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Variability in tropospheric NO_2 columns over SE Europe through satellite observations

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Satellite observations of nitrogen dioxide (NO_2) tropospheric columns over SE Europe are analyzed to study the characteristics of the spatial and temporal variability of pollution in this region, which is considered a crossroad of different pollution sources. Analysis of the interannual variability of the tropospheric NO_2 columns is presented, on the basis of measurements from the satellite instruments GOME/ERS-2, SCIAMACHY/Envisat, OMI/Aura and GOME-2/MetOp. The aim of this work is to assess the ability of the different satellite tropospheric NO_2observations to differentiate between known locally polluted and unpolluted sites, between local and regional sources of NO_2 and to detect potential transboundary transport of the pollutant. In addition the consistency of the different satellite instruments when compiling long-term data sets for pollution monitoring is investigated. Tropospheric NO_2 amounts were simulated for the domain under study with a regional photochemical air quality model (CAMx) and were compared with the satellite data. In most of the cases the model reveals similar spatial patterns with the satellite data, while over certain areas (e.g. Istanbul) large discrepancies were found.