

Interactive comment on “Toward a classification of the Central Pacific El Niño” by M. Pascolini-Campbell et al.

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Reply to Interactive comment by Anonymous Referee #1 and #2 on “Toward a classification of the Central Pacific El Niño” by M. Pascolini-Campbell et al.

We thank Referee#1 and #2 for their comments and helpful suggestions. These helped identify aspects of our study which require clarification.

Our study aims at proposing a set of dates when different methods and datasets most strongly converge in identifying the occurrence of a Central Pacific El Niño (CP) event. We support the identification of such dates with a visual inspection of evolving spatial patterns during CP events. To our knowledge, this is the first attempt to identify CP events by comparing results obtained from different methods and datasets extending

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back to the early 20th century.

Our approach further highlights the ambiguity of CP event identification due to both, the used method and the used dataset. We believe that in this sense our effort is a contribution of interest to the current debate on ENSO diversity. The overall aim of our paper is to suggest that improved indices, and further work on ENSO dynamics, is necessary for characterizing CP events. Noteworthy Referee#2 evaluates our study as potentially interesting since it aims at identifying past events since the early 20th century.

We also introduce a new index in order to demonstrate the ongoing ambiguity which may result from different methodologies, this time based on temporal characteristics of the El Niño. The limitations of our index are acknowledged, and used to further illustrate the variety of CP events arising from different forms of classification.

We acknowledge that several recent studies dispute the existence of a “new” type of El Niño. We do not intend to claim that CP events are phenomenologically distinct from other ENSO manifestations as this would require different experimental designs focused on dynamics rather than statistics. Instead, our aim is to identify years in which tropical Pacific SSTs manifest the typical traits of a CP event, i.e. when the El Niño event is characterized by SST anomalies confined to the central Pacific. If welcomed to submit a revised version of the study, we would improve the introduction to avoid confusion to this regard.

We acknowledge that detrending is a potentially relevant issue. If welcomed to submit a revised version of the study, we would discuss trends in tropical Pacific SSTs and their potential effect on our assessment of CP years. We also acknowledge the poor quality of SST data from earlier in the century. However, results for CP event classification continue to demonstrate variability in the later part of the twentieth century. This supports the goal of our paper in illustrating the inconsistency between different CP El Niño indices.

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We are confident that our interpretation of the Takahashi et al. (2011) results is correct. Their study introduces two new indices, the E and C Index, which respectively characterize strong events in the East Pacific and moderate warm events in the Central Pacific. The C index is used in our study to introduce another method for characterizing Central Pacific SST anomalies.

With respect to referee #1's statement that our manuscript presents "a number of rather weak or vague arguments as well as ad-hoc statistical methods" we note, that this comment is not specific enough to convincingly reply. A similar difficulty concerns the somehow more specific comment that "the "majority statistics" is based on a very ad-hoc approach rather than on formal statistics". We interpret this latter comment as referring to our visual inspection of evolving SST patterns. This "ad-hoc approach" is only used as a further confirmation that the years detected via a statistical approach (using different methods and datasets) are characterized by El Niño conditions with warm SST anomalies confined to the central Pacific.

Interactive comment on Earth Syst. Dynam. Discuss., 3, 979, 2012.