

Solar UV-measurements in Sweden and Finland on great grandpa's time

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A quote still valid!

“Ultraviolet radiation has of late attracted a great deal of attention not only by reason of the photochemical processes, so important from a physiological point of view, which these rays are able to produce, but also on account of the prospects of closer investigations into the amount of the ozone of the atmosphere, which the study of ultra-violet radiation opens out.” (Aurén 1929)

Solar UV-measurements were made in both Sweden and Finland in the late 1920'ies!

Instrumentation

Appropriate instruments were available commercially. Photoelectric cells with a cadmium or a potassium cathode were charged to a reference voltage. The discharge current and time was measured with an electrometer as the cell was exposed to solar UV-radiation through, a for the cell and spectral range chosen, optical filter.

Biologically effective response

In Sweden T.E. Aurén, a scientist funded by the Swedish Anthropological and Geographical Society, made measurements in the 1920's with electrometers and filtered cadmium cell photometers with a spectral sensitivity ranging from approximately 244 to 366 nm, and a maximum around 313 nm. Aurén noted that in sunlight there is *“hardly any radiation of a shorter wavelength than 291 nm”* and that due to the comparatively small longwave UV-sensitivity of Cd-cells *“the radiation observed with the cell generally corresponds to the province that is interesting from a biological point of view, which extends from 320 nm to the (short-) end of the spectrum”*.

UV-climatology

In Sweden Aurén made measurements of both direct and diffuse solar UV-radiation with Cd-cells at five places, Abisko being the northernmost, during the summers of 1926 and 1927 *“to ascertain in how far radiation depends on the geographical position of the place under observation”*.

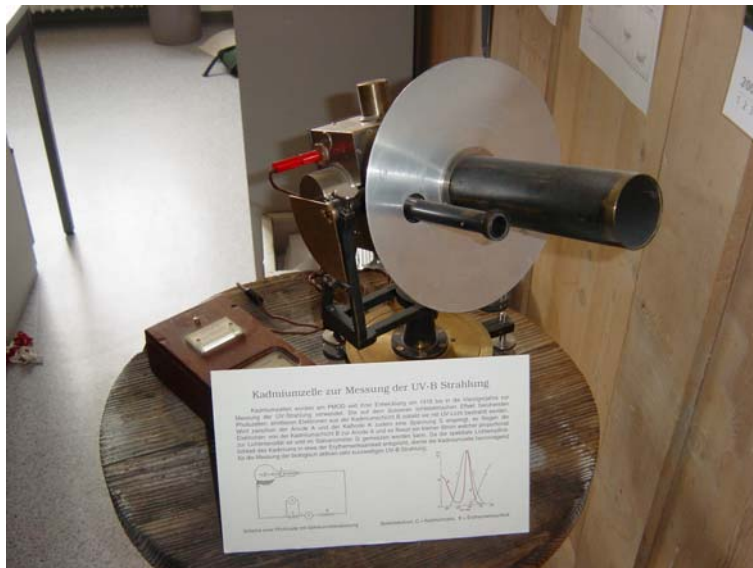
Solar eclipse studied

In Finland extensive measurements were made which also were well documented (Lunelund 1944; Lunelund, Holmberg 1929). On one occasion the UV-variation was studied during a solar eclipse.

Intercomparisons

Aurén was able to compare his results from Sweden with measurements from other sites expressed in units of the Davos-scale

Site	Latitude °N	Altitude (m. a.s.l)	Year	Solar elevation		
				25°	35°	45°
Muottas-Muraigl	46.5	2456	1923	102	216	341
Davos	46.8	1560	1916-18	66	136	223
Agra	46	565	1923	45	96	151
Stockholm	59.4	55	1926-27	30	85	141
Abisko	68.4	375	1926-27	39	93	169



This UVB-measuring sun photometer, a museum object in PMOD/WRC at Davos, may be the normal cell used in the 1920'ies at the solar research center of Davos for intercomparisons with other similar UV-measuring instruments and for normalising their results into units of the “Davos-scale”. (Photo 2005: Lasse Yliantilla, STUK).

References and literature:

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