SEA SURFACE TEMPERATURE AND CHLOROPHYLL SATELLITE OBSERVATIONS OF INSTABILITY WAVES IN THE TROPICAL ATLANTIC OCEAN

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Abstract. Much of the early interest in tropical Atlantic variability (TAV) was motivated by the enormous social and economic impacts it has on the local populations in parts of South America and Africa. Satellite fields of sea surface temperature (SST) and surface chlorophyll (CHL) reveal the existence, close to the equator, of large mesoscale undulations that propagate westward in the last six months of each of the years, when the Atlantic cold tongue is well developed. These so-called Tropical Instability Waves (TIWs) are generated by barotropic and/or baroclinic instabilities and are observed to be a significant contributor for horizontal heat fluxes in the equatorial oceans, to play an active role in the ecosystem of these regions and to generate strong local anomalies in the atmosphere just above. These features are well observed in the northern hemisphere, where they form as waves or vortices, but are poorly documented in the southern hemisphere. These instability waves not only contribute to the climate variability over the Atlantic but are also influenced by it. As the study of TIWs in the Atlantic is still an active filed of investigation, this work will focus on the SST and CHL signatures of TIWs, and explore the temporal and spatial variabilities associated with these waves in the tropical Atlantic. Biologically rich in nutrients and cold equatorial waters are advected northward and downward to form sharp fronts visible in the satellite images. Observations from other authors indicate that it is a fully three-dimensional circulation that dominates the distribution of physical and biological tracers in the presence of tropical instabilities and maintains the cusp-like shapes of temperature and chlorophyll observed from space. We aim to contribute to the understanding of this topic in the region.