

ANALYSIS OF THE ATMOSPHERE AEROSOL AND OZONE CONDITION OVER TBILISI USING SATELLITE DATA AND GROUND TRUTH MEASUREMENTS

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The aerosol contents and ozone concentration are very important parameters of the atmosphere. These values are required for atmospheric processes simulation, weather forecasting, climate change research, environmental assessments, etc.

However, most studies need to know the atmosphere condition over a wide region or continent. A ground-based acquisition of the parameters of atmosphere within a large area is a difficult and expensive procedure. Moreover, a high variability in the atmosphere environment requires a quick update of measurements. This circumstance necessitates the establishment of a dense network of ground instrumentation stations.

Nowadays in the world there are several satellite systems for operational global monitoring of the parameters of atmosphere – in the geostationary (GOES, MSG) and polar (EOS, NPOESS, Metop, Envisat, Meteor-M) orbits. These satellites are equipped with microwave and optical instruments for measuring of the parameters of atmosphere such as aerosol optical thickness, radiative cloud fraction, concentration of water vapour, ozone, greenhouse gases, oxides of carbon, nitrogen, sulphur, profiles of temperature, pressure and relative humidity, etc. Relatively low accuracy of satellite measurements can be significantly improved by the calibration response refining from ground truth data [Станкевич и др., 2013].

Time series of Aura/OMI satellite measurements of atmosphere aerosol optical thickness and ozone concentration over Central and Eastern Georgia in 2009-2011 were analyzed. OMI L2G OMAEROG.003 and OMT03G.003 data products were obtained from the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) using the Mirador Earth science data search tool.

Ground-based measurements of the parameters of atmosphere in Tbilisi during the same period, which are provided by the Mikheil Nodia Institute of geophysics [Амиранашвили и др., 2010], were used as calibration data. Satellite data monthly averaging, preprocessing, analysis and visualization was performed using Giovanni web-based application. Maps of trends and periodic components of the atmosphere aerosol optical thickness and ozone concentration over the study area were calculated.

Станкевич С.А., Титаренко О.В., Харитонов Н.Н., Хлопова В.Н. Картирование загрязненности атмосферы Приднепровского промышленного района диоксидами азота и серы с использованием спутниковых данных // *Доповіді НАН України*, 2013.– № 3.– С.106-111.

Амиранашвили А.Г., Блиадзе Т.Г., Киркитадзе Д.Д., Никофоров Г.В., Нодия А.Г., Харчилава Д.Ф., Чанкветадзе А.Ш., Чихладзе В.А., Чочишвили К.М., Чхаидзе Г.П. Некоторые предварительные результаты комплексного мониторинга концентрации приземного озона (КПО), интенсивности суммарной солнечной радиации и содержания в воздухе субмикронных аэрозолей в Тбилиси в 2009-2010 гг. // *Труды института геофизики им. М. Нодия*, 2010.– Т. LXII.– С.189-196.