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Interactive comment on "Detecting breakpoints in global temperature" *by* Junbo Duan et al.

Anonymous Referee #1

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The authors used an improved sparse representation model to fit global mean surface temperature time series to test the existence of global warming hiatus. They found 2 to 6 breakpoints which all occur before1976. Hence they denied the existence of recent global warming hiatus during 1998-2012.

Though I appreciate the authors' improved sparse representation model, I am not convinced by their results. Thereby, I cannot recommend publication of this manuscript at Earth System Dynamics.

First, the examination of global warming hiatus should not be limited to the analysis of one-dimensional time series of global mean surface temperature. Surface temperature observations (plus subsurface ocean and atmosphere), reanalysis data and climate model simulations provide rich three-dimensional information that can used to infer the physical mechanisms of global warming hiatus. Several mechanisms (such as negative

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phase of the Interdecadal Pacific Oscillation and enhanced heat uptake in the Atlantic) have been proposed to explain the recent hiatus. As such, it is very hard to deny the existence of recent hiatus simply based on some fitting of global mean surface temperature time series.

Besides, surface temperature observations have great uncertainties. An uncertainty maximum is obvious around World War II. Many factors, such as quality control, bias correction and differences between ship and buoy data, all can contribute to the uncertainties of the surface temperature datasets used in this study. Thereby, the authors need to consider these observational uncertainties in their analysis.

Interactive comment on Earth Syst. Dynam. Discuss., https://doi.org/10.5194/esd-2019-45, 2019.