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Interactive comment on "Detecting causality signal in instrumental measurements and climate model simulations: global warming case study" *by* Mikhail Y. Verbitsky et al.

Anonymous Referee #2

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This paper argues that by using method of conditional dispersion (MCD) it is possible to detect causal relationship between surface temperature anomalies and CO2 concentrations in climatological time series (observed and simulated). The method was initially developed to estimate interrelation in low-dimensional dynamical systems and applying it to climatological time series in indeed a novel approach withing the scope of this journal.

Two points need to be clarified to better understand results presented in the paper.

1. The transition from analyzing chaotic time series produced by two coupled Henon maps (briefly discussed in paragraph 2) to studying climatological time series is not as

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Discussion paper

straightforward as it is made in the paper. In particular, it requires some underlying assumptions about the nature of climatological system and interdependences between its variables which are not clearly mentioned in the paper.

2. In paragraphs 3.2 and 3.3, MCD is applied to a set of model simulations. It is unclear from the paper, if these models include parametrization of the effect of surface temperature on CO2 emissions. If not, it would make the connection one-directional (see discussion in paragraph 2) which by itself explains the results presented in Figures 3 and 4.

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