WATER SPECTROSCOPY IN THE 1 μm REGION – A CASE STUDY FOR COLLISIONAL NARROWING

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Water spectra in the 1 μm region were recorded with the Bruker IFS120HR spectrometer located in Oberpfaffenhofen, Germany. Nineteen measurements in the temperature range 230 to 320 K, water pressures from 1 to 16 mb, and air pressures from 0 to 1000 mb were taken at an absorption path of 80 m. The peak-to-peak noise level was in the order of 0.1%, allowing a detailed study of the line profiles. The Galatry and speed-dependent Voigt profiles were used to fit the lines within the noise level. The dependence of the Dicke narrowing parameter on quantum numbers and pressure will be discussed. A detailed error assessment was performed for using the Voigt profile alone, i.e. omitting Dicke narrowing. Consequences for the spectroscopic database and the retrieval of atmospheric measurements will be described. Spectroscopic parameters together with estimates on the continuum will be discussed.
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