Ose, T., Y. Takaya, S. Maeda, and T. Nakaegawa, 2020: Resolution of summertime East Asian pressure pattern and southerly monsoon wind in CMIP5 multi-model future projections. *J. Meteor. Soc. Japan*, **98**, https://doi.org/10.2151/jmsj.2020-047.

**Plain Language Summary:** The southerly surface wind index over the summertime East Asia (SWI) is strengthened in the future in the fifth phase of the Coupled Model Intercomparison Project (CMIP5). However, the differences among the models are much larger than the ensemble average (**Fig. 1a**). The empirical orthogonal function (EOF) analysis is applied to the future changes in the East Asian surface pressure pattern responsible for the SWI. The ensemble average and five EOF modes for the pressure patterns and the associated precipitation changes are identified, and their possible sources are examined. The first mode is high surface pressure anomalies over low Asia Pacific sea surface temperature. The second mode is related to warm temperature anomalies over the Northern Hemisphere continents. The third mode is characterized with suppressed vertical motions over the northern Indian and Pacific oceans. The fourth mode is the Okhotsk High. The fifth mode represents the east–west contrast of the southern East Asian surface pressure anomalies.

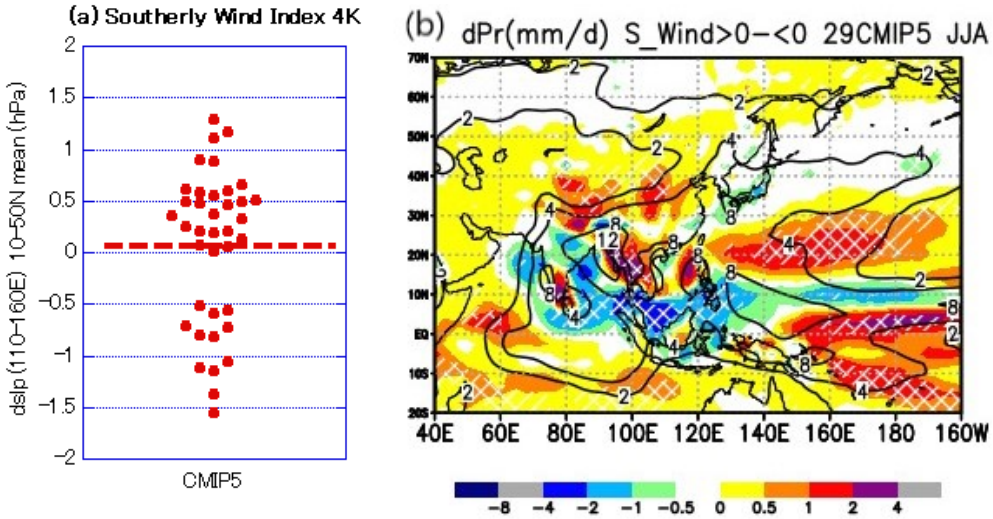


Figure 1. (a) Future changes in the summer East Asian southerly wind index (hPa) for the 38 CMIP5 models. (b) The difference in the simulated present-day precipitation climatology between the CMIP5 models projecting the positive and negative southerly wind index in the future.

- We found the SWI in the future is determined by the mode balance between the land-ocean surface temperature contrast and the suppressed vertical monsoon circulations over the northern Indian and Pacific oceans. The latter is responsible for the large uncertainty in the future SWI.
- The mode-related suppressed vertical motions in global warming reflect the present-day vertical motion (i.e., precipitation) climatology; The future increase/decrease in the SWI tends to be projected by models simulating the relatively small/large Asia Pacific monsoon precipitation over the tropical oceans in the present-day model climatology (**Fig. 1b**).