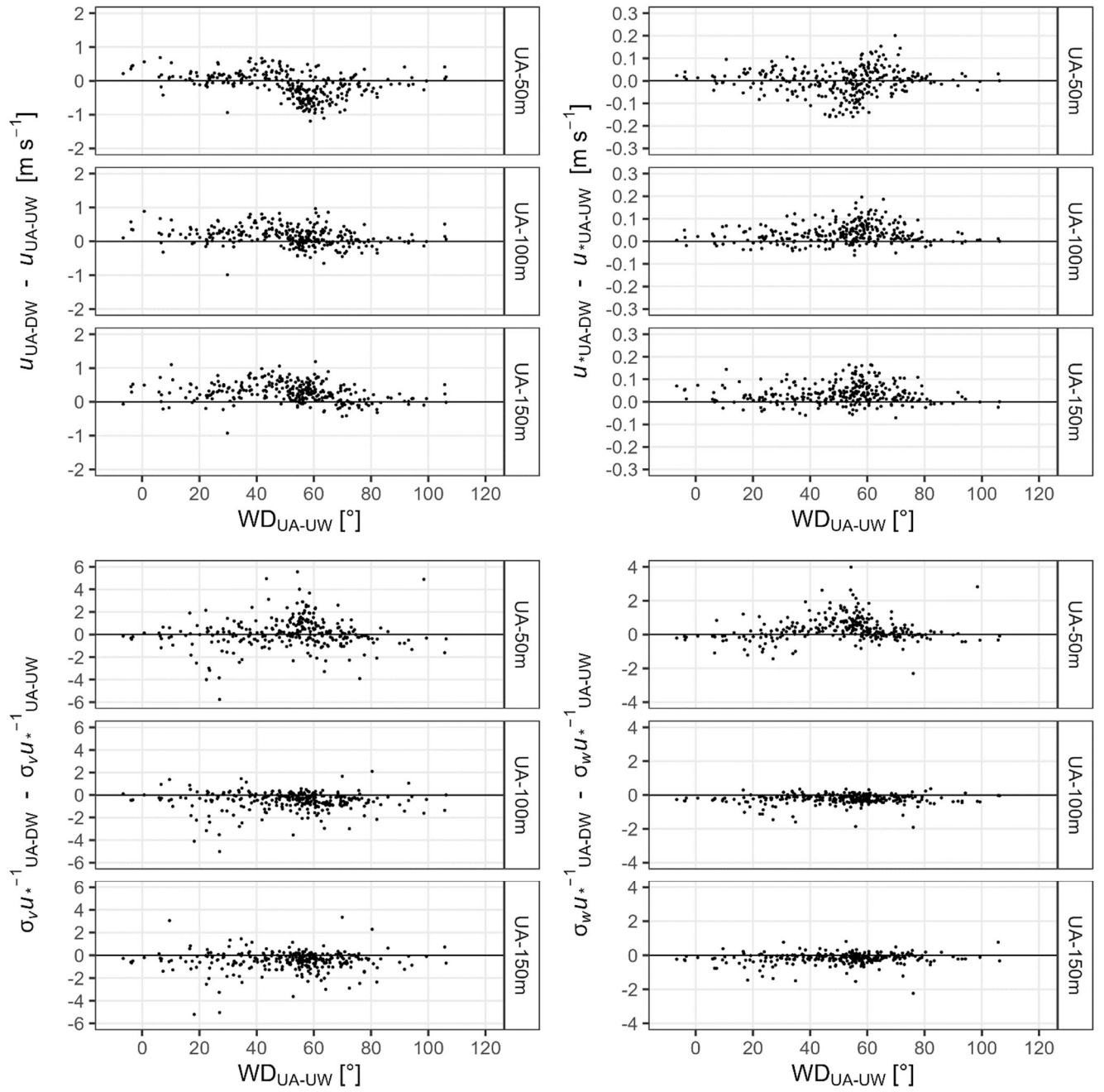
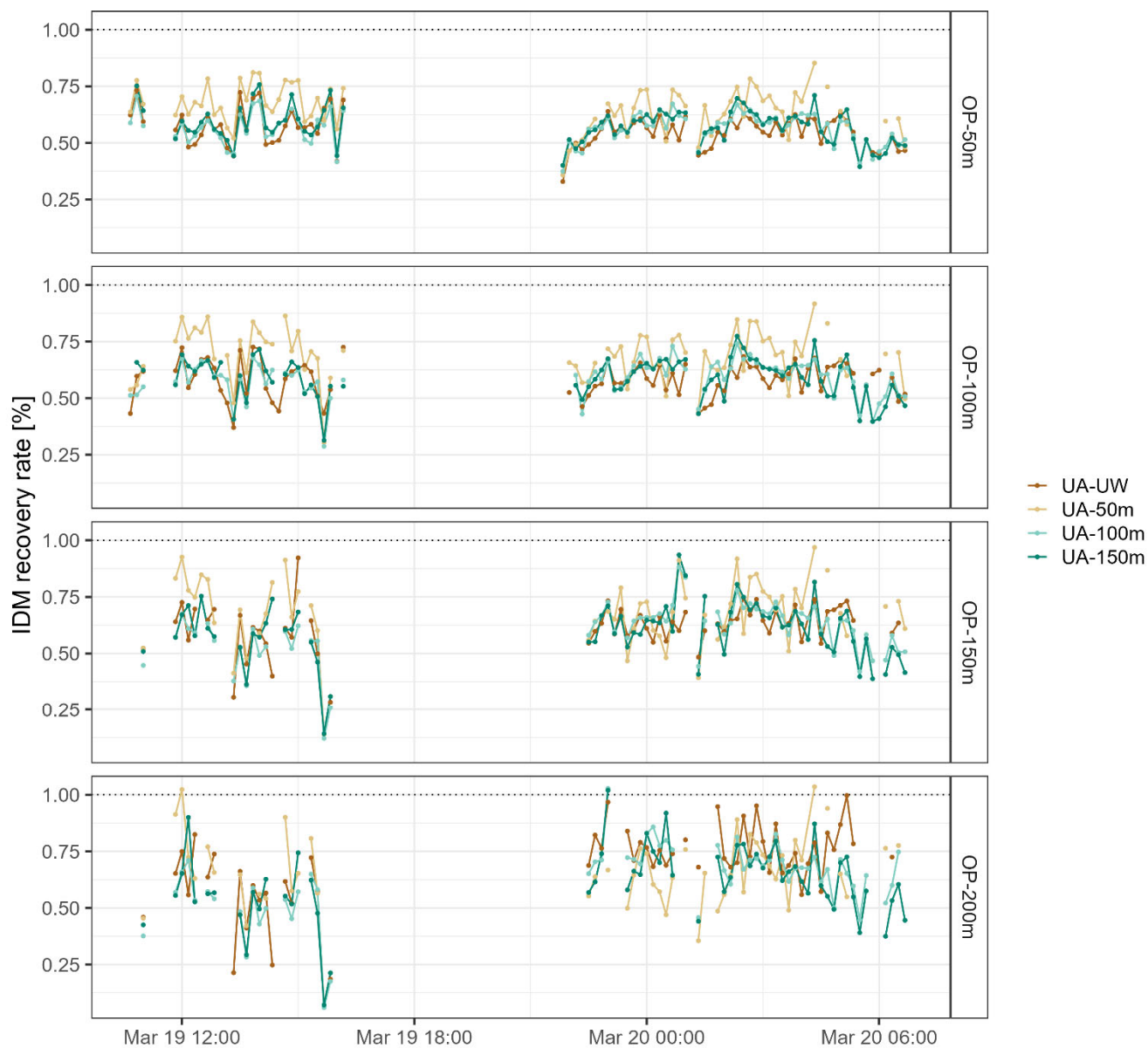


Fig. S3 Schematic overview and wind rose of the four 3D ultrasonic anemometers (UA) of the measurement campaign whilst CH<sub>4</sub> was being released. The wind rose indicates the frequency of occurrence of wind directions and the friction velocity  $u_*$  in each wind direction sector (12° intervals). The longer the wedge, the more frequent the wind direction. The colours indicate the wind speed.



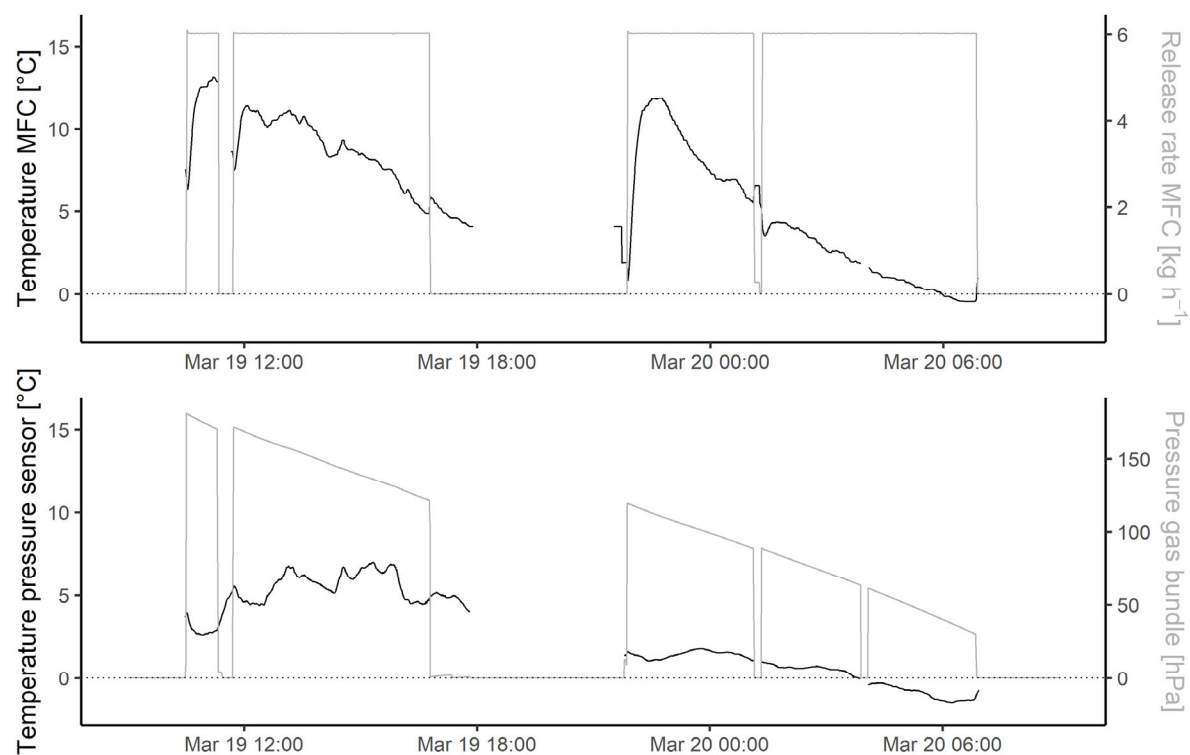
**Fig. 4** Difference in turbulence data of the downwind UA compared to the UA-UW. Given are  $u$  = wind speed,  $u_*$  = friction velocity,  $\sigma_v/u_*$  = standard deviation of the  $v$  wind divided by friction velocity,  $\sigma_w/u_*$  = standard deviation of the  $w$  wind divided by friction velocity.

## S5 - IDM recovery rates

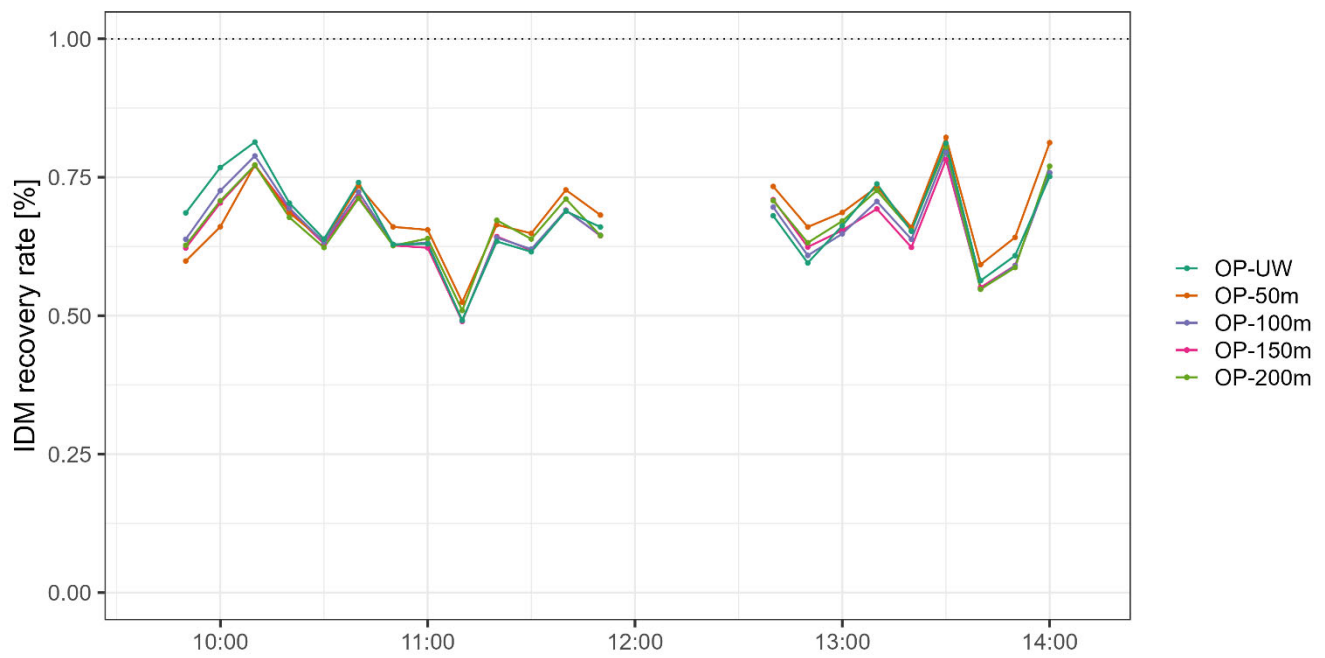


25 **Fig. 5** IDM recovery rate for the measurement campaign with all possible ultrasonic anemometer (UA) and open-path (OP) combinations. Each panel represents an OP (location), and the colours indicates the UA used to calculate the recovery rate. The time series is in UTC+1.

## S6 – Additional plots



**Fig. 6** Logging data of the Keller pressure sensor and the Bronkhorst mass flow controller during the measurement campaign. The lines in light grey correspond to the secondary y-axis.



**Fig. 7 Recovery rate of all OP during IC2. Note, that all OP were placed downwind with approximately 1 m spacing between the devices. The background was taken before the release.**