عنوان مقاله:

Estimation of Solar Radiation Energy in the Paraw Mountain of Kermanshah Province as a Rugged Topography

محل انتشار:

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خلاصه مقاله:

One of the most important characteristics of site selection for solar energy system installations and optimum solar energy harvesting in the hilly or mountainous terrains is knowledge about the amount and duration of solar radiation within such topographic terrains. Solar radiation data are not readily available for most mountain terrains because of their rugged topography. For these areas, solar radiation data can be obtained through alternative methods such as the Hemispherical Viewshed Algorithm in which spatial and temporal variations of radiation are calculated in terms of elevation, slope, and terrain. In this study, this algorithm was used to estimate and model solar radiation in the Paraw Mountain in Kermanshah. The inputs for this method were ASTER Digital Elevation Model (DEM) with a spatial resolution of ۳۰ m and meteorological parameters that affect solar radiation. The slope and aspect maps were created from ASTER DEM and layers for monthly direct, diffuse, global, and radiation periods were generated for the year ۲۰۱۶. The results showed that in the Paraw Mountain, the amount of solar radiation received was dependent on the slope orientation, as the north and northeast-facing slopes received the lowest and the south and southwest-facing slopes and the flat areas received the highest direct and global radiation (i.e., in terms of this factor, these landscapes can be recommended as the best site for solar energy system installations and optimum solar energy harvesting). The sum annual radiation period varies from ۳۸۲.۶۷ to ۴۳۱۰.۹ hours, the total radiation received annually varies between ۱۰۰۵.۵۶ and ۷۴۶۷.۳ MJ/m۲, and the sum monthly solar radiation is the highest in July (۱۸۱.۴۹-۸۴۲.۲۶ MJ/m۲) and lowest in December (۲۵.۴۲-۳۱۹.۹۰ MJ/m۲). Statistical error comparisons between station-based measurements and model-based estimates were performed via R۲, measures. As a result, this model was recommended for solar radiation estimation with acceptable accuracy, especially in high areas with rugged topography where solar radiation data are not readily available.

کلمات کلیدی:

Solar Radiation, Kermanshah province, GIS, Satellite Imagery, Paraw Mountain