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A New Look at the Life Cycle of Stratospheric Sudden Warmings

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This work examines the life cycle of Sudden Stratospheric Warmings (SSWs) sampled from idealized and CMIP5 model integrations as well as reanalysis. It is shown that except for a few details, the generic zonal mean evolution does not depend on the definition used to detect SSWs. Furthermore, composites of SSWs which have a long-term effect on the state of the troposphere (downward 'propagating') strongly depend on the exact definition of what is considered 'propagating'. However, there are two characteristics which seem consistently linked to propagating events, namely a somewhat more barotropic response at the onset date and longer persistence in the lower stratosphere after the onset. We will show that rather than tropospheric forcing (such as upward Eliassen-Palm fluxes), internal stratospheric variability is the decisive factor in setting up the environment for an SSW to occur, and examine the possibility of predicting the occurrence of SSWs.