COMPARATIVE ANALYSIS OF CALIBRATION FUNCTIONS OF PURE ROTATIONAL RAMAN LIDARS USED FOR TROPOSPHERIC TEMPERATURE MEASUREMENTS

V.V. Gerasimov¹,²

¹Institute of Monitoring of Climatic and Ecological Systems SB RAS, Tomsk, 634055, Russia
²Tomsk State University, Tomsk, 634050, Russia

gvvsnake@mail.ru

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Abstract. A comparative analysis of nine calibration functions of pure rotational Raman (PRR) lidars used for tropospheric temperature measurements is presented. All the functions represent special cases of the general calibration function that takes the collisional broadening of all N₂ and O₂ PRR lines into account. The function retrieving temperature profiles with the least statistical uncertainties is determined from both theoretical (simulation) and practical (real lidar data) points of view. The experimental analysis of the calibration functions is made on an example of the tropospheric temperature profiles obtained by the IMCES PRR lidar in Tomsk on 1 April, 2015.