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Atmos. Chem. Phys., 4, 2345–2352, 2004

www.atmos-chem-phys.net/4/2345/2004/

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

L. R. Lait¹, P. A. Newman², M. R. Schoeberl², T. McGee², L. Twigg¹, E. V. Browell³, M. A. Fenn³, W. B. Grant⁴, C. F. Butler³, R. Bevilacqua⁵, J. Davies⁶, H. DeBacker⁷, S. B. Andersen⁷, E. Kyrö⁸, E. Kivi⁸, P. von der Gathen⁹, H. Claude¹⁰, A. Benesova¹¹, P. Skrivankova¹¹, V. Dorokhov¹², I. Zaitcev¹², G. Braathen¹³, M. Gil¹⁴, Z. Litynska¹⁵, D. Moore¹⁶, and M. Gerding¹⁷

¹Science Systems and Applications, Inc., Lanham, Maryland, USA

²NASA Goddard Space Flight Center, Greenbelt, Maryland, USA

³NASA Langley Research Center, Langley, Virginia, USA

⁴SUNARC, San Francisco, California, USA

⁵U. S. Naval Research Laboratory

⁶Meteorological Service of Canada, Ontario, Canada

⁷Danish Meteorological Institute, Copenhagen, Denmark

⁸Finnish Meteorological Institute, Sodankylä, Finland

⁹Alfred Wegener Institute, Potsdam, Germany

¹⁰Deutscher Wetterdienst Meteorologisches Observatorium, Hohenpeissenberg, Germany

¹¹Czech Hydrometeorological Institute, Prague, Czech Republic

¹²Central Aerological Observatory, Dolgoprudny, Russia

¹³Norsk Institutt for Luftforskning, Kjeller, Norway

¹⁴Instituto Nacional de Técnica Aeroespacial, Madrid, Spain

¹⁵Institute of Meteorology and Water Management, Legionowo, Poland

¹⁶U. K. Meteorological Office, Wokingham, Berks, United Kingdom

¹⁷Leibniz-Institute of Atmospheric Physics, Kühlungsborn, Germany

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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Citation: Lait, L. R., Newman, P. A., Schoeberl, M. R., McGee, T., Twigg, L., Browell, E. V., Fenn, M. A., Grant, W. B., Butler, C. F., Bevilacqua, R., Davies, J., DeBacker, H., Andersen, S. B., Kyrö, E., Kivi, E., von der Gathen, P., Claude, H., Benesova, A., Skrivankova, P.,

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