

Abstract

Global radiation measurement by pyranometers is expensive, especially if taken simultaneously at several different places. In this paper a simple, cheap sensor by means of a photovoltaic cell is presented. The intercepted radiation produces a current in the solar cell, which can be converted to a voltage that is almost linearly related radiation flux densities.

During calibration measurements a good correlation of photovoltaic cell voltage measurements and global radiation was found. Radiation values up to 800 W m^{-2} can be converted by a linear regression fit. Higher radiation is systematically underestimated by such a linear regression. A regression fit of a higher degree is necessary for obtaining a more accurate representation of the global radiation.

Photovoltaic cells prove to be suitable for measurements of mean and total global radiation and for measurements of present global radiation with an accuracy of about $\pm 20 \text{ W m}^{-2}$.