
Comparison of a Multidecadal Walker Circulation in European reanalyses

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Abstract

We investigate tropical multidecadal variability using ERA-20C, ERA5, and ERA Interim reanalyses. One of the most prominent features of tropical wave circulation is the Kelvin wave that what can be used as a proxy of the Walker circulation over the Pacific. This is demonstrated by comparing a new Walker circulation index, based on the three-dimensional Kelvin wave energy integral, with the classical Walker circulation indices defined in terms of surface pressure differences and upper-troposphere velocity potential. We show that the new index compares well in the three reanalysis datasets during the satellite era. Multidecadal variability of the Walker circulation in 20th century in ERA-20C is subsequently discussed using the new index.

Keywords: Reanalysis, Kelvin wave, Walker circulation

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