

Towards a Combined Infrared Atmospheric Sounding Instrument (IASI)/Tropospheric Emission Spectrometer (TES) Record of Ozone: Validation and First Results

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Ozone is the third most important anthropogenic greenhouse gas and a significant pollutant at the surface affecting human and plant health. Rapidly increasing Asian emissions of ozone precursors, land-surface changes from burning, and decreasing surface emissions in Europe and North America have resulted in unknown changes to the distribution of tropospheric ozone. Satellite-borne instruments provide the means for global and continuous monitoring of this important trace gas. High spectral resolution infrared radiance measurements, such as those from the Tropospheric Emission Spectrometer (TES) on the NASA Aura satellite (launched in 2004), and the Infrared Atmospheric Sounding Instruments (IASI), on the MetOp-A and MetOp-B satellites (launched in 2006 and 2012 respectively) can be used to derive vertical information of tropospheric ozone. Together, these instruments now present a record spanning more than nine years. As part of efforts to assess consistency between the TES and IASI data records, a retrieval for ozone from IASI radiances, building on the data processor for TES, is under development as a collaboration between NASA JPL and NCAR. Using a priori information consistent with TES retrievals, the optimal estimation approach is applied to IASI radiances in order to obtain vertical distributions of ozone. This presentation shows the characterisation of these IASI ozone retrievals with respect to the vertical distribution of the uncertainties and sensitivities as well as validation with coincident ozonesonde profiles. Further comparisons with TES are presented and observed trends in ozone over Asia, North America, and Europe described.

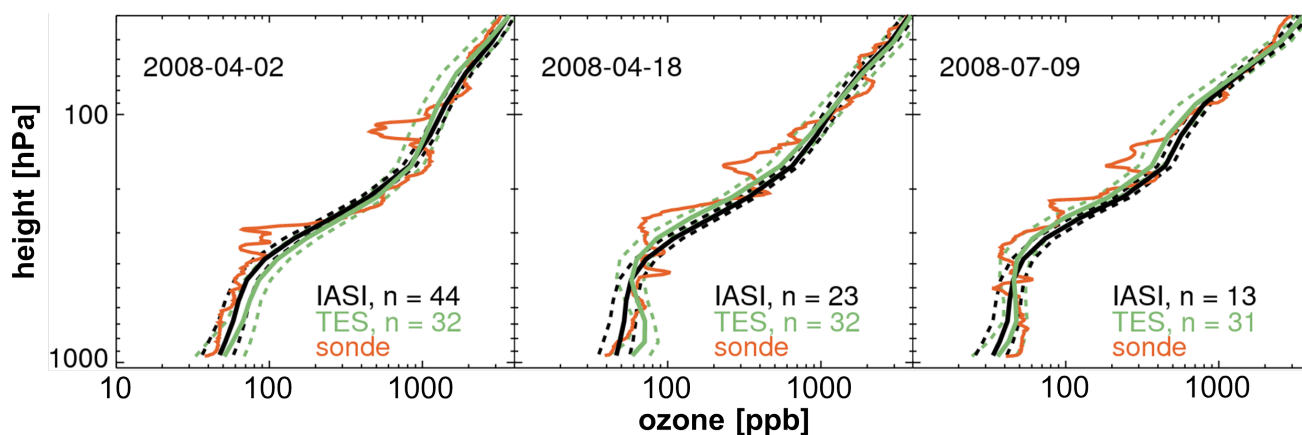


Figure 1. IASI and TES mean ozone profiles for Bratt's Lake Observatory (Canada). The maximum time difference between IASI and TES is 3:26 hr.