THE RESPONSE OF STRATOSPHERIC WARMINGS TO CHANGING CO₂ CONCENTRATIONS

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Many climate models that include a stratosphere show a warming in the northern hemisphere lower stratosphere during winter as greenhouse gas concentrations increase. Here we present results from an experiment with the Met Office Unified Model in which the CO₂ concentration has been increased to four times the preindustrial concentration. By using such high concentrations of CO₂ it becomes easier to establish the significance of the lower stratospheric warming. Wave diagnostics and idealised experiments suggest that much of the response of the wintertime lower stratosphere results from increases in the amplitudes of the tropospherically forced stationary waves.