

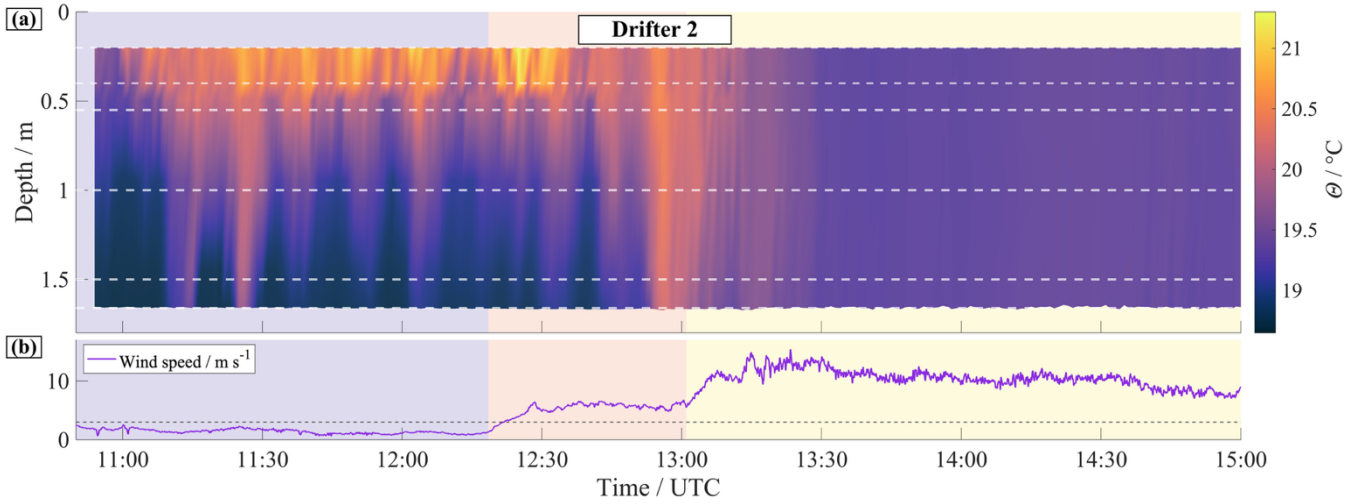
Supplements



Figure S1: Calm sea surface state with a smooth sea surface due to suppressed capillary waves on 21 July 2024.



Figure S2: In-situ environmental conditions with organisms such as jellyfish on 21 July 2024.



5 **Figure S3:** Panel (a) shows the conservative temperature values of Drifter 2 with sensor chain from 21 July 2024. The temperature values are interpolated over depth and time. The dashed white lines indicate the average depth positions of the sensors. Panel (b) shows the wind speed in m s^{-1} measured with RV Heincke.

S1 Estimation of Evaporation Required to Produce a Salinity Anomaly

Salinity is defined as the ratio of salt mass to water mass by

$$S = \frac{m_s}{m_w}, \quad (\text{S1})$$

10 where S denotes absolute salinity in g kg^{-1} , m_s is the mass of salt, and m_w is the mass of water. During evaporation, the salt mass is considered to remain constant. Assuming that evaporation is the only process affecting salinity, the relative freshwater loss f required to produce a salinity increase ΔS from an initial salinity S_0 is given by

$$f = 1 - \frac{S_0}{S_0 + \Delta S}. \quad (\text{S2})$$

S_0 denotes the reference salinity and ΔS the observed salinity increase. The relative freshwater loss can be converted into an equivalent evaporation depth by

$$15 \quad E = f \cdot H, \quad (\text{S3})$$

where E represents the equivalent evaporation in mm and H the thickness of the affected near-surface layer. For comparison with bulk flux estimates, cumulative evaporation derived from the COARE bulk algorithm is calculated from the latent heat flux as

$$E_{\text{COARE}} = \int \frac{Q_L}{\rho L_v} dt \quad (\text{S4})$$

20 with Q_L denoting the latent heat flux in W m^{-2} , ρ the density of seawater, and L_v the latent heat of vaporization. The evaporation estimated using this approach represents a lower bound, as any vertical mixing would increase the freshwater loss required to generate a given salinity anomaly.

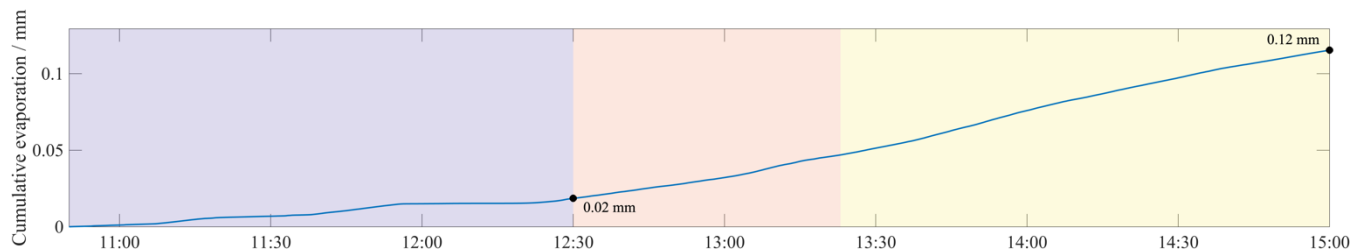


Figure S4: Cumulative evaporation from the COARE 3.6 bulk algorithm between 10:50 and 15:00 UTC on 21 July 2024. Shaded areas mark the analysis periods used throughout the study. Black markers indicate cumulative values at 12:30 UTC and 15:00 UTC.