

Long term changes and climatology of biologically effective UV Radiation  
over Europe

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# UV radiation measurements in the High Tatras and Slovakia

Róbert Blaško

Meteorological observatory

Geophysical Institute of Slovak Academy of Sciences

Stará Lesná, High Tatras, Slovakia

- 2007 - Graduation of master degree in environmental ecology at the university of Pavol Jozef Šafárik in Košice
- Master thesis- precipitation chemistry and atmospheric deposition in the High Tatra Mts
- In the cooperation with the Research station of the Tatra national park
- Further working with the data from master thesis

## UV measurements in Slovakia

- **1993** – **Brewer** spectrophotometer MK IV nr.097 was installed in **Poprad – Gánovce** (49.03N, 20.32E, 706m a.s.l.)
- **1997** – continual monitoring of the biologically effective solar radiation started by installing **UV-biometer** (Solar light company, model 501) at **Bratislava-Koliba** (48.02N, 17.1E, 292m a.s.l.)
- The net of  $UV_{bio}$  measurements of SHMI spreaded to **Košice** (48.70N, 21.27E, 230m a.s.l.) in **1998**

## UV measurements in Slovakia

- **1999 – UV-biometer** was also installed in **Poprad-Gánovce**
- In **2001 standard UV-biometer 4811** was bought by SHMI as a reference standard
- **2002** - our observatories - **UV-biometer 5774** at the observatory at **Skalnaté pleso** (49.183N, 20.183E, 1778m a.s.l.) and **UV-biometer YES** (Yankee Environmental Systems) at the observatory in **Stará Lesná** (49.15N, 20.283 E, 810m a.s.l.) were installed

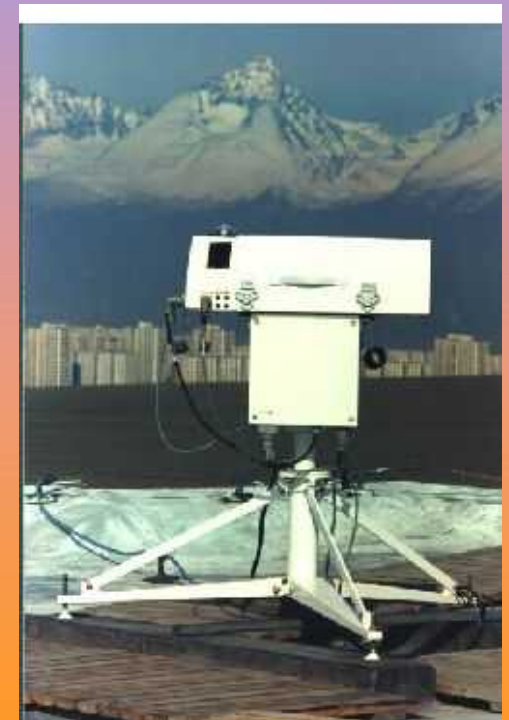
Location	Lat.	Long.	Height a.s.l.	Sensor Nr.	Output	since
Košice- airport	48.70 N	21.27 E	230 m	S/N 3532	analog	Oct-98
Bratislava-Koliba	48.02 N	17.10 E	292 m	S/N 2736	digital	Jan-97
Poprad-Gánovce	49.03 N	20.32 E	706 m	S/N 3531	analog	Aug-99
Poprad-Gánovce-standard	49.03 N	20.32 E	706 m	S/N 4811	digital	Mar-01
Skalnaté Pleso tarn	49.183 N	20.183 E	1778 m	S/N 5774	analog	May-02
Stará Lesná	49.15 N	20.283 E	810 m	* YES Ser. No. 920 502	analog	May-02

## UV measurements in Slovakia

- Comparison of network devices with standard UV biometer: May – June, once a year, first comparison of all network UV biometers with standard device done in 2002
- In 2006 standard UV-biometer calibrated in Davos



UV biometers at Poprad - Gánovce



Brewer spectrophotometer, Poprad-Gánovce

## UV index forecast

- The statistical UV-index forecast based on the Brewer ozone spectrophotometer total ozone and DUV observations has been issued by SHMI from 2000

## Atlas of the UV radiation

- The density and length of time series of UV radiation measurements with controlled quality are not sufficient for estimation of long-term variability of UV radiation
- model GPI created under the COST-726 action was used for determination of typical distribution of erythemal UV radiation over Slovakia (estimation of the UV- climate).
- Analysis of measurements performed at meteorological station GPI Stará Lesná and Skalnaté Pleso was used for parameterization of altitude and snow effect on the total and the UV radiation.

## UV maps over Slovakia

- Measurements of the Slovak Hydro meteorological Institute and of the GPI from decade 1995 – 2004 were utilised as proxy parameters of the UV radiation. Map set of **erythemal UV radiation daily doses** distribution over Slovakia is result of the modelling.
- The maps corresponded to clear sky, to conditions with typical distribution of the cloud effect, to average total ozone (O<sub>3</sub> AVG) and its upper and lower limits expressed by standard deviation from average (O<sub>3</sub> ± STDEV) and to two possibilities of snow cover distribution over Slovakia (snow presence assumed from altitudes with snow probability P=50% and P=70%) were created separately.
- The map-set can be considered as an **Atlas of the UV radiation climate over Slovakia**. The maps can be used for the future studies on UV radiation impact on man and biosphere.
- <http://www.ta3.sk/gfu/atlas.htm>

## Recent studies at the GPI

- at our institute, Anna Pribullová deals with UV radiation
- cooperation with SHMI
- recent studies dealt with
  - effect of ozone and aerosol variability on UV radiation
  - effect of altitude on UV
  - effect of surface albedo and snow cover on UV



# My connections to UV

- In the future I will participate on the reconstruction of UV time series using time series of global radiation measurements of our observatories
- Another possibility is to look at the effect of solar radiation on air chemistry using Brewer spectrophotometer

Thanks for attention!