



Distribution of CO₂ parameters in the Western Tropical Atlantic Ocean

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The variability of sea surface Total Alkalinity (TA) and sea surface Total Inorganic Carbon (C_T) is examined using all available data in the western tropical Atlantic (WTA: 20°S-20°N, 60°W-20°W). Lowest TA and C_T are observed for the region located between 0°N-15°N/60°W-50°W and are explained by the influence of the Amazon plume during boreal summer. In the southern part of the area, 20°S-10°S/40°W-60°W, the highest values of TA and C_T are linked to the CO₂-rich waters due to the equatorial upwelling, which are transported by the South Equatorial Current (SEC) flowing from the African coast to the Brazilian shore. An increase of C_T of $0.9 \pm 0.3 \mu\text{mol kg}^{-1}\text{yr}^{-1}$ has been observed in the SEC region and is consistent with previous published estimates. A revised C_T -Sea Surface Salinity (SSS) relationship is proposed for the WTA to take into account the variability of C_T at low salinities. This new C_T -SSS relationship together with a published TA-SSS relationship allow to calculate $p\text{CO}_2$ values that compare well with observed $p\text{CO}_2$ ($R^2=0.90$).