Supplementary Material for
CMIP5 Projections of Two Types of El Niño and Their Related Tropical Precipitation in the 21st Century

Kang Xu
State Key Laboratory of Tropical Oceanography, South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, China; Earth System Science Programme, The Chinese University of Hong Kong, Hong Kong, China

Chi-Yung Tam *
Earth System Science Programme, The Chinese University of Hong Kong, Hong Kong, China

Congwen Zhu, Boqi Liu
Institute of Climate Systems, Chinese Academy of Meteorological Sciences, Beijing, China

Weiqiang Wang
State Key Laboratory of Tropical Oceanography, South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, China

* Corresponding author address: Chi-Yung Tam, Earth System Science Programme, Faculty of Science, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong.

E-mail: Francis.Tam@cuhk.edu.hk.
FIG. S1. EOF patterns of the interannual SST anomalies corresponding to EP El Niño calculated from observations and the historical runs of each of the 31 CMIP5 climate models. Patterns (units: K) are computed by regressing SST anomalies onto the corresponding principal components, and numbers printed in top right of each panel indicate the percentage of variance explained by the EOF mode.
FIG. S2. The same Fig. S1, but for CP El Niño.
Fig. S3 Composites of the NDJFM mean anomalous precipitation (units: mm day$^{-1}$) associated with EP El Niño events calculated from the observations (GPCP data), the MME and the historical runs of each of the 17 CMIP5 climate models.
Fig. S4 The same Fig. S3, but for CP El Niño events.
FIG. S5. NDJFM climatological mean precipitation (units: mm/day) averaged over the 10°S–5°N band from (a) the historical runs, (b) 2050-2099 projections under RCP8.5 from each of the 17 selected CMIP5 models, and (c) their differences. The MME mean (black solid lines) as well as the inter-model spread (grey shading) are also shown.
FIG. S6. MME average of the NDJFM climatological Walker circulation (arrows, see scale on the left of the panels) and pressure velocity (shading; units: $10^{-2}$ Pa/s) averaged over 5°S–5°N from (a) the historical runs, (b) 2050-2099 projections under RCP8.5 from the 17 selected CMIP5 models, and (c) their differences. Pressure velocities are multiplied by a factor of -100 for clarity. Purple vectors in (c) indicate agreement among 70% of models or more on the sign of change in either the zonal or vertical component of wind vectors.