

Solar-induced stratospheric circulation changes

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The incoming solar radiation and heating depend on the solar activity (SA), which undergoes cyclic changes with a period of about 11 years. Variability in solar ultraviolet (UV) radiation influences stratospheric dynamics through photochemical and radiative processes. Changes in the SA can affect the temperature and circulation, changing the conditions for the propagation and reflection of planetary waves (PW) and gravity waves (GW) in the upper atmosphere. This paper explores the mechanisms by which solar-induced changes in UV flux alter the temperature structure and circulation of the stratosphere, focusing on the Brewer-Dobson circulation, zonal wind variability, and their tropospheric coupling. Using both observational data and model results, we discuss how changes in solar activity affect climate variability.

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