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Convective gravity waves parameterized in a global model using a transient gravity-wave model

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Convection is a major source of atmospheric gravity waves in the tropics. The tropical convection has variability in its activity and properties, on diurnal to interannual time scales, which also induces variations in gravity wave activity and characteristics. For the purpose of introducing variability of tropical gravity waves in a global model, we couple the convective sources to a transient gravity-wave parametrization, the Multi-Scale Gravity Wave Model (MS-GWaM), presently being implemented into and further developed within the Icosahedral Nonhydrostatic (ICON) Model. An analytic solution of gravity-wave momentum flux at cloud-top levels to a convective heat source is used, which depends on the vertical depth and magnitude of the heat as well as environmental flow properties (Song and Chun, 2005, *J. Atmos. Sci.*, **62**, 107–124). The properties of convective heat sources are obtained from the subgrid-scale convection parametrization used in the model. Momentum flux, spectral characteristics, and their variability/intermittency of the parameterized convective gravity waves are presented. Impacts of introducing convective sources to the transient gravity-wave parametrization upon the middle atmosphere will be discussed.