

Interactive comment on “Sea surface temperature anomalies, seasonal cycle and trend regimes in the eastern Pacific coast” by A. Ramos-Rodríguez et al.

Anonymous Referee #2

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This paper studies the sea surface temperature fields off the eastern Pacific coast and relates them to variability in the solar irradiance. Specifically the authors try to link solar cycles to regimes of SST. The main conclusion is that the amount of energy received from the sun integrated over complete solar cycles is a major factor in creating regime change in eastern Pacific SST. They also examine the seasonal cycle of observed SST and discuss how much it is governed by the seasonal cycle of incoming solar radiation. The paper has some interesting ideas but I think it has two major deficiencies: i) it considers only the solar irradiance and does not consider any other possible mechanisms that have been mentioned in previous work, and ii) the quality of written English is very poor, so much so that it is difficult to understand what methods they

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have used. I have also read the other Reviewer's comments and concur with those comments. Comments. Page 1218 line 12. I wonder if the 2degree ERSST dataset is too coarse for studying coastal processes? Page 1217 lines 21-24. 'The spatial and temporal variation in solar radiation due to ... changes in Earth's orbital eccentricity and tilt of the rotational axis ... produce seasonal variations...' I think these changes in the Earth's rotation affect much longer time scales (i.e. tens of thousands of years), not seasons. Page 1219. Line 7. Section 2.2. Please mention that this analysis was applied to Sea Surface Temperature data. Page 1219. Lines 22-page 1220 line 4. Even with the expanded description given in the reply to the Reviewer, this section 2.3 is still unclear. For example" ...we computed ...the annual mean solar irradiance. The latter is a function of the ...day of year." The annual mean is NOT a function of the day of year. Aside from this problem of English grammar, the final few lines of this section are extremely unclear and I do not know what was regressed against what. i.e. Carefully define the phrases 'theoretical latitudinal solar irradiance amplitude series' (is this a time series?), "mean SST seasonal amplitude" and "latitudinal SST amplitude". Regarding Figure 2 and associated discussion. It is suggested that the amount of solar irradiance integrated in time over whole solar cycles governs SST regimes. How does this relate to the findings of e.g. Meehl et al. 2009 that actual peaks in solar cycles correspond to cool SST in the eastern Pacific (Meehl et al. Fig. 1), which eventually switches to warm SST a couple of years later via air-sea coupling? Clearly Meehl et al are referring to different time scales (interrannual) compared to your 'decadal' processes, but I would like a discussion on how they are related. Also, you find regime changes in the late 1970s and the late 1990s. There are a lot of papers in the literature that discuss these well-known regime shifts and analyse the relationship to the Pacific Decadal Oscillation, air-sea coupling, etc. I think you should relate your findings much more carefully to previous literature on this subject.

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