

Development of a two component net radiation radiometer

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The net radiation flux is an important parameter for scientific research in e.g. climatology, hydrology and horticulture. There is a wide choice of instruments available to measure the net radiation flux. Ranging from simple one component to four component instruments.

Kipp & Zonen has developed a new type of two component net radiation radiometer capable of measuring net short wave (305 nm to 2800 nm) and net long wave ($4.5\mu\text{m}$ to $45\mu\text{m}$) radiation. The instrument consists of two separate net radiation sensors, both capable of receiving down and up welling radiation. One sensor has up and down facing glass domes and the other has two solar blind silicon windows in a similar set-up.

Advantages of this instrument compared to single component net radiometers are the improved accuracy and distinction between short and long wave net radiation. Also there is no wind sensitivity and no need for replacement of soft domes due to degradation. Compared to a four component net-radiometer, it only requires 2 data acquisition channels and is relatively lightweight and inexpensive.

In 2005 and 2006 several qualification tests of the instrument have been performed. Results show a 95% response time of < 3 s and a temperature dependence of $< 5\%$ from -10°C to $+40^{\circ}\text{C}$. Outdoor comparison with high end pyranometers and pyrgeometers yielded an uncertainty $< 5\%$ for daily average values.