Supplement of Ocean Sci., 21, 661–678, 2025
https://doi.org/10.5194/os-21-661-2025-supplement

Ocean Science Open Access EGU

Supplement of

River discharge impacts coastal southeastern tropical Atlantic sea surface temperature and circulation: a model-based analysis

Léo C. Aroucha et al.

Correspondence to: Léo C. Aroucha (leo.aroucha@geomar.de)

The content of this file is:

- Supplementary Figures S1 to S9

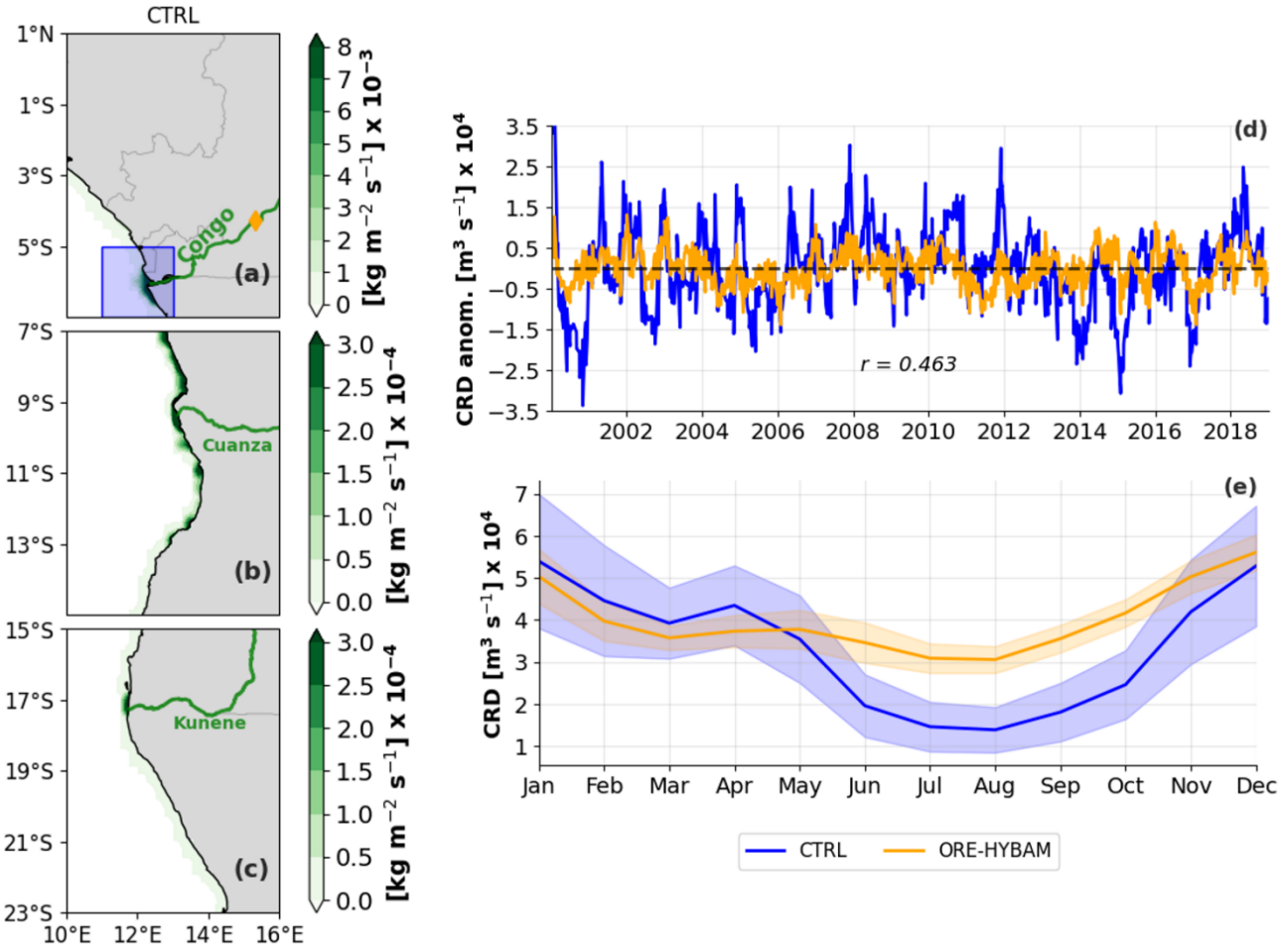

Figure S1. Freshwater input from CTRL (blue) vs Congo River discharge from Kinshasha-Brazzaville station (orange). **(a)** Freshwater input from CTRL run. Blue box (5ºS – 7ºS, 11ºE – 13ºE) in (a) represents the area where CTRL freshwater input was averaged. Orange diamond shows location of Kinshasha-Brazzaville station. **(b)** and **(c)** same as (a). Note that colorbar scales change from (a)-(b). **(d)** Daily anomalies of both box-averaged CTRL freshwater input and ORE-HYBAM river discharge. **(e)** Seasonal climatology from 2000-2018 of both products. Shading in (e) indicates monthly standard deviations.

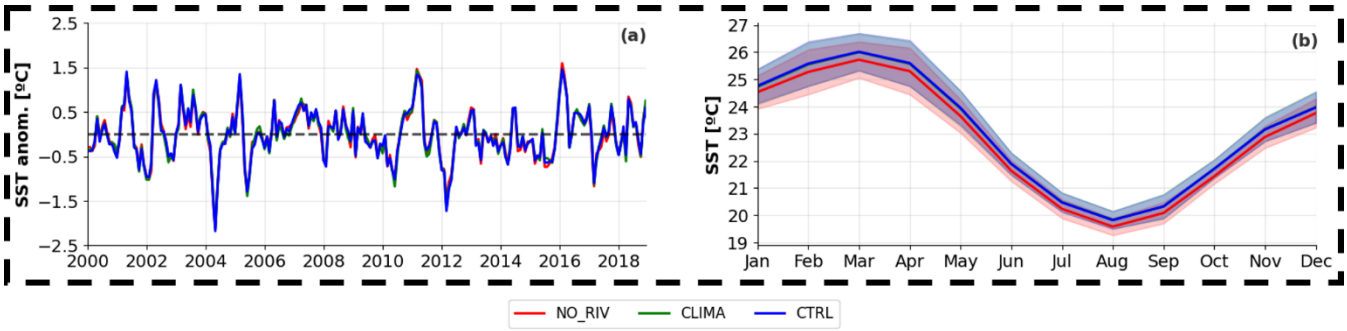

Figure S2. (a) SST anomalies averaged for CABA shown for the three model experiments (CLIMA in green, NORIV in red, CTRL in blue). **(b)** Same as (a) but for the monthly climatologies. Shadings indicate monthly standard deviations.

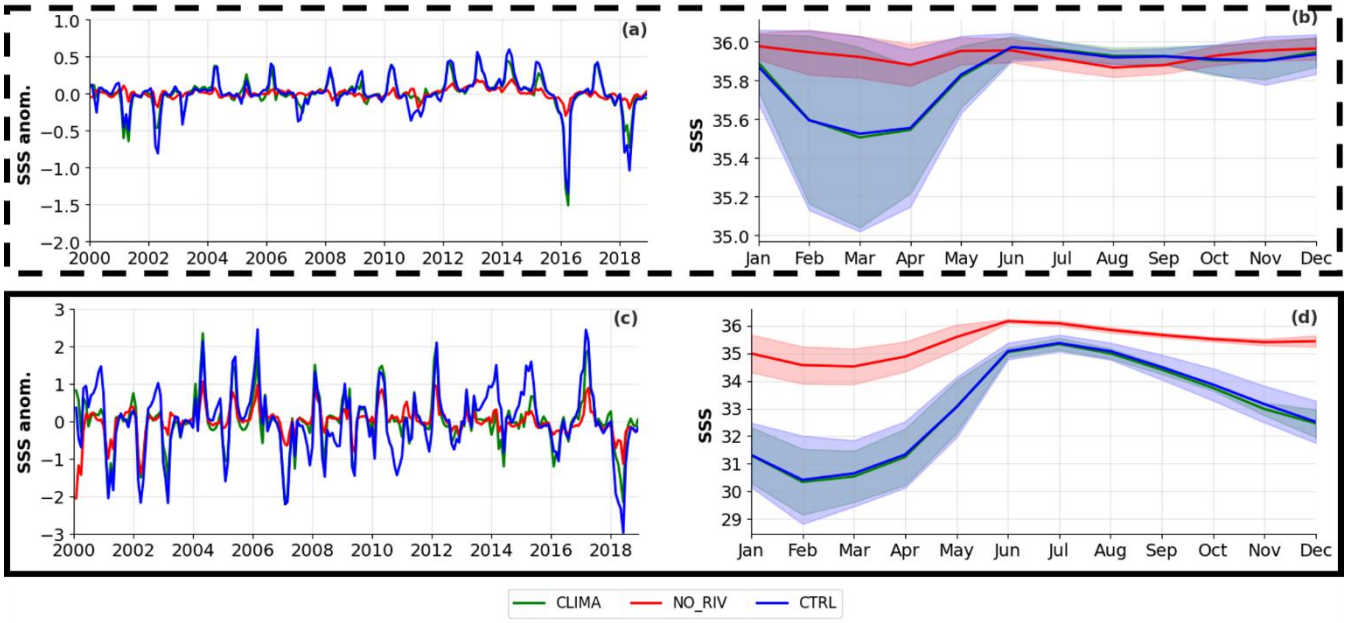

Figure S3. (a) SSS anomalies averaged for CABA for the three model experiments (CLIMA in green, NORIV in red, CTRL in blue). **(b)** Same as (a) but for the seasonal climatologies. Shadings indicate monthly standard deviations. **(c)** and **(d)** same as (a) and (b) but for CRMA..

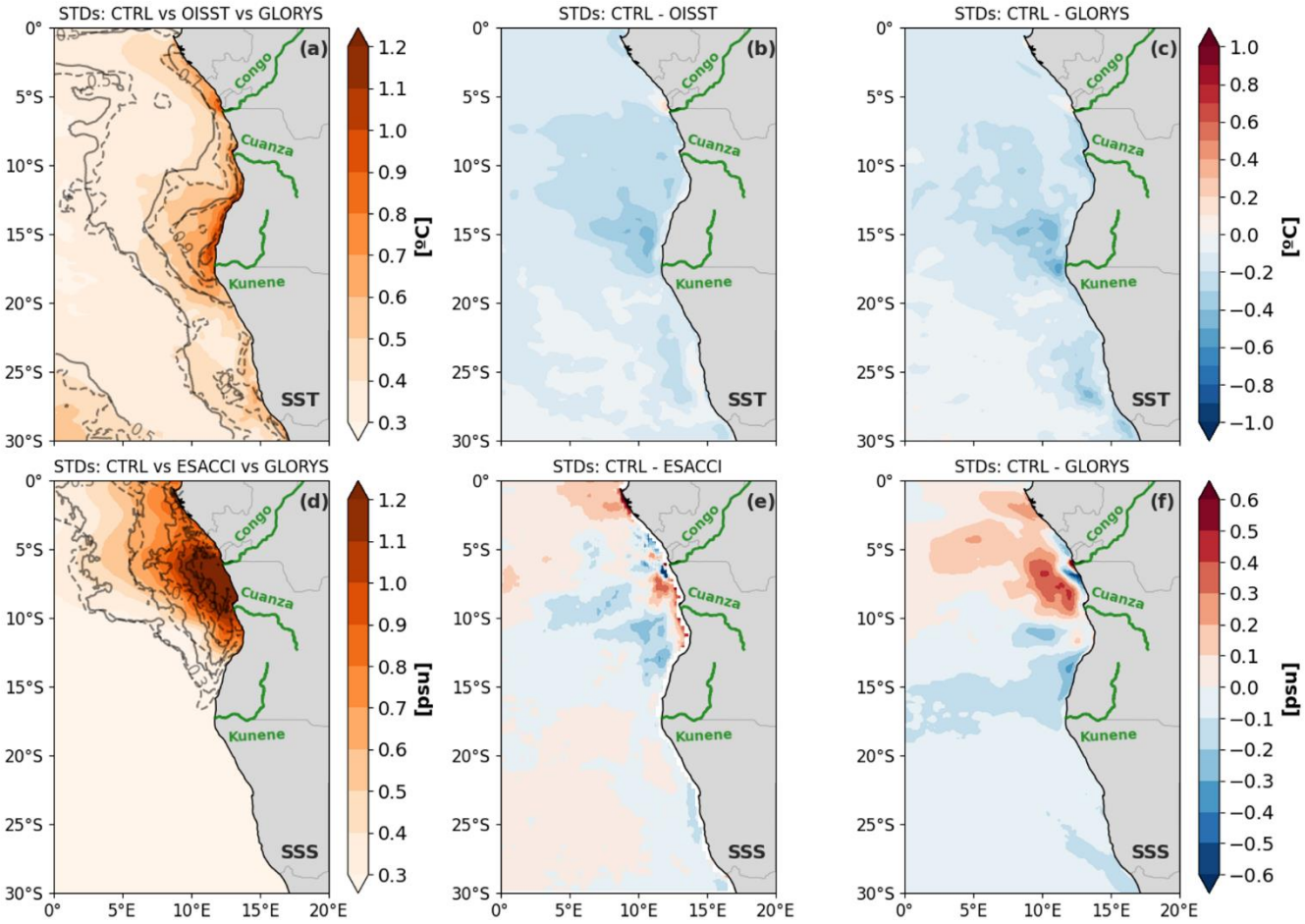

Figure S4. Comparison of simulated SST variability against observations and reanalysis. **(a)** Mean SST anomalies monthly standard deviation (STD) from CTRL (shading), OISST (solid contours), and GLORYS (dashed contours) from 2000-2018. **(b)** Mean difference in SST anomalies STD between CTRL and OISST. **(c)** Same as (b) but difference between CTRL and GLORYS12. **(d)** Same as (a) but for CTRL SSS anomalies STD, compared to ESACCI (solid contours, from 2010-2018) and GLORYS12 (dashed contours, 2000-2018). **(e)** Same as (b) but for ESACCI SSS and anomalies from 2010-2018 **(f)** Same as (c) but for SSS.

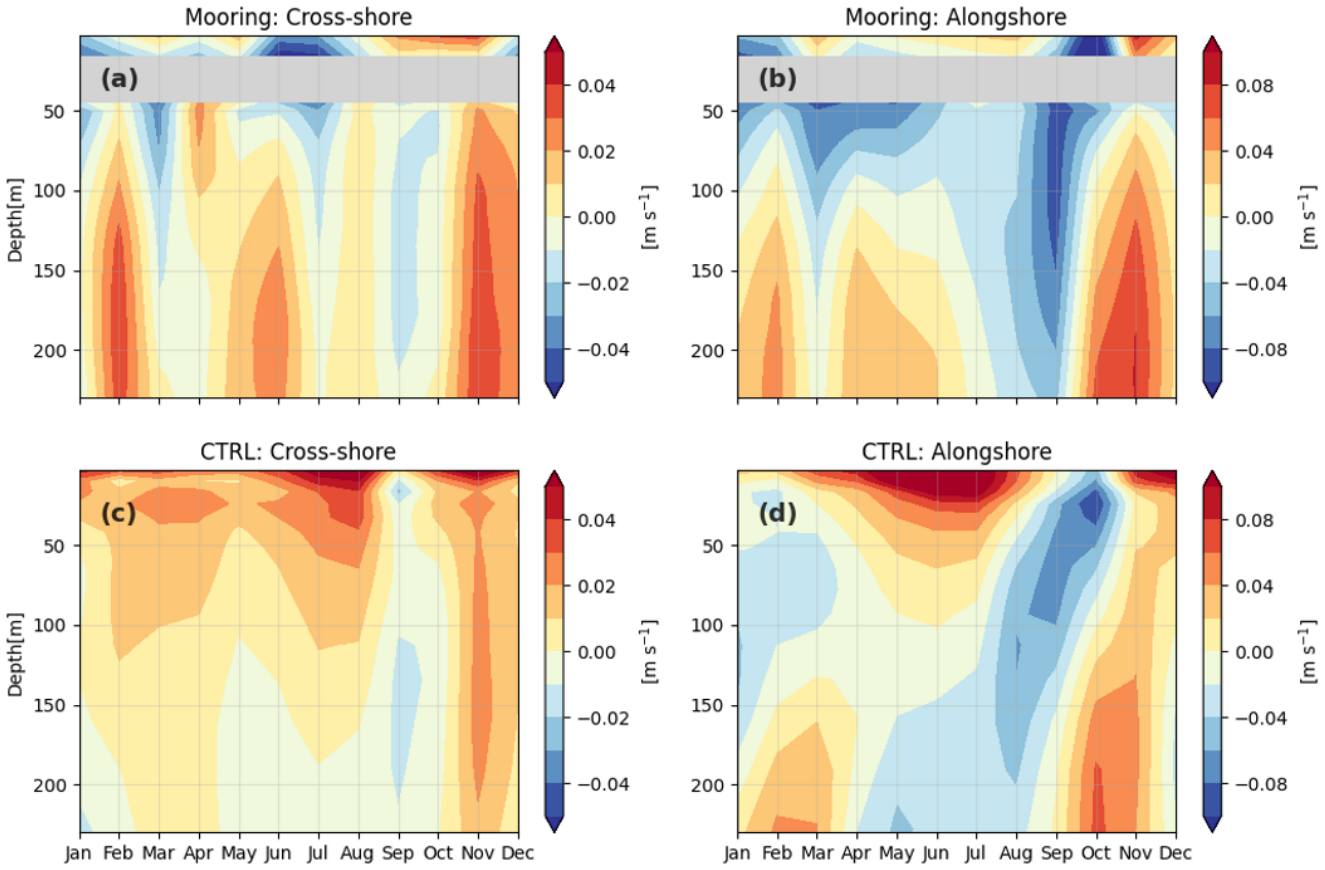

Figure S5. Cross-shore **(a, c)** and along-shore **(b, d)** current velocity climatology (rotated by -34º with respect to true north) recorded by the moored ADCP located at 10º50'S, 13º00'E combined to surface velocities from GLOBCURRENT (a, b); and taken from CTRL run (c, d) at nearest grid position from mooring location and -34º rotation. Climatologies were calculated over the period 2014 – 2018.

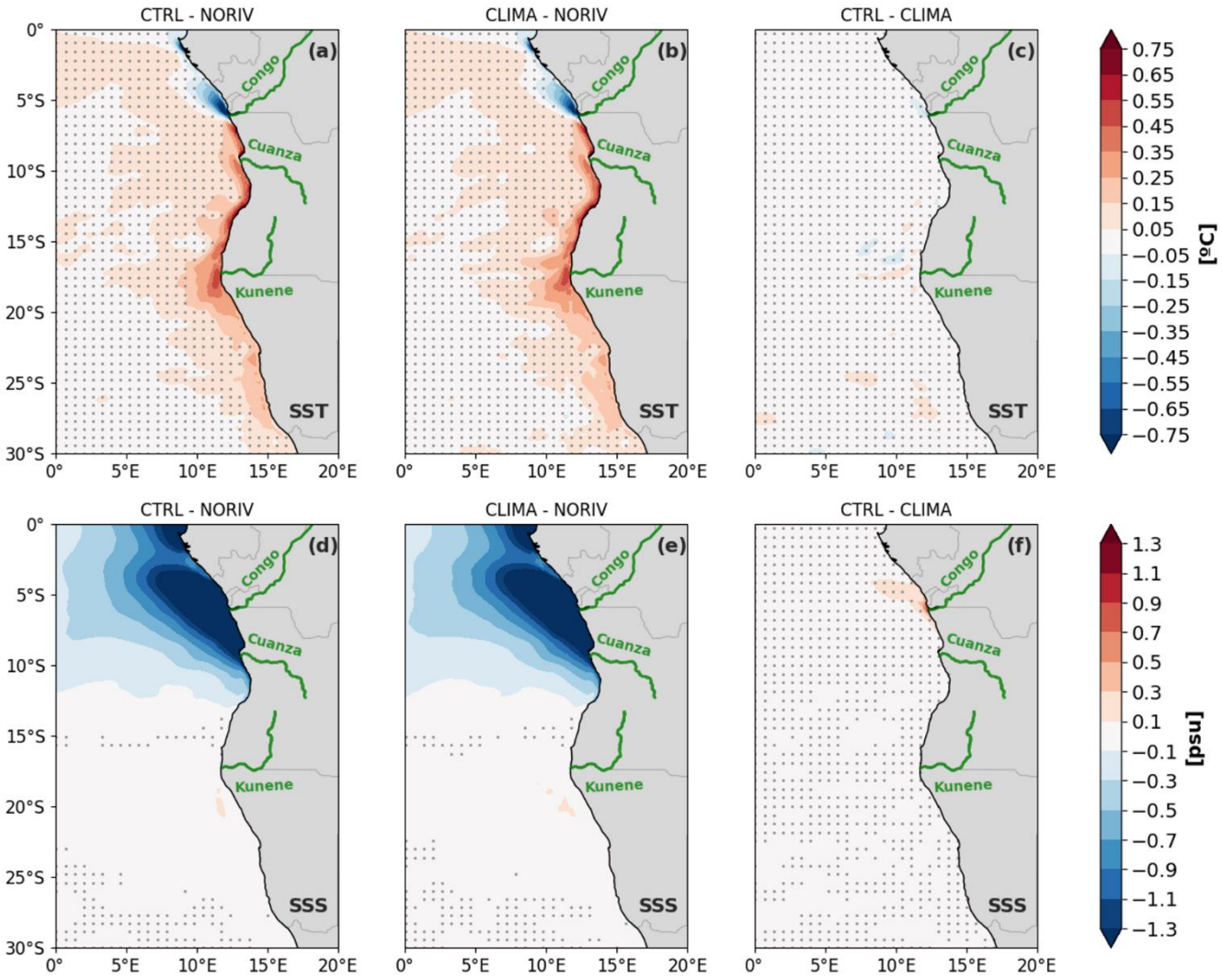

Figure S6. Mean state difference between runs. **(a)** Mean SST CTRL – Mean SST NORIV. **(b)** Mean SST CLIMA – Mean SST NORIV. **(c)** Mean SST CTRL – Mean SST CLIMA. **(d), (e), (f)** same as (a), (b), (c), respectively, but for SSS. Stippled grey areas indicate where difference is not significant in a 95% confidence level.

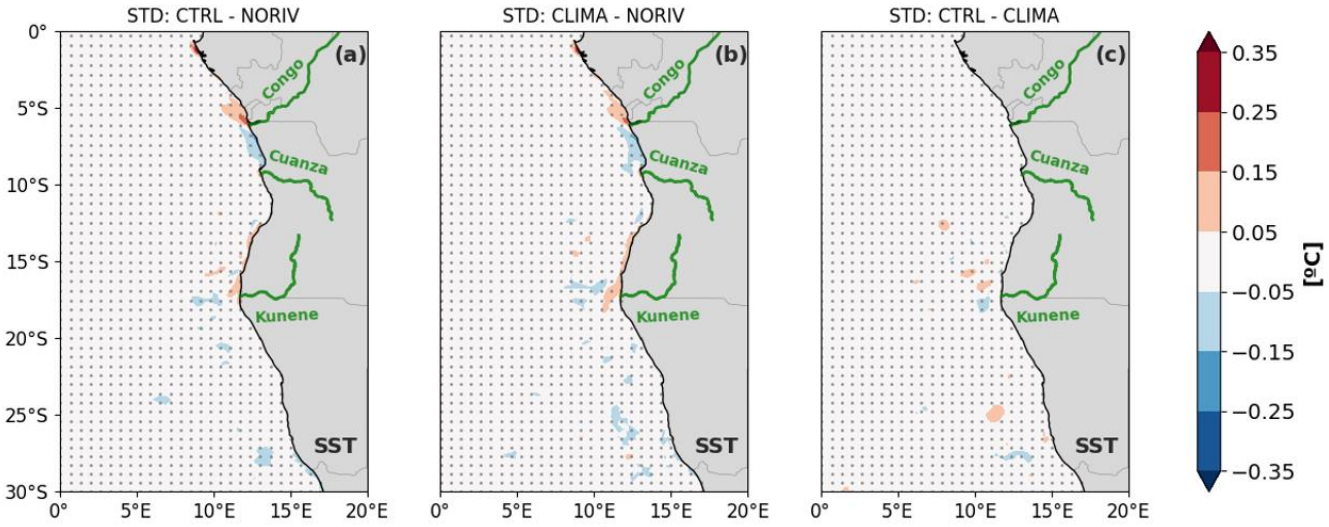

Figure S7. Monthly SST anomalies standard deviation (STD) mean difference between runs. **(a)** Mean SST anomalies STD CTRL – Mean SST anomalies STD NORIV **(b)** Mean SST anomalies STD CLIMA – Mean SST anomalies STD NORIV. **(c)** Mean SST anomalies STD CTRL – Mean SST anomalies STD CLIMA. Stippled grey areas indicate where difference is not significant in a 95% confidence level.

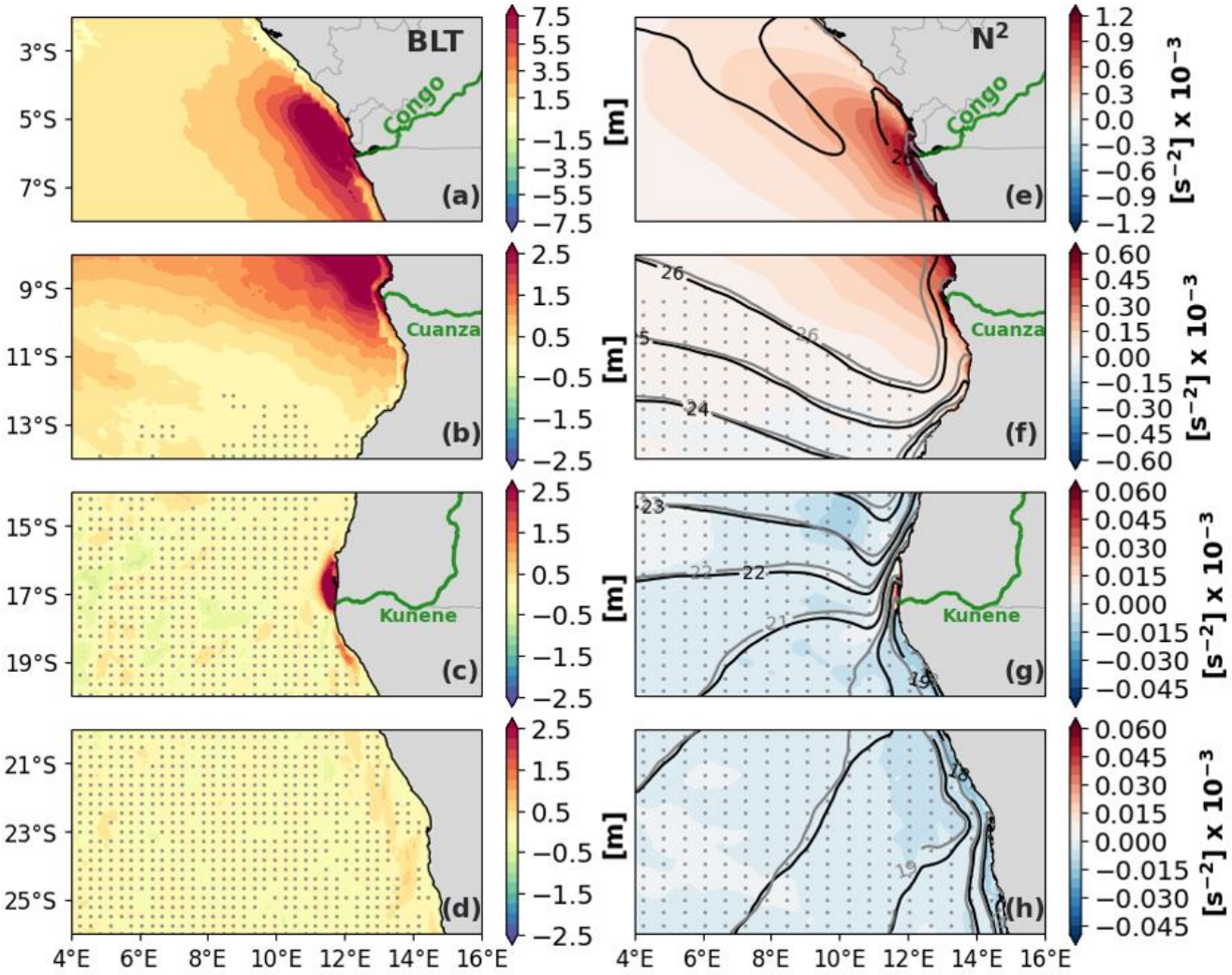

Figure S8. Difference between CLIMA and NORIV mean states (CLIMA-NORIV) for BLT **(a-d)**; N^2 averaged from surface to 50m depth **(e-h)**. Stippled grey areas indicate where difference is not significant in a 95% confidence level. Black (grey) lines from e-h depicts isotherms from CLIMA (NORIV) run. Note that colorscales change for a (e) in relation to b-d (f-h).

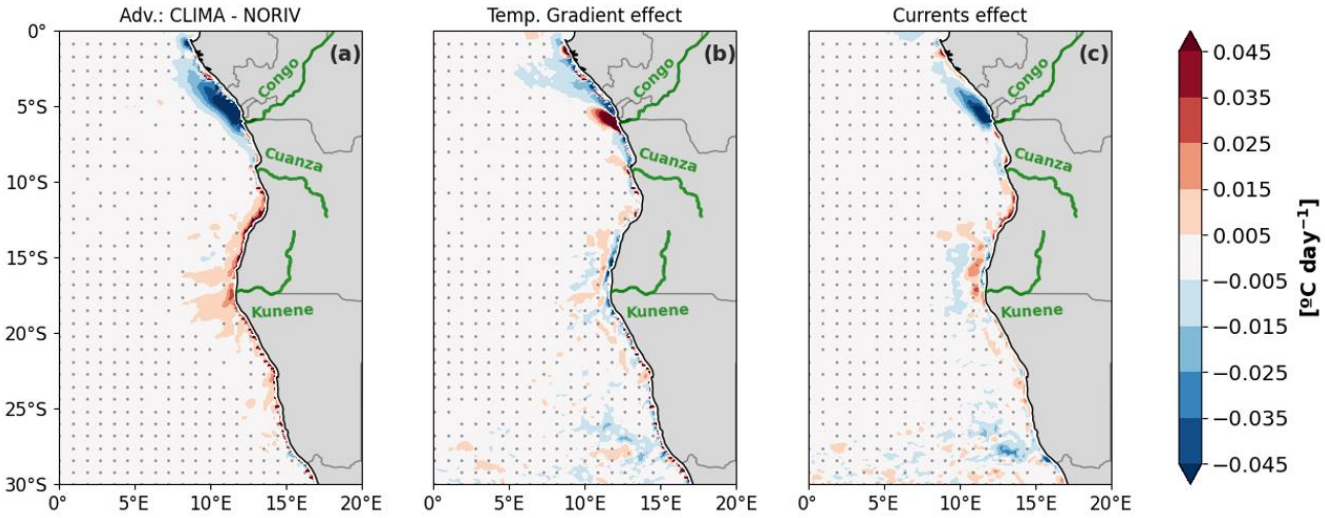

Figure S9. Difference between CLIMA and NORIV mean states (CLIMA-NORIV) for horizontal advection. In **(a)** both temperature gradient and horizontal currents are from the different runs; in **(b)** only temperature gradient is different (currents from CLIMA); in **(c)** only horizontal current is different (temperature gradient from CLIMA). Stippled grey areas indicate where difference is not significant in a 95% confidence level.