



A new instrument to measure UV radiation at inclined planes

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A new instrument was developed to measure UV radiation at inclined planes. The instrument consists of 9 photodiodes that measure UV radiation from 4 cardinal directions at inclinations of 0°, 45° and 90°. It can measure with a frequency of 1 second and store data. The temperature of each photodiode is also stored although there is almost no change in sensitivity of the diodes and electronics in the range from -20°C to 60°C. Quartz domes protect the diodes and the directional sensitivity is the same as other UV monitoring devices. The instrument shows no deviation from linearity within the range of natural solar UV irradiance. At this time two different photodiodes are available. One type is measuring erythemally weighted UV radiation and the other is measuring UVA. Currently we use the erythemally weighted instrument operationally in Vienna, Austria. As for other instruments a calibration function for each measuring head is needed to correct for total ozone and solar elevation due to instrumental imperfections. In its offline mode the instrument can work over a period of at least 6 month with a temporal resolution of 5 minutes.

The purpose of this instrument is to measure UV radiation at inclined surfaces from the 9 directions at the same time. Data from the instrument are used to calculate the body distribution of realistic biological receivers that in our case are humans and animals. To get a higher resolution an interpolation model was developed. Currently we do a step width of 5° in azimuth and vertical inclination that delivers a matrix of 72x18 in total 1296 points. An important advantage of this instrument is that a miniature personal dosimeters exists that contain the same type of diode and electronics i.e. there is no instrumental difference. This is important when you correlate the personal and ground station UV measurements. The personal dosimeters look like a wristwatch and can easily be mounted on a person.