Session: B6 Oral presentation

The influence of parameterized gravity waves on the quasi-biennial oscillation in ECHAM6

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The quasi-biennial oscillation (QBO) in the tropical stratosphere is an oscillating regime of easterly and westerly jets and the dominating mode of variability in the lower equatorial stratosphere. It is driven by wave mean flow interaction involving different types of convectively triggered waves, which only in part can be resolved in climate models. We analyze the momentum balance of coupled atmosphere ocean simulations using the ECHAM6/MPIOM model at two resolutions, which are T63 (1.9^{o}) L95 and T127 (0.94^{o}) L95 in the atmosphere, and, mimicking the variability of small scale tropical convection, varying magnitudes of the parametrized gravity wave stress. Covering the transition from a model set-up capable of simulating a QBO with realistic period and amplitude to conditions no longer supporting a QBO, we investigate the upscale influence of parametrized, small scale processes on changes of the large scale dynamics and the resolved wave mean flow interaction. The wave analysis performed on these simulations gives special emphasis to representation and propagation properties of the resolved equatorially trapped waves and large scale inertia gravity waves. Fields of outgoing long wave radiation and precipitation clearly show these waves as predicted by linear theory, suggesting that the modeled tropospheric weather generates a realistic wave spectrum on the resolved scales.