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Ozone column content variability at the Kishinev site from satellite retrievals and ground observations

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It is analyzed variability of the total ozone content (TOC) in column of atmosphere by using ozone retrievals from satellite platform and from direct ground observations at the Kishinev site, Moldova (47.00N; 28.56E). Direct ground observations of the TOC are regular carried out by Atmospheric Research Group (ARG), Institute of Applied Physics at the ground-based solar radiation monitoring station, Kishinev site, by using of hand-held ozonemeter MICROTOPS II. TOC measurements started since 2003. Data of ozone observations are presented at the research group web-site http://arg.phys.asm.md. Satellite TOC dataset at specific coordinates of Kishinev site was derived by using linear interpolation of the parent gridded databases from TOMS (1979-2004) and OMI (2005-2008) observations. It was established that relative difference of TOC between periods from 1979 to 1983 and from 2004 to 2008 was -5.16 %. Data were processed by applying of 5-year averaging "window". For a period from 1979 to 2008 statistical estimation of linear trend of the TOC was -2.08% per decade. Climatic norm of TOC for this period was equal to 335 DU. Variation of ozone column content at Kishinev site shows it seasonal character with maximum of the order of $\sim$378 DU (in March and April) and with minimum of the order of $\sim$289 DU (in October). The largest and lowest range of oscillations of monthly means of the TOC retrieved for Kishinev site from TOMS and OMI observations in the course of the period from 1979 to 2008 were $\sim$ 102 DU (in February) and $\sim$29 DU (in October). Extremely low and high values of the TOC ever registered for Kishinev site from TOMS and OMI observations were $\sim$ 209 DU (on December 1, 1999) and $\sim$ 532 DU (on March 3, 1988).
It was shown that ARG ground observations give overestimated TOC values in comparison with the TOMS and OMI observations from satellite platforms. Relative differences or biases (in %) between satellite and ARG ground observations of the TOC at Kishinev site were derived by using of daily means of TOC from the short-long series of simultaneous measurements for respective pairs: TOMS vs ARG (2003-2005) and OMI vs ARG(2004-2008). These differences were -1.85% (or -6 DU) for pair TOMS-ARG and -2.15% (or -7 DU) for pair OMI-ARG observations. It should be noted that derived correlation coefficients for sets of TOMS-ARG and OMI-ARG observations of daily means of TOC were $\sim$0.981 and $\sim$0.992, respectively.