

# Teleconnection between the Madden-Julian Oscillation (MJO) and the Sudden Stratospheric Warmings (SSW)

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Sudden Stratospheric Warming (SSW) events influence the Arctic Oscillation and mid-latitude extreme weather, and are shown to relate to the Madden-Julian Oscillation (MJO) in observation. Our work validated the MJO-SSW teleconnection and explained the behind mechanism, using both a full-coupled GCM and a dry dynamic core simulation. Interestingly, in response to a stronger MJO forcing as expected in a future warmer climate, the SSW frequency almost doubles in both models; and the SSW response due to the MJO strengthening stands out from other climatology changes in a global warming scenario. More mechanism study using dry dynamic core experiment indicated a dominant role played by the zonal asymmetry in both the background state and the forcing, which may lead to either enhancement or suppression of SSW events by MJO-like forcing. The determinant process turned out to be the strengthening or weakening of the mid-latitude stationary wave pattern through its interaction with the MJO-forced large-scale waves.

Key words: MJO, Arctic, teleconnection, troposphere-stratosphere coupling, climate change

## References

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