

Interactive comment on “Observation of ENSO linked changes in the tropical Atlantic cloud vertical distribution using 14 years of MODIS observations” by Nils Madenach et al.

Anonymous Referee #1

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The authors use the 14-years MODIS record to explore variations in high cloud properties over the Tropical Atlantic Ocean in association with El Niño. They find trends of increasing high cloud fraction and cloud top height during the early part of the record, followed by trends of the opposite sign in the later part of the record. These changes are tied to variations in large-scale ascent in the region, which are tied to SST anomalies associated with ENSO.

I do not find the paper to be a useful contribution to the literature. It is clear from the very high correlation between high cloud fraction (HCF) and cloud top height (CTH) that both are simply measures of the relative amount of high clouds, which makes sense

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intuitively but is not particularly insightful. It is well known that the amount of high clouds in a given region is strongly governed by large-scale ascent, and so tropical Atlantic HCF and CTH anomalies are unsurprisingly strongly related to the local anomalies in vertical motion. Vertical motion in this region is well known to be affected by the phase of ENSO; therefore the interannual component of temporal variations in HCF and CTH in this region will arise mostly from the phase of ENSO. Breaking the 14-year timeseries into two periods that have large ENSO-related anomalies at the endpoints will unsurprisingly introduce “trends” in vertical motion, CTH, and HCF of opposite signs in the two periods. I see no value in interpreting these as trends as opposed to variations in high cloud amount governed largely by variations in ascent.

If the authors are trying to make a more insightful point than “ENSO induces vertical motion anomalies over the Tropical Atlantic, which affects the amount of high clouds there”, it is not coming through in the paper. If this is their point, then it does not rise to the level of a scientific contribution worthy of publication in this journal.

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