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More accurate Pandora total ozone columns by improved laboratory calibration and simultaneous retrieval of effective ozone temperature

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The current operational total ozone column (TO_3) retrievals from Pandora spectrometer systems (Pandoras) in direct sun mode utilize an extraterrestrial reference spectrum from literature and ozone cross sections at a constant temperature. We estimate the accuracy of TO_3 to 10 DU. This number is based on comparisons amongst different Pandoras themselves, comparisons to data from other ground-based instruments (Brewer and Dobson spectrophotometers), and comparisons to satellite data (SCIAMACHY and OMI). The main reasons for the limitations in TO_3 accuracy are: the current operational laboratory calibration does not include #1) absolute calibration or #2) stray light calibration and #3) the algorithm uses a constant effective ozone temperature. #1 typically causes a bias in the data, #2 a deviation at high solar zenith angles, and #3 a seasonal cycle. In this study we describe the planned next version of Pandora total ozone columns and how the accuracy improves compared to the current version.