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Interactive comment on "Evaluation of the eastern equatorial Pacific SST seasonal cycle in CMIP5 models" *by* Z. Song et al.

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General comments

This is a very interesting paper evaluating the ability of current climate models in simulating the mean climate of the eastern tropical Pacific. The issue addressed in this study is very important since this has been a problem plaguing many coupled models and the authors have done a fine job. The bias in the seasonal cycle of the eastern tropical Pacific SST is contrasted with that from observations and the authors conclude that biases in wind stress translate into errors in latent heat fluxes and consequently, SSTs. I agree with the authors that errors in surface wind may introduce errors in SST through the Bjerkenes feedback mechanism and also through misrepresentation of air-sea fluxes. However, if a heat-budget analysis had been performed for the mixed layer

in the EP1 and EP2 regions, I'm curious to know if the conclusions would remain the same. Could there be other factors that are also playing a role in this? For instance, a reduction in the strength of southeast trade winds will also reduce upwelling along the coast of continental South America leading to warm biases in SST, which may then be advected into the study region. In other words, what is the contribution of advection to the SST bias found in EP1 and EP2 regions? Also, since the thermocline is shallower in the eastern pacific compared to the west Pacific, vertical entrainment becomes a key factor that can modulate the heat balance of the mixed layer. How are the entrainment processes at the base of the mixed layer represented in these models?

Interactive comment on Ocean Sci. Discuss., 11, 1129, 2014.