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Model simulation of the global circulation in the middle atmosphere for January conditions

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Abstract. A mathematical model of the global neutral wind system of the Earth's atmosphere, developed earlier in the Polar Geophysical Institute (PGI), is utilized to simulate the large-scale global circulation of the middle atmosphere for January conditions. The utilized model enables to calculate not only the horizontal components but also the vertical component of the neutral wind velocity by means of a numerical solution of a generalized Navier-Stokes equation for compressible gas, so the hydrostatic equation is not applied. Global distributions of the horizontal and vertical wind, calculated for January conditions, are compared with simulation results, obtained earlier for conditions corresponding to summer in the northern hemisphere. It was found that the global distributions of the neutral wind, calculated both for winter and for summer periods in the northern hemisphere, in particular, the large-scale circumpolar vortices, are consistent with the planetary circulation of the atmosphere, obtained from observations.

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