

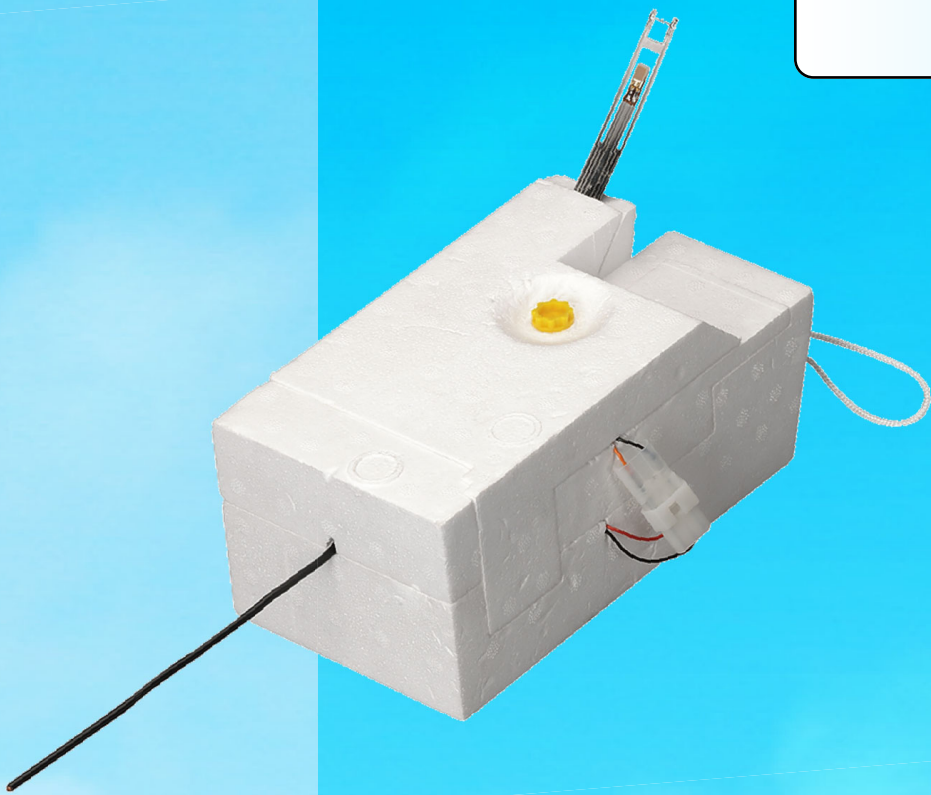
# Development of a Mean Intensity Radiometer for GRAW Radiosondes

Important applications of the new Radiosonde-based Mean Intensity Radiometer:

It offers the possibility to correct temperature measurements which are affected by solar radiation with real - measured - data (Note that the sensor has about the same dimension and shape as the temperature sensor).

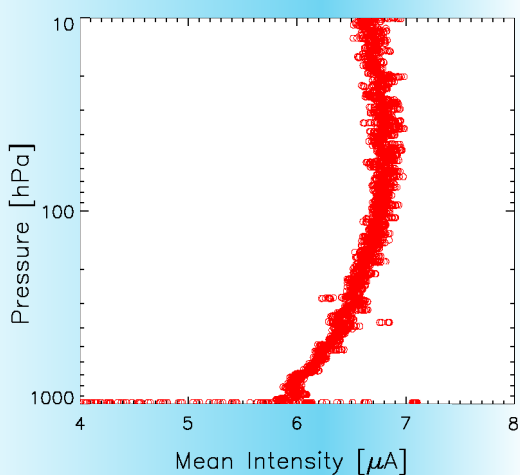
The mean intensity is proportional to the atmospheric heating rate caused by solar radiation. Hence this radiative quantity measured with radiosondes can play an importance role in climatologic research.

The mean intensity which is also know as "actinic flux" is proportional to the photodissociation rate of chemical components, such as  $\text{NO}_2$  ( $\text{NO}_2$  -(UV radiation)->  $\text{NO} + \text{O}$ )

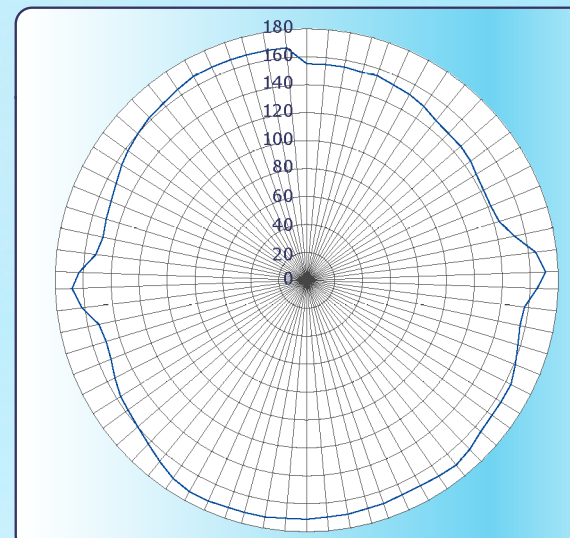


GRAW Radiosondes GmbH & Co and Kipp & Zonen BV started recently the development of a new miniature "Mean Intensity Radiometer" for balloon sounding applications. The glass fiber based Mean Intensity Radiometer has a diameter of only 3 mm and a (nearly) isotropic sensitivity, shown in Figure 1.

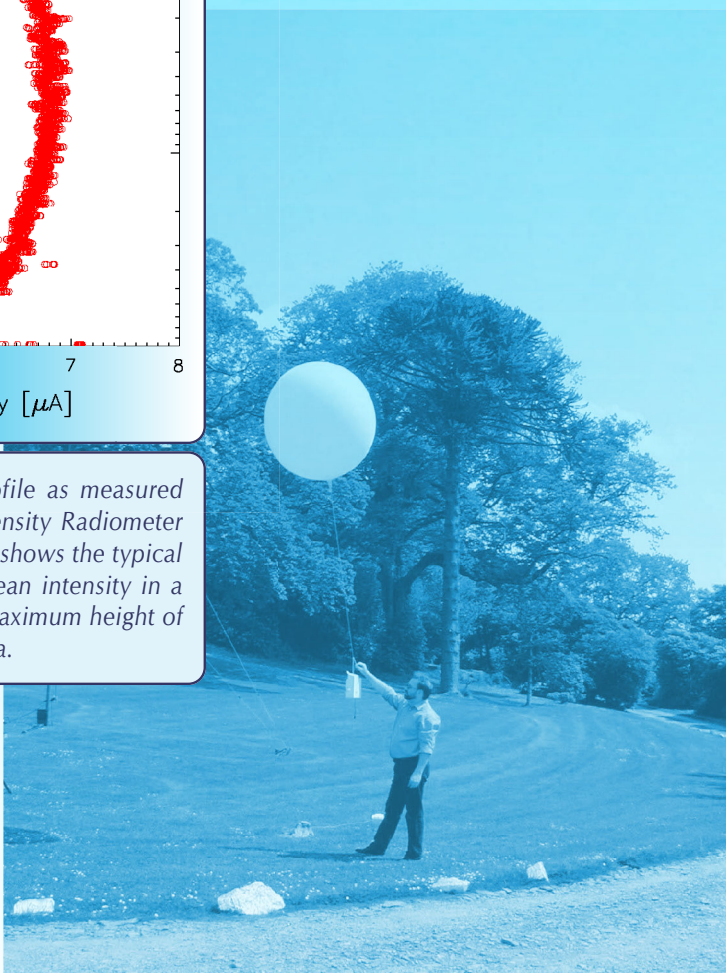
On 21st of December 2004 a prototype Mean Intensity Radiometer was launched with an adapted GRAW radiosonde. Results of this test sounding are depicted in Figure 2. It shows the typical curved profile of the mean intensity which increases with decreasing height due to multiple scattering before it eventually decreases again as a consequence of extinction.



**Figure 2:** Mean intensity profile as measured with the prototype Mean Intensity Radiometer on 21st of December 2004. It shows the typical curved profile of the solar mean intensity in a cloud-free atmosphere. The maximum height of this sounding was about 50 hPa.



**Figure 1:** Sensitivity (or isotropy) of the prototype Mean Intensity Radiometer. The isolines are arbitrary units. The anisotropy of about +/- 12% (min/max) of this detector is not unacceptably high as detectors measuring irradiances can have even larger cosine-response errors.



[www.graw.de](http://www.graw.de)



[www.kippzonen.com](http://www.kippzonen.com)