**Review**

**Manuscript Number:** JCLI-D-13-00595

**Full Title:** Impact of Global Warming on Natural SST Variability from CCSM4 and Observations

**Overall recommendation:** Reject

**Comments:** The manuscript tries to address the question whether global warming impacts SST variability using observations and CCSM4 simulations. Unfortunately, the authors do not make a good case for the manuscript to be accepted. The authors use the Extended Empirical Orthogonal Function (EEOF) analysis but seem to spend more time on describing the various modes and reconstructing curves rather than drawing any conclusions from the results leaving the discussion section completely inadequate. The conclusions do not follow from the evidence presented and there are numerous holes in the logic presented.

One wishes they had considered using the model control runs in order to decide whether forced or unforced variations are being seen. There seems to be some confusion resulting in “naturally forced” and “externally forced” being mutually exclusive (Line 67) and make statements such as “*'historical' run forced by observed atmospheric composition changes*” (38). They also do not consider any alternate observed SST reconstructions to HadISST but proceed to dismiss it as contaminated (239-240). And the use of NCEP/NCAR Reanalysis with no reference to anything they did in the context of the results or discussion seems a waste of space and misleading (89-94).

Many statements are made in the manuscript that are either awkward or redundant or both – for e.g. “*El Nino has large natural variability*” (52); “*With a large ensemble of varying initializations and physics, model's natural variability could in principle be suppressed*” (60-61); “.... *while climate models are capable of producing El Nino, it is not clear if the models could also simulate externally forced changes*....” (62-64); “*The extended dataset is large*” (104); “*Mode 1 is also significant.*” (170); “*We use only the satellite era, 1982-2012.”* (188); “*The anthropogenic forcing is cumulative as the greenhouse gases increases continuously*” (227); and “*The present study could have important policy implication on climate change*”(287).