Session: B3 Oral presentation

Variability of the mixed hayer Heat budget in the Eastern Equatorial Atlantic during 2005-2007 as inferred using ARGO floats

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We examine the variability of the sea surface temperatures in the eastern equatorial Atlantic during 2005-2007 by using ARGO profiling floats, PIRATA buoys and satellite, in-situ, and atmospheric datasets. The eastern equatorial Atlantic, characterized by shallow mixed layers all year long, is divided into nine boxes of nearly equal surface area, with respect to the dynamics and thermodynamics in this region. Monthly mixed layer heat budgets are computed in each box from 10-day ARGO profiles. In all the boxes, the net surface heat flux is one of the main causes of the seasonal cycle of sea surface temperatures for the three years studied. The amount of short-wave radiation penetrating through the base of the mixed layer and horizontal heat advection may locally contribute to the temperature variability, while entrainment has a weaker contribution. To balance the heat budget, a residual term exists which includes all processes that cannot be calculated with observations as well as the possible errors in the other terms. This residual is more intense in the cold tongue and the northern region, and exhibits a clear seasonal cycle, with minimum (negative) values in boreal summer and maximum values in winter. This residual compares well with available observations of vertical turbulent mixing estimated during EGEE campaigns (2005-2007) in the eastern equatorial Atlantic. When assuming that the residuals are mostly associated with vertical turbulent mixing, it can be conjectured that turbulent mixing is a significant cooling source in the cold tongue and north of the equator.