

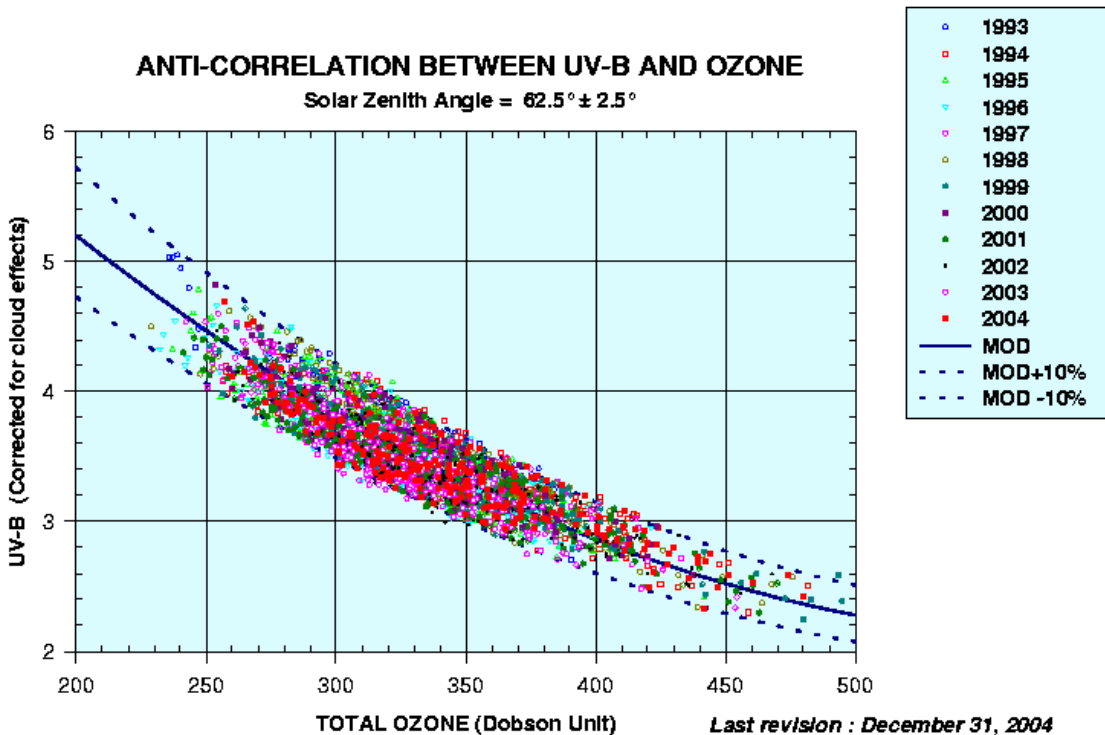
**Which factors have an influence on the amount of UV-radiations at the surface of the earth?**

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**Ozone**

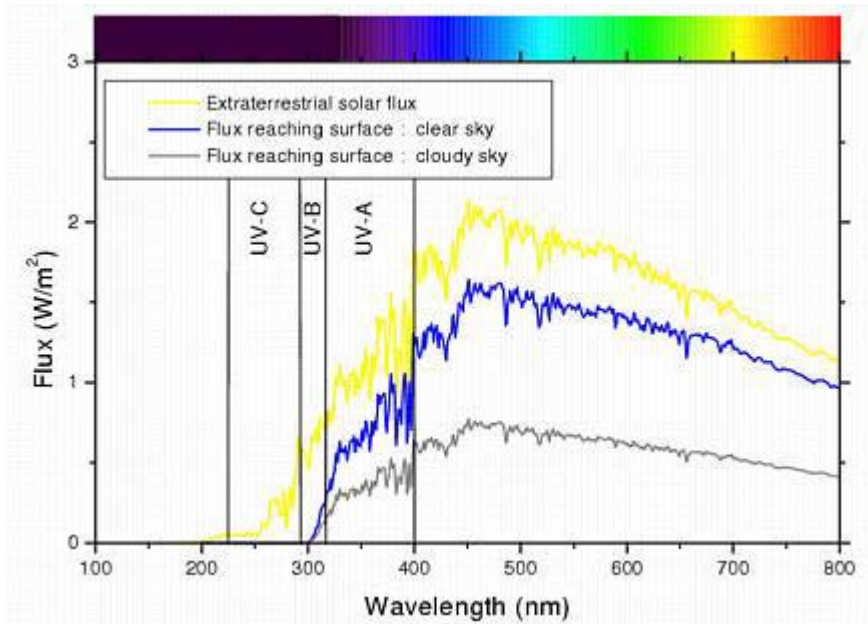
When UV-radiations of the Sun reach the atmosphere of our planet, constituents of the atmosphere absorb the greatest part of it, smaller part is reflected back into the deep space. Ozone and oxygen present in the atmosphere of the Earth are the main chemical constituents protecting us against UV-radiations. Therefore all incident radiations with a wavelength shorter than 280 nm are absorbed before reaching the surface of the Earth.

The current trends, with a decrease of ozone at high and mid-latitude inducing an increase of the UV-radiations on the Earth's surface, permit to foresee a significant increase of health risks. This correlation is illustrated in the following graph.



Therefore, one easily understands why control programmes for the measurement of UV-radiations are set up. Furthermore a precise knowledge of the ultraviolet flux is of major importance for the study of physico-chemical phenomena in the atmosphere in general.

The following graph illustrates the part of the solar spectrum (the radiation intensity as a function of wavelength) from far ultraviolet to visible. The yellow curve represents the intensity of radiations reaching the top of the Earth's atmosphere. The blue curve represents the radiation intensity reaching the surface of the Earth. As we can see, all radiations with a wavelength shorter than 280 nm are completely absorbed by the ozone while crossing the atmosphere.



### The clouds

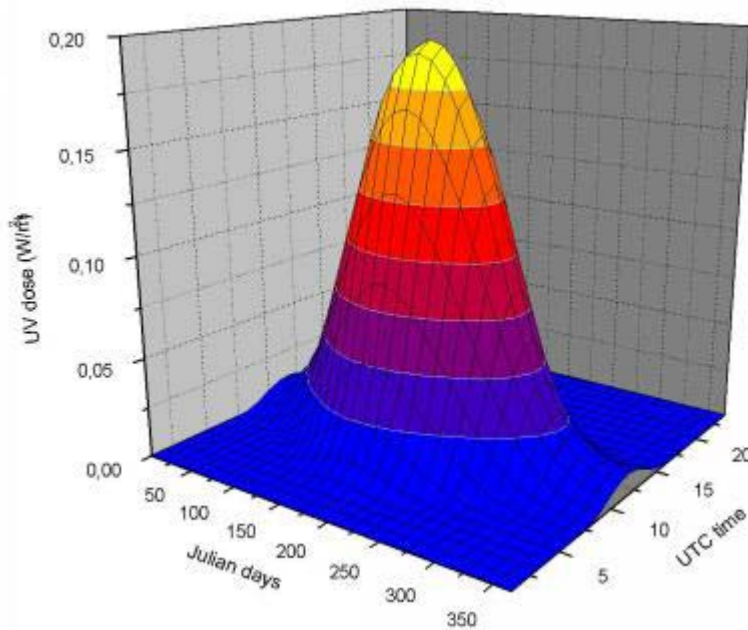
The figure illustrates the effect of another phenomenon in the atmosphere: clouds. Fine water drops, that compose clouds, disperse the sunlight in all directions, even in the direction of deep space. The presence of clouds therefore decreases proportionally the amount of radiations reaching the surface of the Earth. The grey curve represents the intensity of radiations at the surface with medium cloudiness.



### Degree of latitude and local time

We all know that at our latitude, it is more "easy" to get sunburn around noon in the summer than in winter. The intensity of the solar radiations depends largely on the height of the Sun above the horizon. The lower the Sun, the longer the path through the atmosphere for radiations reaching the surface of the Earth, and the bigger the chance to be absorbed by the ozone layer or to be reflected.

To illustrate it, the following figure represents the erythemal dose of UV-radiations that an individual receives in Uccle (Belgium) in relation to the day of the year and the local time. The first Julian day corresponds with the first day of the year. The 365th Julian day corresponds with the 31st of December. It is clear that the maximal dose is reached during summer solstice at noon, when the Sun stands at its highest above the horizon.



### Characteristics of the Earth's surface

When photons reach the Earth's surface, a part of it is being reflected back in to the atmosphere. Another part is absorbed by the surface of the Earth itself. The amount of radiation reflected in relation to the amount of incident radiation, depends on the nature of the surface. The size of the reflection is indicated by a number called "albedo". It is defined as the ratio of the reflected light to the incident light. This number lies between 0 (complete absorption) and 1 (complete reflection). It is well known that the UV-radiation is rather intense on beaches or snowy areas. These two types of surface have an albedo larger than the mean value. The consequence is an increased UV-flux.

