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Influence of the 11-year Solar Cycle on the Aspects of the Stratospheric Circulation

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This study examines the 11-year solar cycle effect on the amplitude of planetary wavenumbers (WN) 1 and 2 during Northern winter. In this analysis monthly mean geopotential heights from the ECMWF reanalysis project (ERA-40) at levels up to 1 hPa are used for the last 4 solar cycles (1960-2002). Mean composite differences between solar maximum and solar minimum years are presented, and the amplitude of WN1 is found to be higher at solar minimum. Differences between early and late winter are discussed. The solar effect is found to be modulated by the QBO phase, when it is represented by equatorial winds at 50 hPa. It reverses during the QBO east phase, so that the WN1 amplitude is higher in solar maximum. No clear signal was detected in the case of planetary WN2.