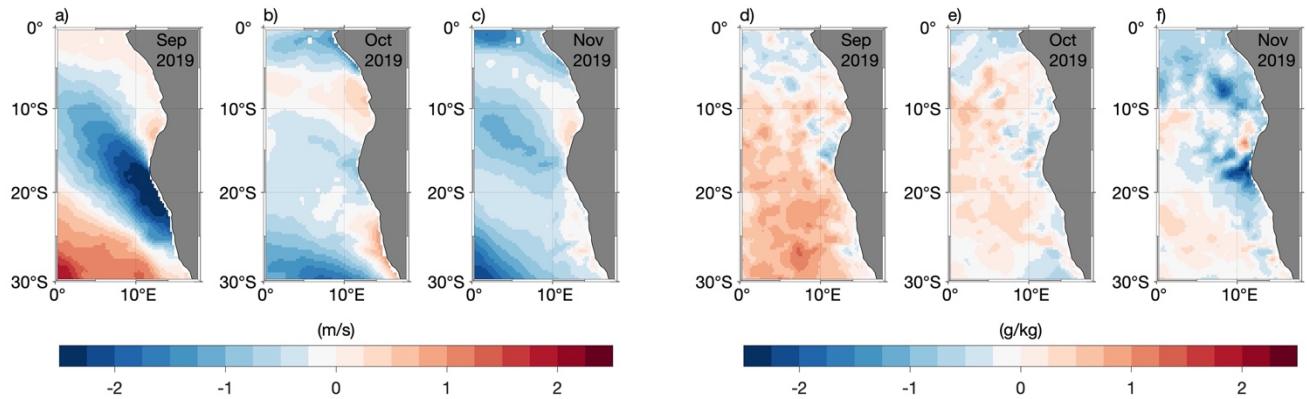
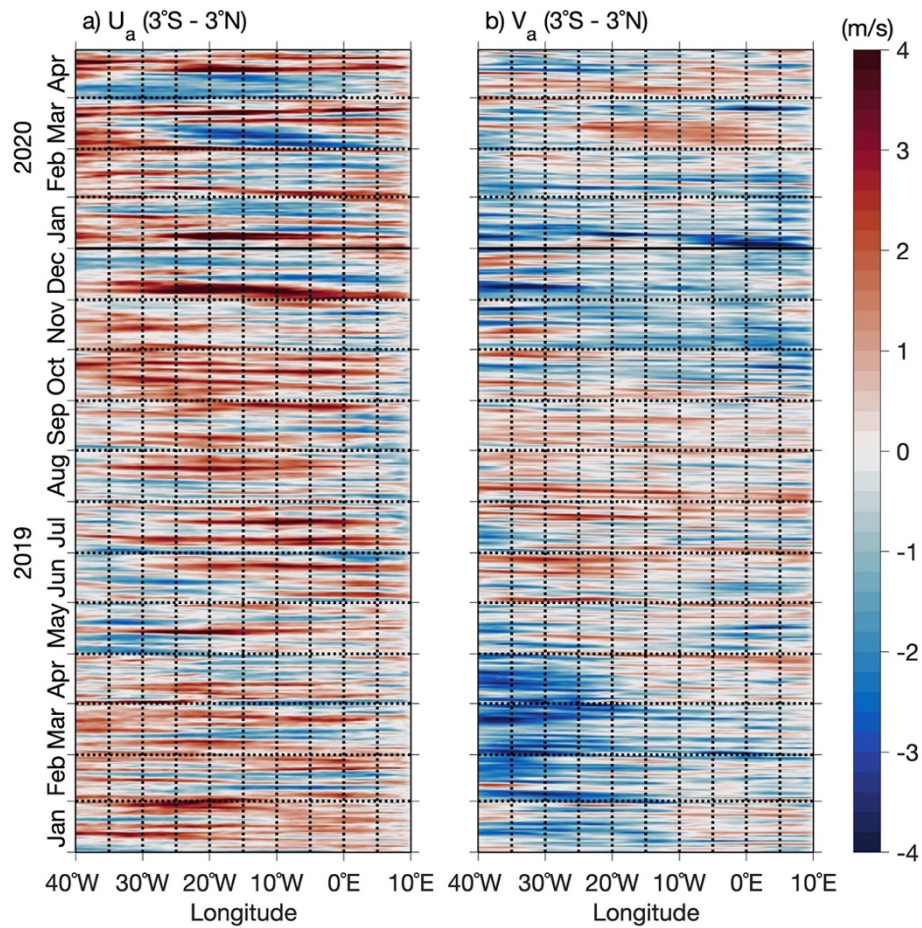


## *Supplementary Material*

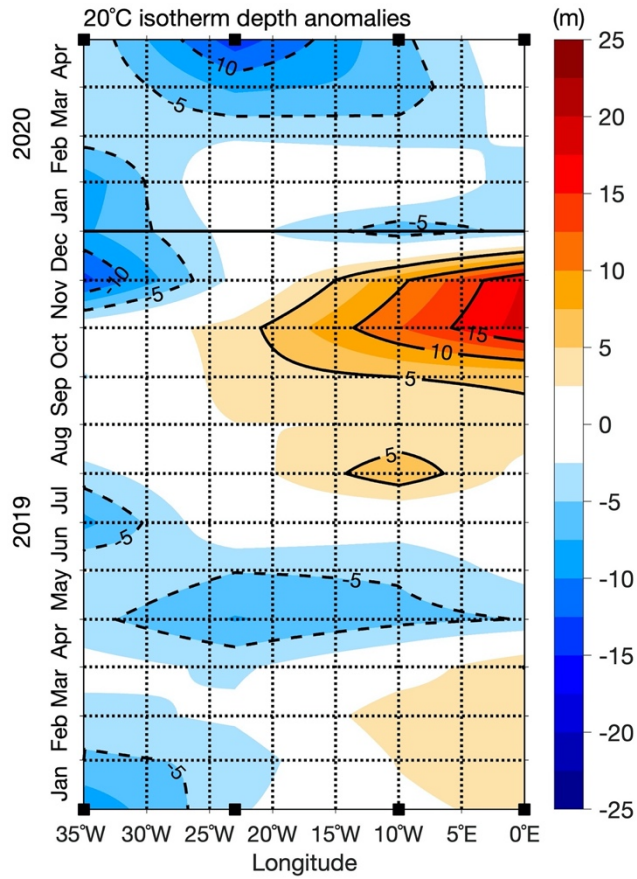
### 1 Supplementary Figures



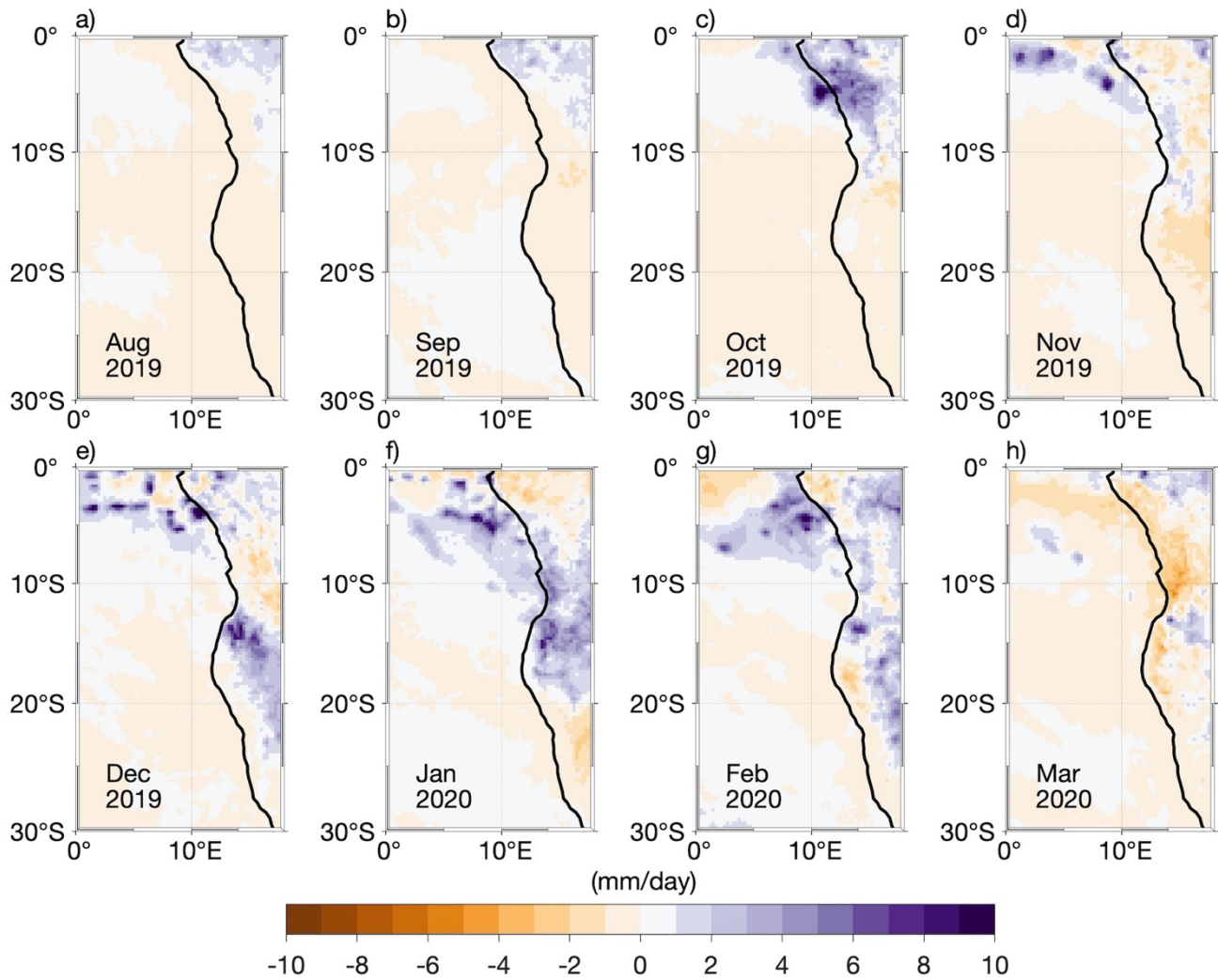
**Supplementary Figure 1.** (a-c) Monthly detrended anomalies of wind speed calculated from ERA5 surface winds at 10 m from September to November 2019. (d-f) same as (a-c) but for the specific humidity difference between the air and the sea surface. The anomalies are calculated relative to the period January 1982 and April 2020.



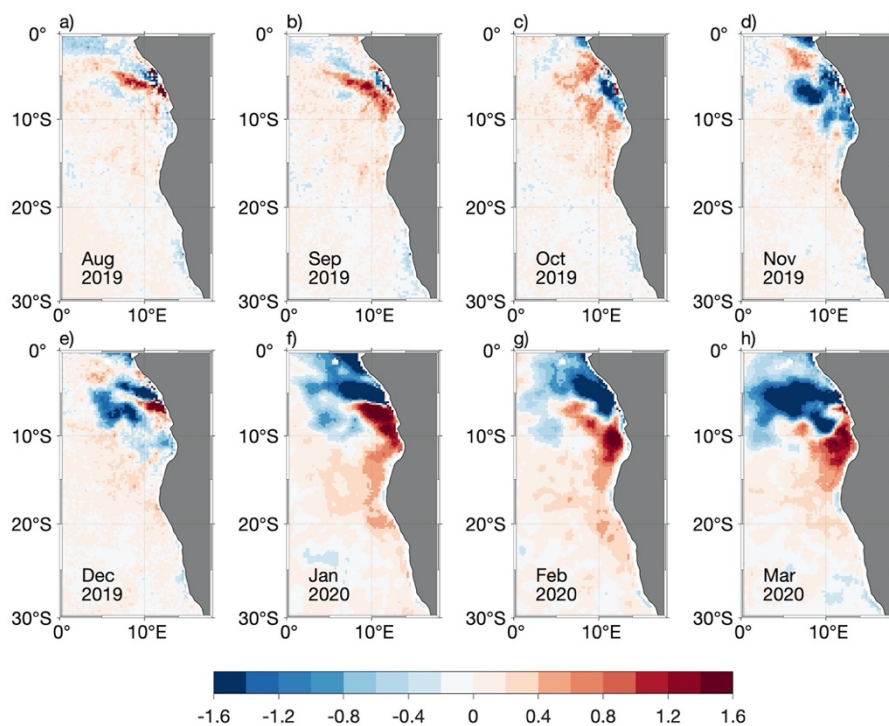
**Supplementary Figure 2.** (a) Hovmöller diagram of detrended daily ERA5 zonal wind anomalies along the equator (averaged over  $3^{\circ}\text{S} - 3^{\circ}\text{N}$ ) from  $40^{\circ}\text{W}$  to the African coastline between January 2019 (bottom) to April 2020 (top). (b) Same as (a) but for meridional wind anomalies. The anomalies are originally calculated between January 1982 and April 2020.



**Supplementary Figure 3.** Hovmöller diagram of 20°C isotherm depth anomalies from January 2019 (bottom) to April 2020 (top) inferred from ePIRATA data and interpolated between mooring locations (filled black squares on the x-axes).



**Supplementary Figure 4.** (a-h) Monthly detrended anomalies of ERA5 total precipitation from August 2019 to March 2020. The anomalies are calculated relative to the period January 1982 and April 2020.



**Supplementary Figure 5.** (a-h) Monthly detrended anomalies of ESA CCI + SSS during August 2019 to March 2020. Anomalies are calculated relative to the period 2010 to 2020.