

UV and Ozone Measurements Provide Meteorological Data

APPLICATION NOTE 114

Combined Measurements of UV Radiation and Ozone Provide Useful Meteorological Data

Measuring ultraviolet radiation in the Biosphere and the stratosphere's ozone is important to different disciplines and done with unique meters. Combining the 2 measurements allows calculation of other meteorological factors.

The ultraviolet (UV) part of the solar spectrum has the highest radiant energy in the biosphere. The photon energy at the shortest end of the UV has enough energy to damage and even break DNA, the repository of all the genetic information for each life form. In addition UV damages cell membranes. Both the grave consequences of ultraviolet radiation and the life-sparing effect of the ozone layer were recognized almost immediately upon the discovery of the ozone layer a century ago.

Above the atmosphere solar ultraviolet is continuous from 400 nm, just below the visible spectrum, to where the photon energy is considered to be x-ray, at about 10 nm. Traveling through the atmosphere the intense radiation ionizes air molecules. Fortunately for the development of life, some of the ionized oxygen together with molecular oxygen is reconstituted into ozone, which absorbs much of ultraviolet. The ozone concentration in respect to other gas molecules is at maximum at about 25 km in the stratosphere.

The efficacy of the ozone layer absorption doesn't allow wavelengths below 290 nm to reach the earth's surface. Clouds and haze attenuate the UV above 290nm; ozone decreasingly so.

Measurements Show Long-Term Effects of UV

Measuring biologically effective UV is of importance in relating the effects seen in various species with the dose and intensity of the UV. Skin cancer, plant and fish aberrations, eye problems in people and in cattle are among the phenomena related to biologically effective UV. The establishment of an international UV Index informs people about the strength of this radiation so they can exercise care.

The Model 501 measures biologically effective UV. It is weatherproofed and temperature stabilized to provide accurate information in any environment. It is a most accurate way of determining the UV Index in real time.

Ozone Thickness Measurement Permits Calculation of UV

Microtops measures the ozone thickness in the total atmosphere. This is important in answering the question about whether the ozone is being maintained. Handheld, it is pointed at the sun and the ozone thickness is automatically calculated and displayed in seconds. It performs the role of much more expensive, bulky and time-consuming instruments. Microtops also measures haze and water vapor separately.

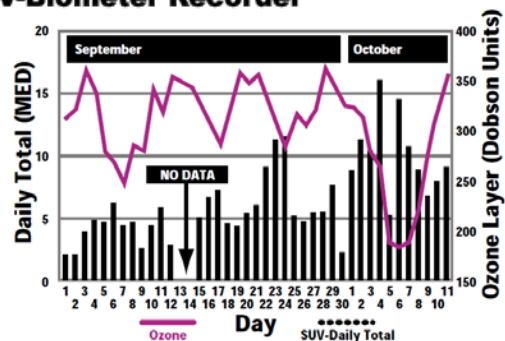
Microtops can measure 5 wavelengths. Absorption at different wavelengths indicates haze and water vapor and can indicate particle size and absorbing material.

Knowing the ozone thickness it is possible to calculate the biologically effective UV reading for a cloudless, haze-free sky. Comparing calculated UV to actual gives a measure of cloud and haze absorption.

Cloud and haze absorption is of importance in respect to global warming. It is anticipated that cloud cover will increase with global warming. Measurements that 501 and Microtops can provide in a network over time will show if and by how much cloud cover is changing.

For more information on the Model 501 and the Microtops, call Solar Light at 215-927-4206 or visit our website at www.solar.com.

UV-Biometer Recorder



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