

EGU21-13986

<https://doi.org/10.5194/egusphere-egu21-13986>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## Role of tropical cyclones along the monsoon trough in the future changes of the Asian monsoon precipitation by high-resolution models

**Hiroshi Takahashi**

Tokyo Metropolitan University, Hachioji, Japan (hiroshi3@tmu.ac.jp)

This study examined the future changes of Asian monsoon precipitation to global warming on the regional scale, focusing on tropical cyclones along the monsoon trough. This is because the Asian monsoon precipitation is closely associated with tropical disturbances. To reproduce convective precipitation and tropical disturbances, this study used outputs of high-resolution climate simulations. First, two sets of approximately 30-yr simulations under present-day (control) and warmer climate conditions (global warming) were conducted by the 14-km Nonhydrostatic Icosahedral Atmospheric Model (NICAM) with explicitly calculated convection, which were analyzed (Takahashi et al. 2020). Overall, the Asian summer monsoon was well simulated by the model. Precipitation increased as a result of global warming along the monsoon trough, which was zonally elongated across northern India, the Indochina Peninsula, and the western North Pacific Ocean. This increased precipitation was likely due to an increase in precipitable water. The spatial pattern of the increased precipitation was associated with enhanced cyclonic circulations over a large area along the monsoon trough, although it was difficult to determine whether the large-scale monsoon westerly was enhanced. This enhancement can be explained by future changes in tropical disturbance activity, including weak tropical cyclones. In addition to this result, this study will provide the results of future changes in the Asian monsoon precipitation by high-resolution models.

- Takahashi, H. G., Kamizawa, N., Nasuno, T., Yamada, Y., Kodama and, C., Sugimoto, S., & Satoh, M. (2020). Response of the Asian Summer Monsoon Precipitation to Global Warming in a High-Resolution Global Nonhydrostatic Model, *Journal of Climate*, 33(18), 8147-8164,