

SOLAR IRRADIANCE ON THE TIBETAN PLATEAU

Nuozhen Gelsor, Øyvind Frette, Jakob J. Stamnes, and Børge Hamre

Department of Physics and Technology, University of Bergen.

We present measured and modeled solar irradiance levels on the Tibetan plateau from July 2010 to December 2012. The Tibetan plateau lies in southwest China between 27.3°N and 36.4°N at an average altitude exceeding 4,500 meters, where the amount of overhead atmosphere is reduced to almost one half of the amount at sea level. The combination of low solar zenith angle with low atmospheric attenuation gives high solar radiation levels, which could be exploited by solar power plants. To quantify irradiance levels as well as their spatial and temporal variations, we present pyranometer measurements of the global irradiance recorded every minute throughout the year 2010, 2011 and 2012 at one site in Lhasa (29.647°N , 91.178°E , 3683m), one in Nyingchi (29.658°N , 94.365°E , 2995m), and one in Nagqu (31.474°N , 92.058°E , 4510m). In addition, we use a radiative transfer model to: (1) quantify variations in irradiance levels due to variations in the amount of aerosols and clouds, and (2) compare irradiances at sea level altitude with the high altitude irradiances measured on the Tibetan plateau.

Figure 1 shows the data measurement site in Lhasa.



Fig. 1 The rainbow points out the pyranometer at the data measurement site in Lhasa.