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Non-Oberbeck-Boussinesq effects in rotating Rayleigh-Bénard convection SUSANNE HORN, OLGA SHISHKINA, CLAUS WAGNER, German Aerospace Center — We present results from Direct Numerical Simulations of rotating Rayleigh-Bénard convection in a cylindrical cell with unity aspect ratio for water with a Prandtl number of $Pr = 4.38$ and glycerol with $Pr = 2547.9$ with a special focus on temperature dependent material properties and thus not within the framework of the conventionally used Oberbeck-Boussinesq (OB) approximation. The generated turbulent flow fields are analysed with respect to the deviations from the OB cases. For the non-Oberbeck-Boussinesq cases we obtain a breakdown of the top-bottom symmetry, that is different boundary layer thicknesses, asymmetric velocity flow patterns and modified mean temperature profiles including an increase of the centre temperature and in the case of rotation a diminished temperature gradient within the bulk. Furthermore we find a slightly different scaling of the Nusselt number with the Rayleigh as well as with the Rossby number.

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