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Stratosphere-troposphere coupling: Relationship of ENSO to stratospheric sudden warmings

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The El Niño-Southern Oscillation (ENSO) is thought to impact the Northern Hemisphere wintertime stratosphere. In this study, we consider the influence of ENSO on the strongest manifestation of stratosphere-troposphere coupling: stratospheric sudden warmings (SSWs). We find that in the observational record, both El Niño and La Niña winters are associated with an increased frequency of SSWs relative to ENSO-neutral winters. We then examine the frequency of SSWs in relation to ENSO in a suite of Chemistry Climate Models (from the CCM Validation 2 Project) forced with observed sea surface temperatures from 1960-2000 (REF B1). The majority of models fail to capture the low frequency of SSWs during ENSO-neutral winters, and tend to simulate more frequent SSWs during El Niño winters than La Niña winters.