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Abstracts

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water. We made the experiment with two plates, and calculated electro-conductivity of water by the formula

Table 4 Experimental values for different water types measured conductivity [1]

Water type	**Conductivity, µS/cm**
Distilled water	6,1
Tap water	378,5
Mineral water	102,0

Conclusions:

Some different types of water have different conductivity, because a different amount of different salts are dissolved in water. In our country, Moldova, water has a very high amount of CO_3^- and HCO_3^- ions, however a very small amount of I-(iodine) ions. This method of water salinity determination is a basic process in food industry, so that`s why knowing the secrets really helps people to avoid wrong statements.

References

1) http://en.wikipedia.org/wiki/Dissociation_constant
2) http://www.pasco.com/products/probeware/index.cfm
3) Hamilton P. Cady, Inorganic Chemistry, McGraw-Hill, 1992.

ATMOSPHERE AND SOLAR RADIATION MONITORING AT THE IAP GROUND-BASED STATION, KISHINEV(MOLDOVA)

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Results of long-term measurements of aerosol optical and microphysical properties, total ozone content (TOC) in column of atmosphere, and solar radiation at the IAP's ground-based solar radiation monitoring station for the period of observations from 2004 to 2013 are presented. In 2003 IAP's ground-based station (47.0013°N, 28.8156°E; 205 m a.s.l.) was created and registered in the Global Atmosphere Watch Station Information System (GAW SIS) as a Regional fixed station in WMO RA VI–Europe (http://gaw.empa.ch/gawsis/ reports.asp?StationID=-739518802). Since 1999 observations of aerosol characteristics have being carried out within the international Aerosol Robotic Network (AERONET) project managed by NASA/GSFC (http://aeronet.gsfc.nasa.gov/new_web/photo_db/Moldova.html). Solar radiation and TOC data are submitted on regular basis to the World Radiation Data Center (WRDC) and World Ozone and Ultraviolet Radiation Data Centre (WOUDC) within Global Atmosphere Watch (GAW) programme, WMO since 2003.

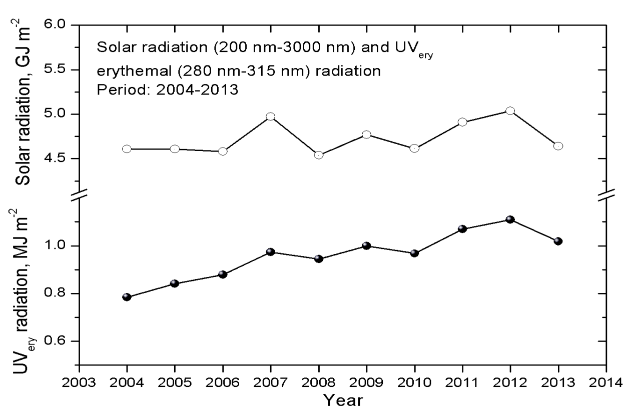

Figure 1. Time-series of global solar (200nm-3000nm) and ultraviolet erythemal UV_{ery} (280 nm-315 nm) radiation measured at the ground-based station placed at the IAP ASM.

The IAP's ground-based station was also registered at these Data Centers as continuously operating solar monitoring station at the territory of Moldova. Yearly totals of global broadband solar radiation (200 nm - 3000 nm) and UV_{ery} erythemal (280 nm- 315 nm) radiation onto the horizontal plane for the period of observations from 2004 to 2013 are shown on Fig. 1. Multiyear mean values of yearly totals of the solar and erythemal radiation are $\langle Q_{gl} \rangle_{MY}$ =4.728 GJ m^{-2} (1313.34 kWh m^{-2})

and $<Q_{UVery}>_{MY}$ = 0.959 MJ m^{-2} (0.266 kWh m^{-2}).
Aerosol optical and microphysical characteristics in the column of atmosphere are retrieved from direct solar and sky diffuse spectral radiance measurements using a multi-wavelength sun-photometer Cimel CE-318 in seven spectral channels. Spectral aerosol optical depth (AOD) at set of wavelengths from 340 nm to 1024 nm is used to characterize the turbidity of atmosphere due to presence of the aerosol only. Time-series of monthly means of AOD at 500 nm, $<\tau_a(500)>_m$ measured at the ground-based station in the course of period from 1999 to 2014 is shown in Fig. 2. Multiyear mean value of AOD is equal to $<\tau_a(500)>_{MY}$=0.20 ± 0.05, indicating that the atmosphere is relatively clear(by taking into account only the aerosol component). For comparison here are also presented AOD values $<\tau_a(500)>_M$ for some analogous sites within the globally distributed AERONET : ~0.06 -Canberra, Australia; ~0.15 -London, UK; ~0.20 -NASA/GSFC, US; ~0.24 -Bucharest, Romania; ~0.34 -Osaka, Japan; ~0.73 –Beijing, China. High peaks of AOD involved in the course of 2001-2003 (see Fig. 1) are attributed to influence of aerosols (smoke, dust) in air masses transported from outer regions. Appearance of the largest peak among others taking place in September 2002 with $<\tau_a(500)>_m$ =0.57 is attributed to influence of highly polluted air masses loaded with smoke particulates and long-range transported from some regions of Russia, Belarus, and Ukraine: in these regions numerous loci with intensive biomass burning(forest and peat fires) were observed. Peak in AOD observed in April 2003 with was due to Sahara dust outbreaks transported in Moldova. The highest ever measured point $\tau_a(500)$ and daily mean $<\tau_a(500)>_d$ values of AOD at the Kishinev site were observed on September 11, 2002 and were equal to $\tau_a(500)$ =2.75 and $<\tau_a(500)>_d$ =2.15, respectively.

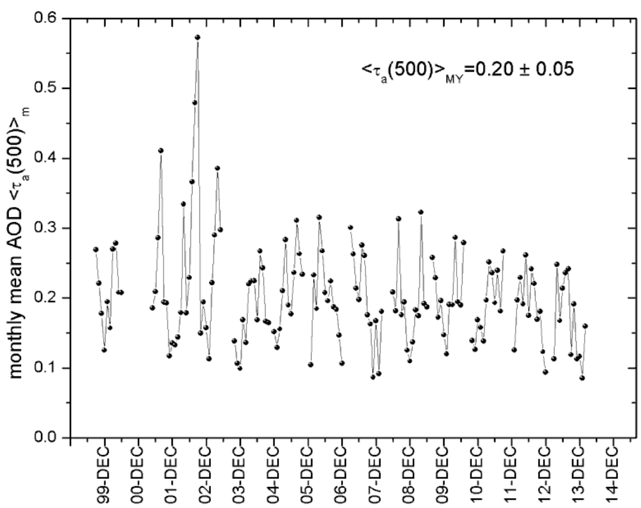

Figure 2. Time-series of monthly means of AOD $<\tau_a(500)>_m$ measured at the ground-based station at the Kishinev site in the course of period from 1999 to 2014.

Measurements of TOC were fulfilled at the IAP ground-based station using a hand-held microprocessor controlled MICROTOPS II ozonometer. Seasonal variation of monthly means of TOC $<X>_m$ measured at the ground-based station at the Kishinev site in the course of period from 2004 to 2013 is shown in Fig. 3. It is clearly seen seasonal variation with maximum of TOC $<X>_m$ with 380 DU in April and minimum with $<X>_m$ =289 DU in October. The highest and lowest ever measured point values of TOC at the Kishinev site were X_{max} =489 DU (February 12, 2008) and X_{max} =240 DU (November 16, 2008). Time series of yearly means of TOC $<X>_Y$ retrieved from satellite observations and measured at the ground-based station at the Kishinev site in the course of period from 1979 to 2013 is shown in Fig. 4. For creation of composed time-series it was used ozone data retrieved from the following satellite platform observations: Nimbus 7 (1979-1992), EP TOMS (1997-2004) and OMI AURA (2005-2013). Climatic norm of TOC for Moldova derived from satellite observations is equal to $<X>_{clima}$=334 ± 9 DU. Trend analysis of time-series from satellite observations reveals the following estimation of ozone variation: it is observed TOC decreasing at the rate of $\partial X/\partial Y \approx$ - 5.5 DU per decade or – 1.6% per decade.

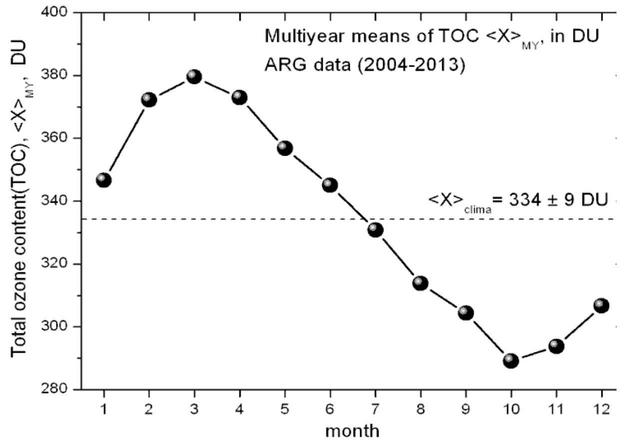

Figure 3. Seasonal variation of monthly means of TOC <X>$_m$ measured at the ground-based station at the Kishinev site in the course of period from 2004 to 2013.

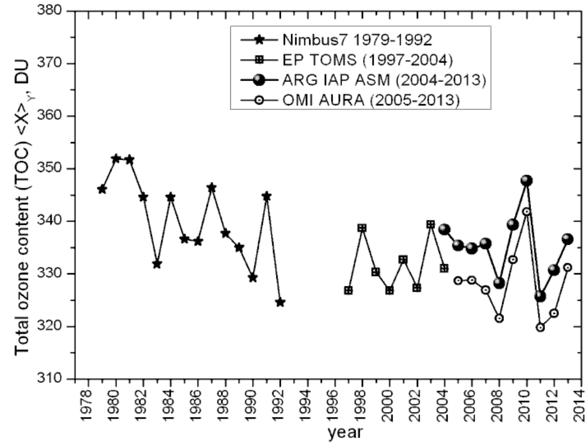

Figure 4. Time series of yearly means of TOC <X>$_Y$ retrieved from satellite observations and measured at the ground-based station at the Kishinev site in the course of period from 1979 to 2014.

REALIZAREA INDEPENDENŢEI ENERGETICE - CONDIŢIA *SINE QUA NON* PENTRU DEZVOLTAREA DURABILĂ A REPUBLICII MOLDOVA

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Asigurarea dezvoltării durabile este un imperativ global fără alternativă. Dezvoltarea este total dependentă (condiţionată, dirijată) de transformările de energie. Respectiv, Strategia Energetică reprezintă miezul şi esenţa Strategiei Dezvoltării Durabile.

Transformările de energie care au loc (sunt operate) în economie se supun legilor Termodinamicii, mai exact Termodinamicii sistemelor neechilibrate. După cum se ştie, fundamentul Termodinamicii este Legea Universală de Conservare a Energiei (care nu are excepţii). Acest fapt incontestabil garantează veridicitatea concluziilor expuse mai jos.

Noi considerăm că din punct de vedere termodinamic dezvoltarea (progresul) a fiecărui organism (sistem) aparte şi a civilizaţiei în întregime poate fi numeric caracterizat prin creşterea (increment) a energiei libere ΔG (energiei lui Gibbs). Adaosul cumulativ a acestei energii libere poate fi prezentat ca suma a doi termeni:

$$\Delta G = \Delta G_{fossil} + \Delta G_{renewable} \quad (1)$$

Primul termen ΔG_{fossil} reflectă sporul energiei libere a sistemului termodinamic datorită consumului de energie din surse fosile (tradiţionale, nerenovabile) şi poate fi definit ca unul “extensiv” (nesustenabil, care nu corespunde dezvoltării durabile). Al doilea termen $\Delta G_{renewable}$ corespunde creşterii “intensive” (sustenabile, care asigură dezvoltarea durabilă) a energiei libere - din surse renovabile, numite netradiţionale (radiaţia solară directă şi derivatele ei principale - energia hidro, eoliană, bio). Energia nucleară, de asemenea, se clasifică ca una sustenabilă - datorită rezervelor enorme a acesteia.

Combustibilele fosile nu pot asigura dezvoltarea durabilă - ele sunt epuizabile, plus folosirea lor este indispensabilă de imanente efecte negative de mediu. Gradul de sustenabilitate poate fi caracterizat numeric de “indice sustenabilităţii” S:

$$S = \Delta G_{renewable} / (\Delta G_{fossil} + \Delta G_{renewable}) \quad (2)$$

Evoluţia in timp a acestui indice este prezentat în Fig.1.