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Satellite observed anomalies of cloud vertical distribution in the tropical Atlantic Ocean

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14 years of Aqua Moderate Resolution Imaging Spectroradiometer (MODIS) monthly mean cloud data is analyzed to identify possible changes of the cloud vertical distribution over the tropical Atlantic Ocean using multiple linear regression. Within the investigated period two major phases in the time-series of the tropical Atlantic mean cloud top height can be distinguished with a significant linear increase in the first phase and a significant linear decrease in the second phase. The changes are strongest at regions with large scale upward movements near to the equator and are found to be related to the changes of the mean amount of high clouds (HCF). A comparison with the large scale vertical motion ω at 500hPa obtained from Interim ECMWF Re-Analyses and the $ENSO_3.4$-index indicates that the changes in HCF are induced by ENSO linked changes in the large scale vertical upward movements over the tropical Atlantic Ocean. A first comparison with the DARDAR data set, which combines CloudSat radar and CALIPSO lidar measurements, shows qualitatively good agreements for the HCF and its linear decrease in phase two.