

1 Supplementary Material

2 **Title: New observations confirm the progressive acidification in the Mozambique Channel**

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4 Nicolas Metz<sup>1</sup>, Claire Lo Monaco<sup>1</sup>, Aline Tribollet<sup>1</sup>, Jean-François Ternon<sup>2</sup>, Frédéric Chevallier<sup>3</sup>,  
5 Marion Gehlen<sup>3</sup>

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7 1 Laboratoire LOCEAN/IPSL, Sorbonne Université-CNRS-IRD-MNHN, Paris, 75005, France

8 2 MARBEC, Université de Montpellier, CNRS, Ifremer, IRD, 34203 Sète, France

9 3 Laboratoire LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay Gif-sur-Yvette, 91191, France

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12 This document includes Figures S1-S6 providing the supplementary information that supports part of  
13 the discussion presented in the main article.

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Figure S1: Profiles of  $N-C_T$  (filled circles, line),  $C_{ant}$  (open circles, dashed) and density (Sigma-0) at the station occupied in June 1995 (blue) and in December 2003 (red) (GLODAP station 591 at 42°E/24.7°S). In June,  $N-C_T$  and  $C_{ant}$  concentrations are homogeneous in the deep mixed-layer (0-70m). In surface,  $N-C_T$  in June and December are very close, coherent with the seasonal cycle (Figure 4). Note that the same  $C_{ant}$  concentrations (40  $\mu\text{mol/kg}$ ) were evaluated below 100m in 1995 and 2003 whereas in surface  $C_{ant}$  values in December are unrealistic.

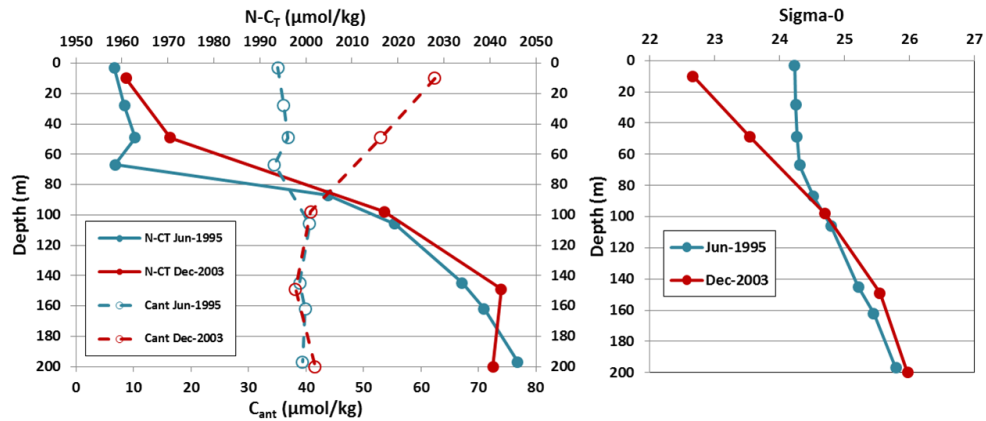
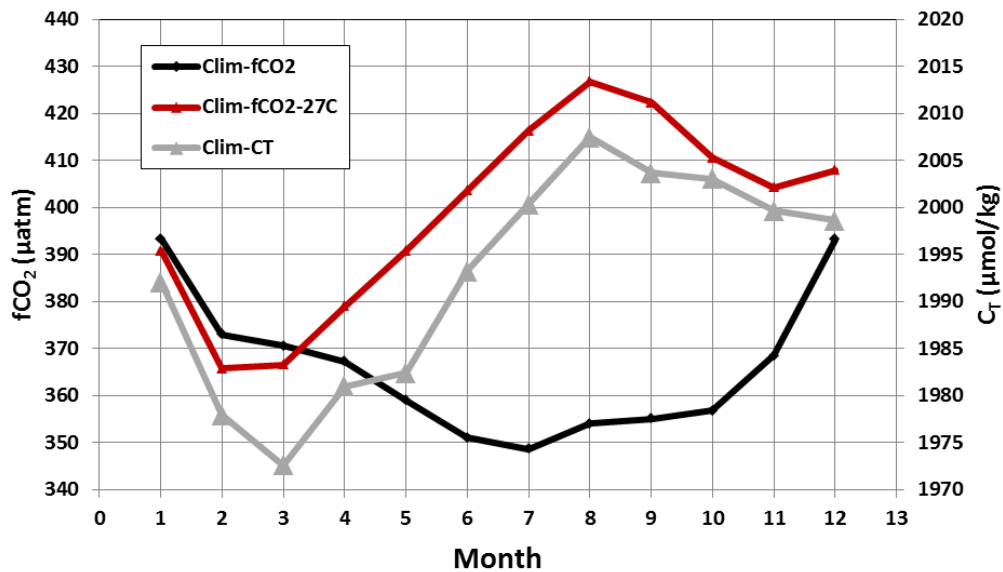
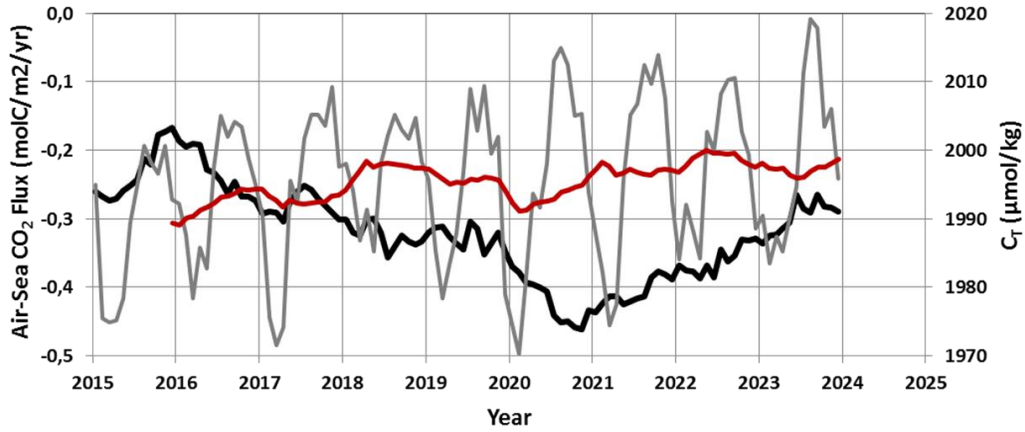


Figure S2: Seasonal cycle of  $f\text{CO}_2$  (black),  $f\text{CO}_2$  normalized at temperature 27°C (red) and  $C_T$  (grey) in the southern Mozambique Channel (24-30°S) derived from the monthly climatology (reference year 2010, Fay et al, 2024).

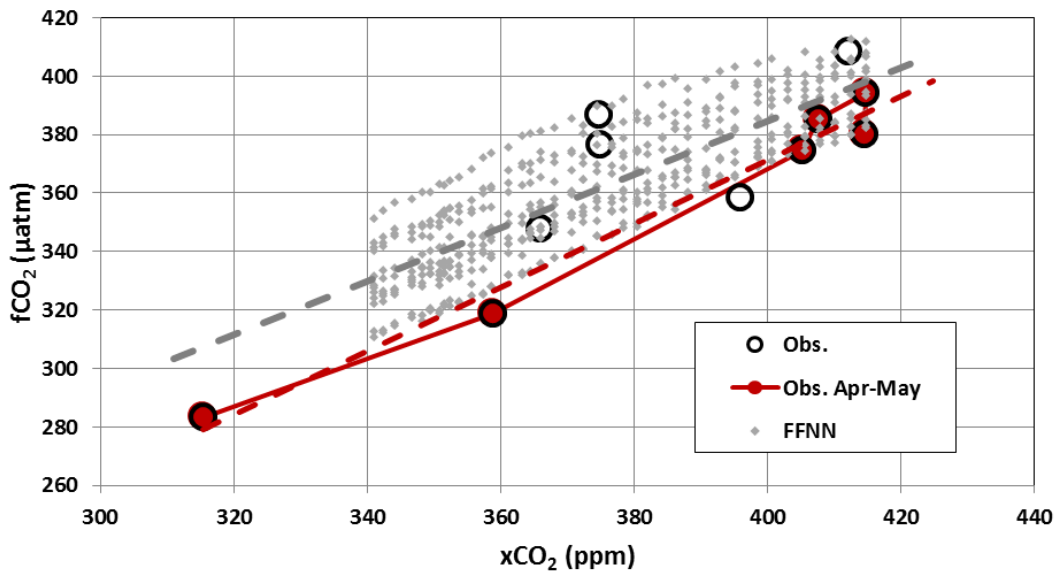


62 Figure S3: Time-series of air-sea CO<sub>2</sub> flux (black, negative for ocean sink) and C<sub>T</sub> concentration (grey  
 63 and 12-month running mean in red) averaged in the southern Mozambique Channel (24-30°S) based  
 64 on the FFNN-LSCE model over 2015-2023. When the sink is stronger (e.g. in 2020) the C<sub>T</sub> increase is  
 65 faster.



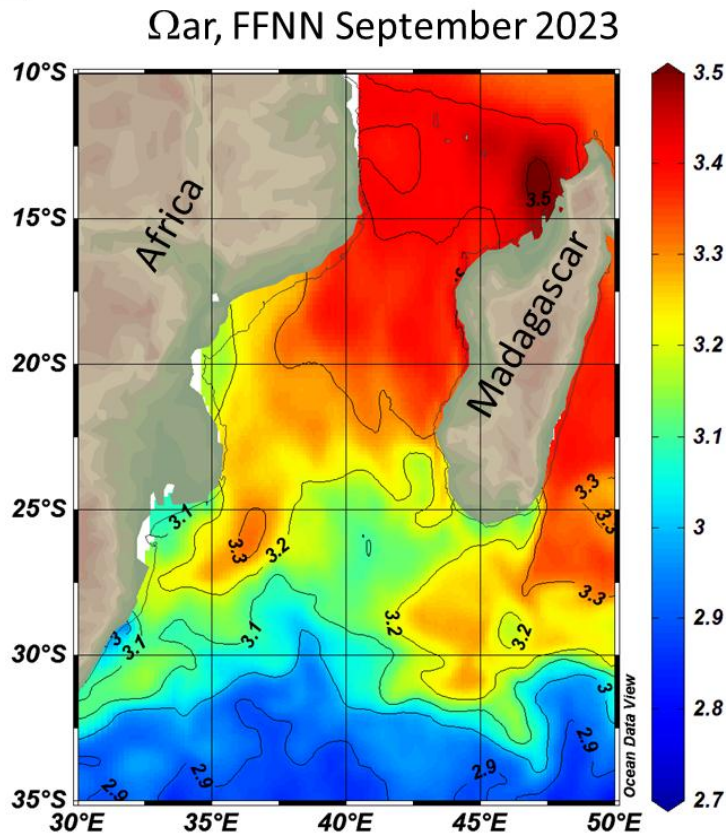
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81 Figure S4: Time-series of oceanic fCO<sub>2</sub> versus atmospheric CO<sub>2</sub> in the southern Mozambique Channel  
 82 (24-30°S) based on averaged observations between 1963 and 2022 (circles) and the FFNN model over  
 83 1985-2023 (grey diamonds, dashed grey line). Available observations are shown for all seasons but  
 84 the trend of +1.089 µatm/ppm (red dashed line) evaluated using only April-May data (red circles).



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110 Figure S5: Map of  $\Omega_{ar}$  in September 2023 in the Mozambique Channel based on the FFNN model.  
111 South of 20°S,  $\Omega_{ar} < 3.3$ . Figure produced with ODV (Schlitzer, 2018).  
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163 Figure S6: Top: Time-series of weekly SST in the Mozambique Channel, at 23°S/40E over 2019-2025.  
164 In January 2025 SST reaches 31°C (data from <https://data.marine.copernicus.eu/product/>, Multi  
165 Observation Global Ocean ARMOR3D L4 MULTIOBS\_GLO\_PHY\_TSUV\_3D\_MYNRT\_015\_012). Last  
166 access 12/5/2025. Bottom: Map of Marine Heat Wave category for January 5<sup>th</sup> 2025 In the Indian  
167 Ocean. The location of the BGC-Argo float in the southern Mozambique Channel is indicated by  
168 orange circle.

