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Non-coincident inter-instrument comparisons of ozone measurements using quasi-conservative coordinates

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Abstract. Ozone measurements from ozonesondes, AROTAL, DIAL, and POAM III instruments during the SOLVE-2/VINTERSOL period are composited in a time-varying, flow-following quasi-conservative (PV-θ) coordinate space; the resulting composites from each instrument are mapped onto the other instruments' locations and times. The mapped data are then used to intercompare data from the different instruments. Overall, the four ozone data sets are found to be in good agreement. AROTAL shows somewhat lower values below 16 km, and DIAL has a positive bias at the upper limits of its altitude range. These intercomparisons are consistent with those obtained from more conventional near-coincident profiles, where available. Although the PV-θ mapping technique entails larger uncertainties of individual profile differences compared to direct near-coincident comparisons, the ability to include much larger numbers of comparisons can make this technique advantageous.

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