Peter
Brandt
GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany, Faculty of Mathematics and Natural Sciences, Kiel University, Kiel, Germany
Johannes Hahn, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
Sunke Schmidtko, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
Franz Philip Tuchen, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
Robert Kopte, Institute of Geosciences, Kiel University, Kiel, Germany
Rainer Kiko, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany, now at Sorbonne Université, Laboratoire d'Océanographie de Villefranche, Villefranche-sur-Mer, France
Bernard Gourles, IRD, Instrumentation, Moyens Analytiques, observations en Géophysique et Océanographie, Plouzané, France
Rena Czeschel, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
Marcus Dengler, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany
Invited Talk
(Invited Talk)
The tropical Atlantic upper-ocean circulation experiences multiannual to decadal changes associated with different climate modes and is simultaneously adjusting to climate warming. The most energetic current in the tropical Atlantic is the Equatorial Undercurrent (EUC) flowing eastward along the equator with a core depth of about 80 m shallowing toward east. Based on long-term moored observations, we show that the EUC strengthened by more than 20% over the decade 2008-2018. This EUC strengthening is associated with increasing subsurface oxygen concentrations and a thickening of the upper-ocean oxygenated layer in the equatorial Atlantic, thereby counteracting climate warming-induced deoxygenation in this region. The EUC strengthening is found to be mainly forced by trade wind changes in the western tropical North Atlantic. A comprehensive 60-year dataset reveals that the recent oxygen increase in the upper equatorial Atlantic is associated with multidecadal variability characterized by low oxygen concentrations in the 1990s and early 2000s and high oxygen concentrations in the 1960s and 1970s. The observed oxygen variability seems to be linked to a compression and expansion of the habitat of tropical pelagic fish and must be accounted for when evaluating possible consequences of deoxygenation for marine ecosystems and fisheries.
Presentation file
brandt-presentation.pdf
Meeting name
PIRATA-24/TAV Meeting
Download to PDF