

Weak ENSO Asymmetry Due to Weak Nonlinear Air–Sea Interaction in CMIP5 Climate Models*

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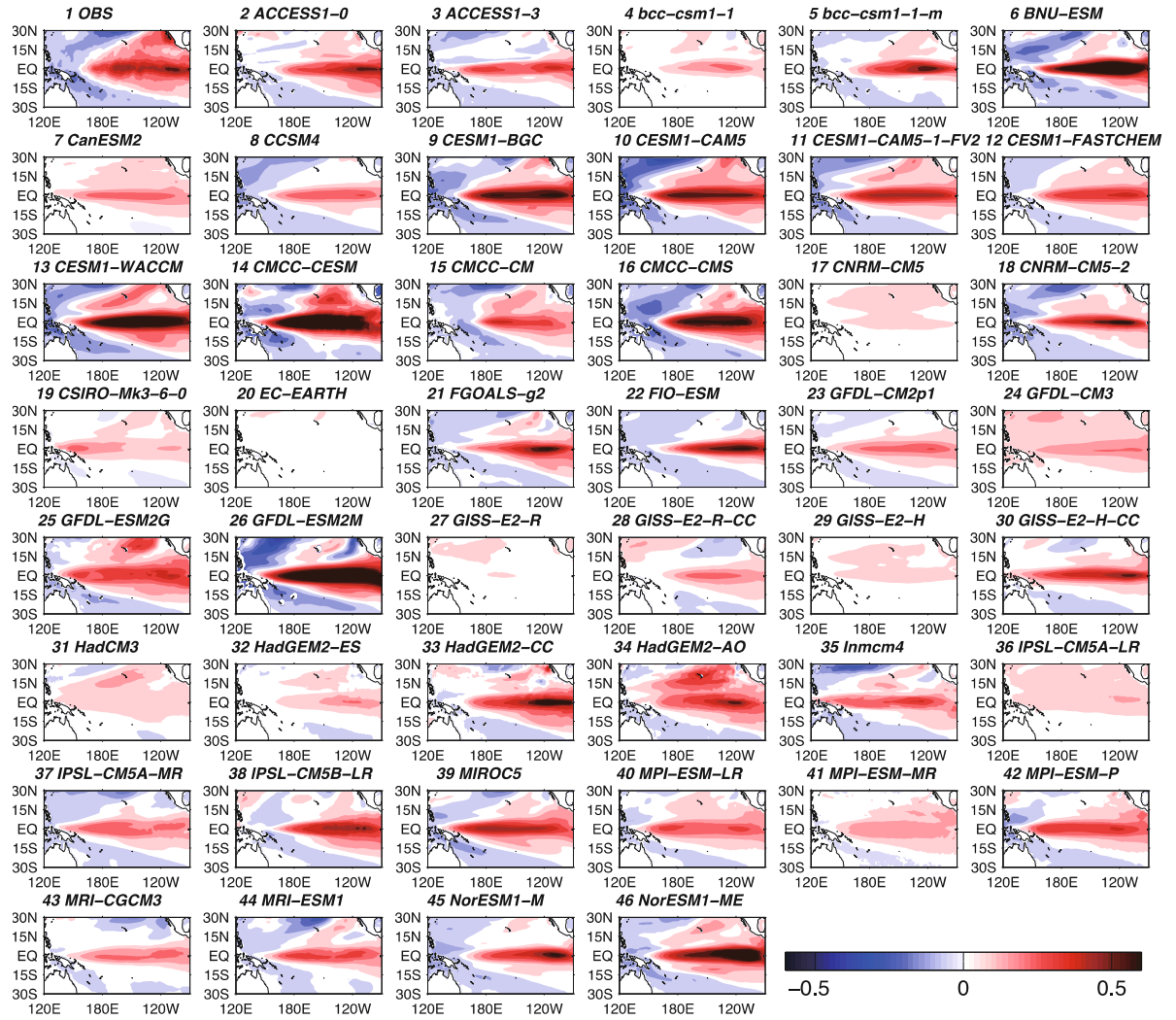


Fig. S1. The first EOF mode of the SST over the tropical Pacific in the observation and CMIP5 climate models.

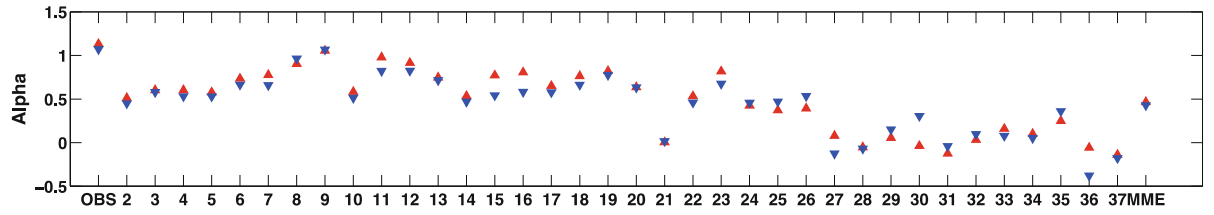


Fig. S2. The air–sea coupling intensity associated with ENSO in the observation and CMIP5 models. Red (blue) triangles represent the air–sea coupling coefficient estimated as the central Pacific (5°S–5°N, 180°–140°W) surface zonal wind stress anomaly divided by the Niño3 SSTA during El Niño (La Niña) in the observation and CMIP5 models. Zonal wind stress anomalies have been amplified by 10^2 N m^{-2} . For the model names of the numbers, refer to Fig. 1. The last number is the MME mean value.

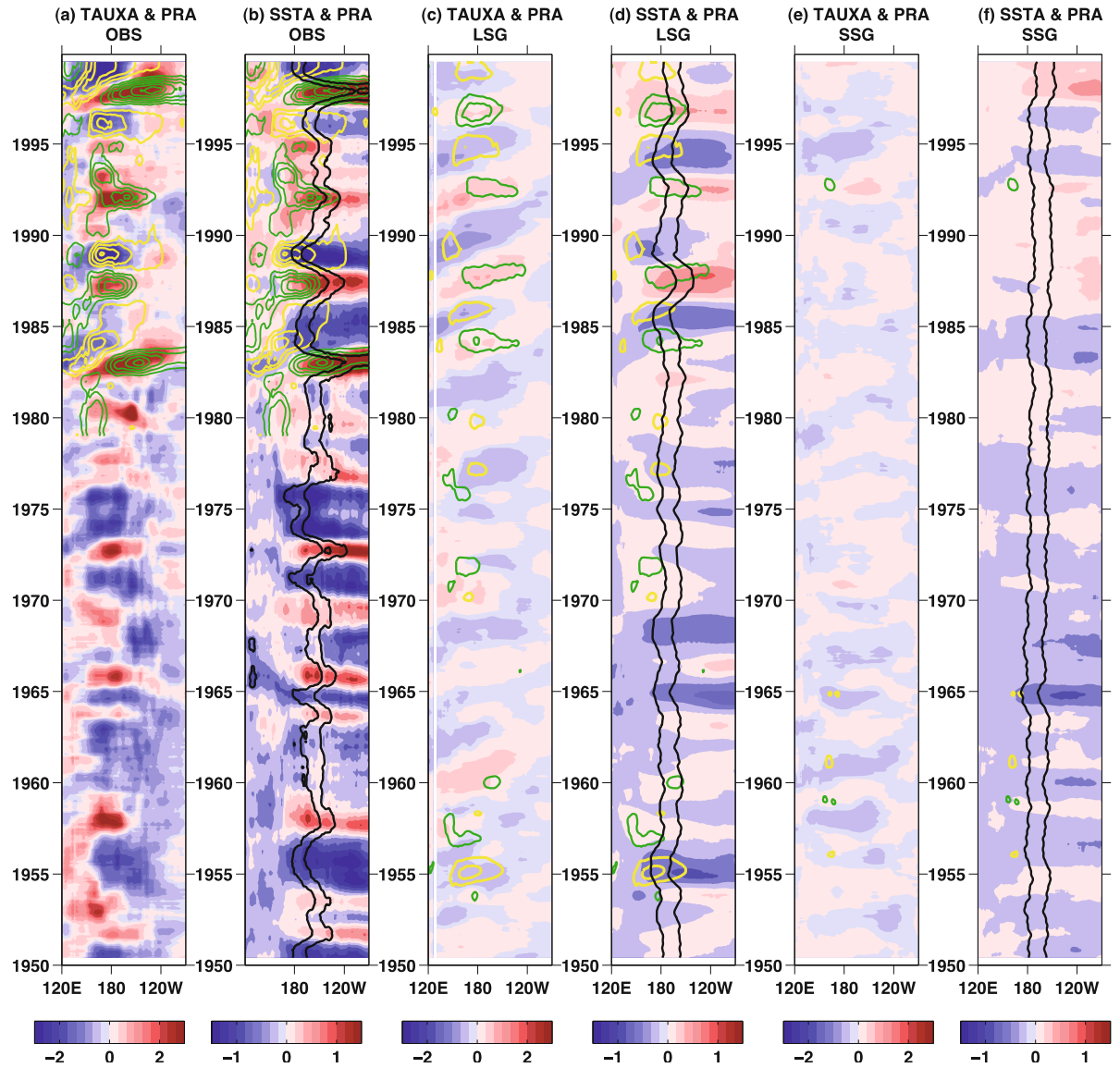


Fig. S3. The westerly wind anomaly (shaded) and precipitation anomaly (contours), and the SST anomaly (shaded) and precipitation anomaly (contours) propagation feature with time in the observation are shown in (a) and (b), respectively. Panels (c) and (d) are the same as (a) and (b) but for the ensemble mean of the 10 largest skewness group (LSG) of the CMIP5 climate models. Panels (e) and (f) are the same as (c) and (d) but for the 10 smallest skewness group (SSG) of the CMIP5 models. The thick black contours are the 28°C and 27°C isotherms. The green (yellow) contours represent the positive (negative) precipitation anomaly. All the anomaly data are the meridional mean value from 5°S to 5°N over the equatorial Pacific region and have been smoothed by the 11-month running mean. Zonal wind stress anomalies and the precipitation anomaly have been amplified by 10^3 N m^{-2} and $10^4 \text{ kg m}^{-3} \text{ s}^{-1}$, respectively.