



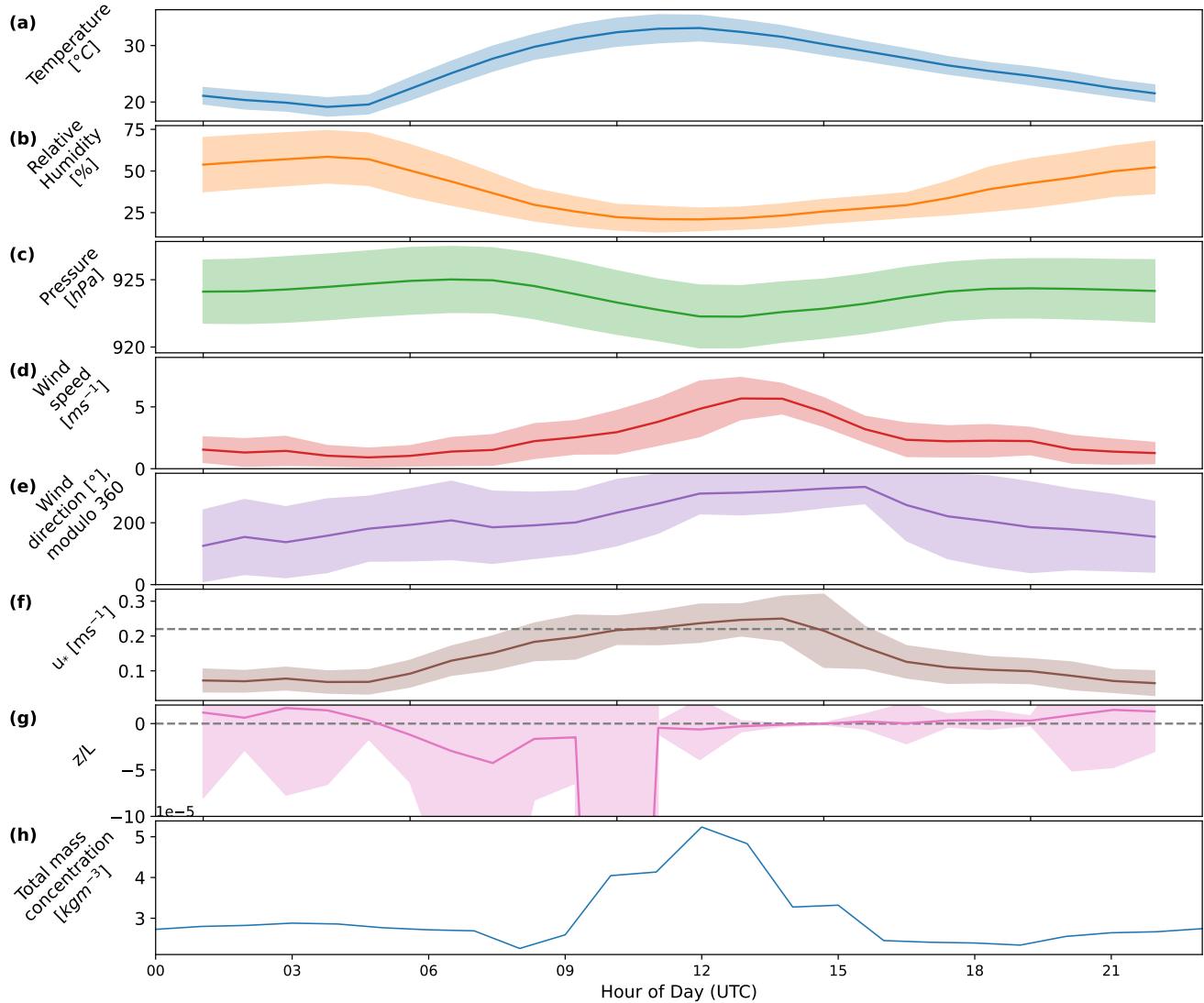
*Supplement of*

## **From fine to giant: multi-instrument assessment of the dust particle size distribution at an emission source during the J-WADI field campaign**

**Hannah Meyer et al.**

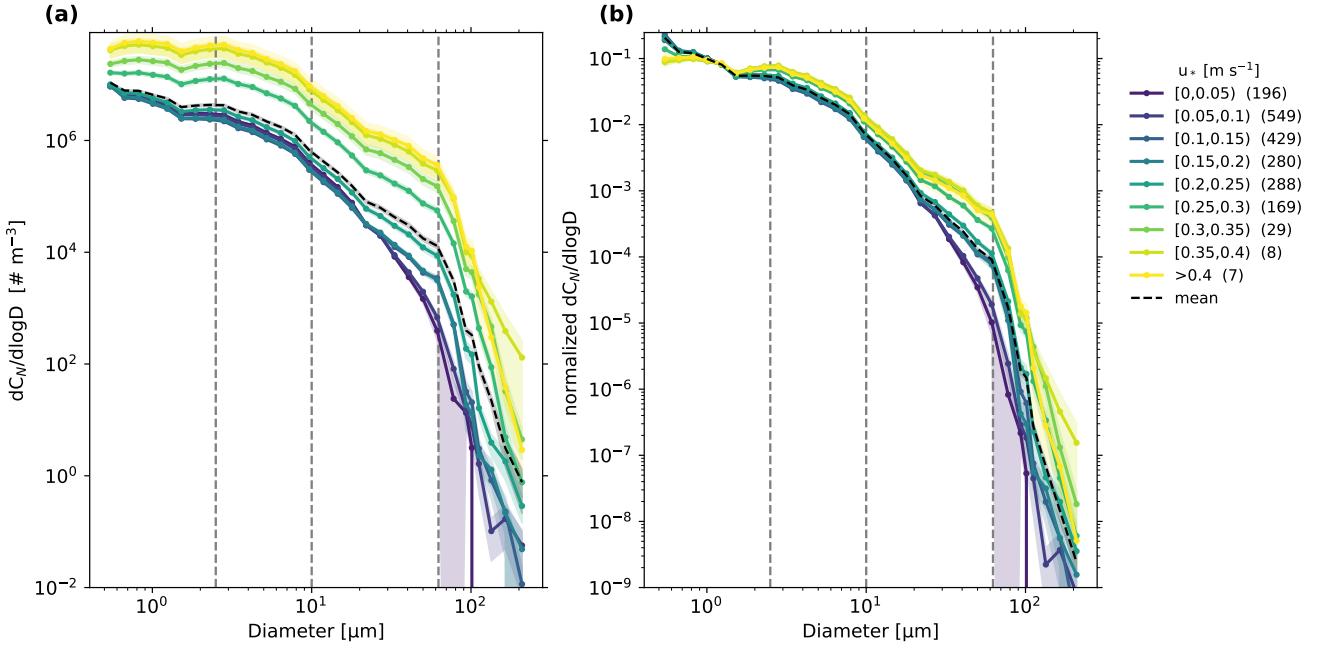
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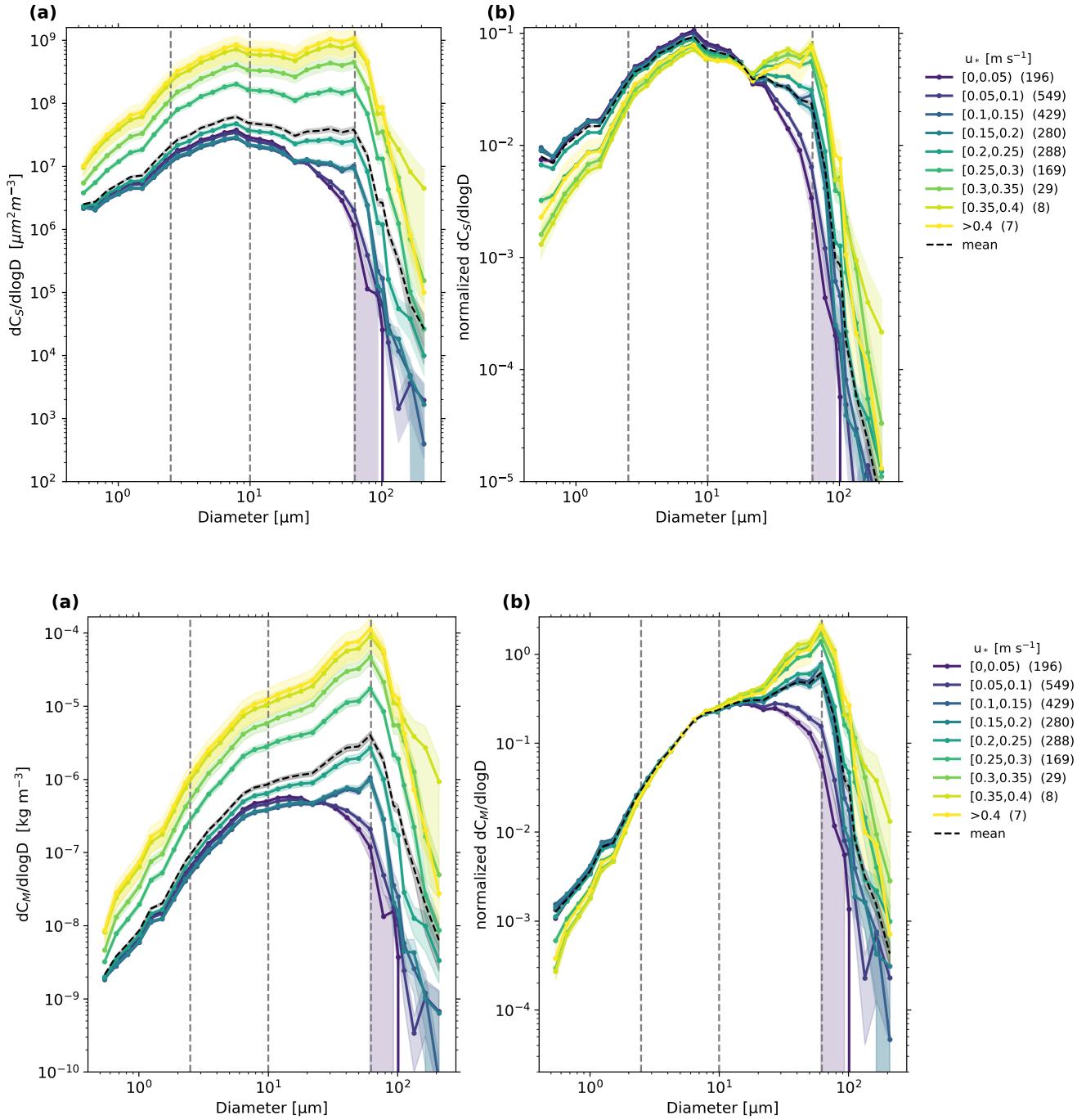


*Fig. S1: Average diurnal cycle over the whole campaign from 15-minute averaged meteorological and dust conditions during the campaign corresponding to Figure 8 in the main body of the document. Shaded areas correspond to the standard deviation for the time of the day.*

(a) Temperature (4 m), (b) relative humidity (2 m), (c) pressure (1 m), (d) wind speed (4 m), (e) wind direction (4 m), (f) friction velocity  $u_*$  from the scintillometer (2.54 m) with the dashed line representing the threshold friction velocity  $u_{*t} = 0.22 \text{ ms}^{-1}$ . (g) Atmospheric stability represented by  $z/L$ , where  $L$  is the Obukhov length obtained from the scintillometer and  $z$  is the reference height 2.54 m. The dashed line represents  $z/L = 0$ . (h) Combined total particle mass concentration obtained from Welas, Fidas, and SANTRI2. Here no standard deviation is given for more clarity of the figure. These data include the corrections explained in Sect. 2.1.2.



*Fig. S2: Number concentration PSD as in the main body of the document for mass concentration corresponding to Fig. 11. (a) Variability of number concentration PSD with  $u_*$  deduced from SANTRI2, Welas and Fidas over the whole campaign time. Colors indicate  $u_*$  during the 15-min averaging time period corresponding to the PSDs and the black dashed line the mean of all PSD. Shaded areas depict the standard error of PSDs within each class across the different time steps used. Numbers in parentheses indicate the number of 15-min PSDs taken into account in each  $u_*$  range. Dashed lines indicate the size ranges of the dust size classifications (Sect. 1). (b) Same as (a) but normalized to unity in each time interval.*



*Fig. S3: Surface area concentration PSD as in the main body of the document for mass concentration corresponding to Fig. 11. (a) Variability of surface area PSD with  $u_*$  deduced from SANTRI2, Welas and Fidas over the whole campaign time. Colors indicate  $u_*$  during the 15-min averaging time period corresponding to the PSDs and the black dashed line the mean of all PSDs. Shaded areas depict the standard error of PSDs within each class across the different time steps used. Numbers in parentheses indicate the number of 15-min PSDs taken into account in each  $u_*$  range. Dashed lines indicate the size ranges of the dust size classifications (Sect. 1). (b) Same as (a) but normalized to unity in each time interval.*

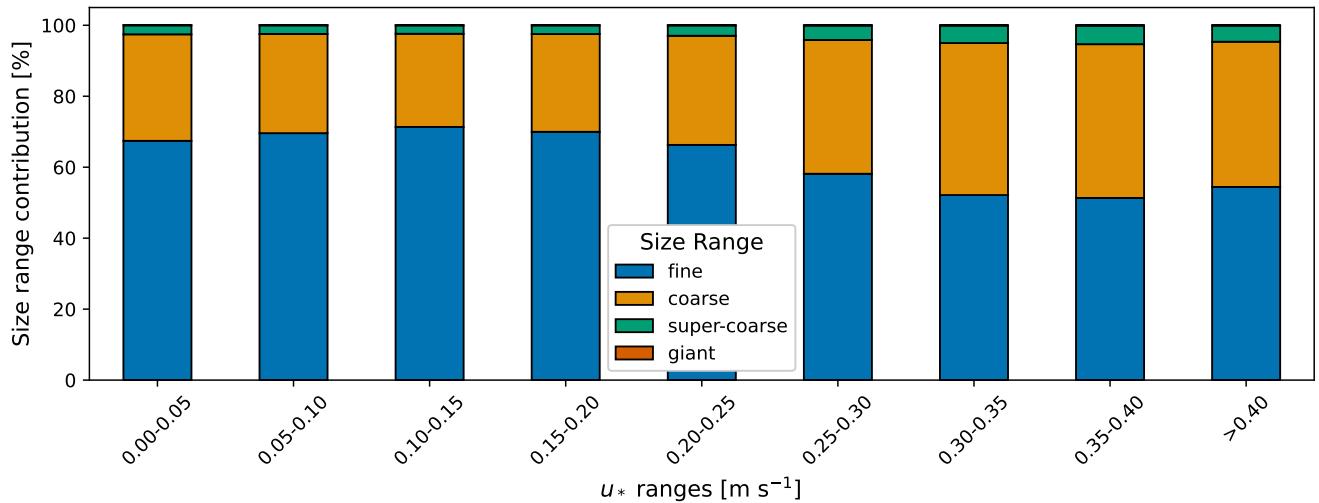


Fig. S4. Percentage number concentration abundance of particle size ranges deduced from SANTRI2, Welas and Fidas over the whole campaign with  $u^*$  as in the main body of the document for mass concentration corresponding to Fig. 12.

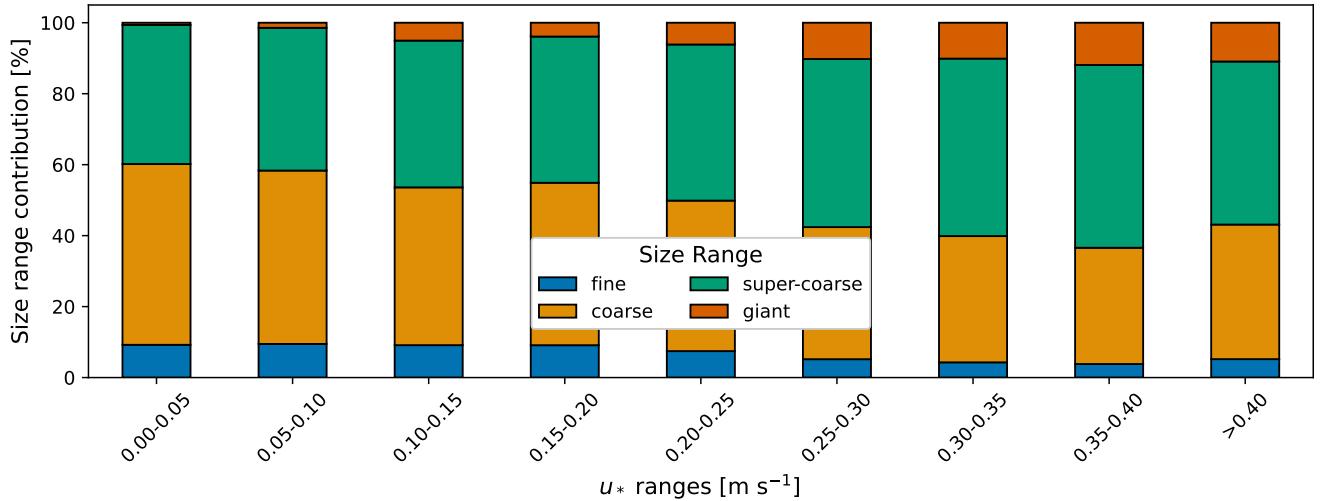


Fig. S5: Percentage surface area concentration abundance of particle size ranges deduced from SANTRI2, Welas and Fidas over the whole campaign with  $u^*$  as in the main body of the document for mass concentration corresponding to Fig. 12.