



GROUND-BASED & SATELLITE DOAS MEASUREMENTS INTEGRATION FOR AIR QUALITY EVALUATION/FORECAST MANAGEMENT IN THE FRAME OF QUITSAT PROJECT

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The observations of the Earth's atmosphere from space provide excellent opportunities for the exploration of the sophisticated physical-chemical processes on both global and regional scales. The major interest during the last three decades was focused mainly on the stratosphere and the ozone depletion. More recently the continuous improvements of satellite sensors have revealed new opportunities for larger applications of space observations, attracting scientific interest to the lower troposphere and air quality issues. The air quality depends strongly on the anthropogenic activity and therefore regional environmental agencies along with policy makers are in need of appropriate means for its continuous monitoring and control to ensure the adoption of the most appropriate actions. The goal of the pilot project QUITSAT, funded by the Italian Space Agency, is to develop algorithms and procedures for the evaluation and prediction of the air quality in Lombardia and Emilia-Romagna regions (Italy) by means of integrating satellite observations with ground-based in-situ and remote sensing measurements. This work presents dedicated Differential Optical Absorption Spectroscopy (DOAS) measurements performed during the summer of 2007 and the winter of 2008. One of the DOAS instruments operate at Mt.Cimone station (2165m a.s.l) and the other two instruments conducted measurements in/near Bologna (90 m. a.s.l). Different observational geometry was adopted (zenith-sky, multi-axis and long-path) aimed to provide tropospheric NO₂ columns and O₃, SO₂ and HCHO concentrations at ground level as an input data for QUITSAT procedures. Details of the instruments, the radiative transfer model used and the algorithms for retrieving and calculation of the target gases concentrations are presented. The obtained experimental results are correlated with the corresponding ones retrieved from SCIAMACHY /ENVISAT observations during the overpasses above the ground-based instruments. The analysis stresses on the specificity of the satellite and ground-based observations and the importance of the right choice of appropriate scenario for correlative studies.