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## The MJO-SSW Teleconnection: ENSO Modulation and a Recent Intensification over the Past Two Decades

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The Madden-Julian Oscillation (MJO) has been demonstrated to play an important role in the occurrence of sudden stratospheric warming (SSW) events, suggesting possible extratropical impacts of MJO via a stratospheric pathway. However, the existence of this stratospheric pathway is determined by the horizontal and vertical propagation of Rossby waves, which is closely related to both the MJO convection itself and the extratropical basic state. Our studies suggest that the El Niño-Southern Oscillation (ENSO) significantly regulates the MJO-SSW relationship, which is robust during La Niña winters but almost nonexistent during El Niño winters. Further analysis indicates that ENSO influences the extratropical response to MJO, which facilitates the amplification and vertical propagation of the wavenumber 2 component of planetary waves during La Niña winters. Moreover, we have identified a pronounced intensification of the MJO-SSW relationship in the past two decades, probably due to the prolonged duration of MJO-related enhanced convection during P7 and the shifts in the extratropical basic state.