ARGON PRESSURE BROADENING IN THE OXYGEN A-BAND

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The oxygen A-band, centered at 760 nm, is commonly used in space- and ground-based remote sensing to determine air mass because of the constant mixing ratio of oxygen in Earth's atmosphere. Since the retrieved air mass has a direct impact on measured concentrations of target species like carbon dioxide, increasingly precise greenhouse gas measurements require high-accuracy spectroscopy of the A-band. Pressure broadening, which results from collisions between the absorbing species and other atoms or molecules, dominates line widths in the A-band and is dependent on the identity of the collision partner. Pressure broadening by argon, which comprises 0.934% of Earth's atmosphere by volume, is typically neglected in atmospheric and laboratory measurements of the A-band. To investigate the magnitude of pressure broadening by argon, we used cavity ring-down spectroscopy to measure lineshapes of high J'' lines in the P-branch of the oxygen A-band over a range of pressures and argon concentrations. Argon foreign-broadening parameters for these lines were determined in combination with other lineshape parameters using a multi-spectrum fitting algorithm. In addition to comparing the results to literature values, we will discuss the implications of including argon pressure broadening in atmospheric and laboratory measurements of the A-band.