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Modeling of mesospheric airglow layers response to gravity waves (freely propagating and damped)

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Modeling of the O 1 S airglow layer response to gravity waves was carried out and combined with previous modeling of O 2 and OH layers to derive dynamical parameters of the three mesospheric airglow layers The cancellation factor was computed for various vertical wavelengths and damping factors and a comparison was performed among the three layers The simulations show that the centroid height of the variance in brightness of O 1 S due to waves is lower and thinner than the emission layer itself This finding is similar to that found earlier for O 2 and OH layers The phase and amplitude differences among three layers were also derived They are primarily determined by the wave s vertical wavelength and damping factor These relations can be used with airglow observation to derive wave parameters and their momentum and energy fluxes

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