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Cloud detection in the sun area of total sky images using a conventional and a low-cost sky camera

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In the search of technologies for improving the use of solar energy, remote sensing techniques have been widely employed for different purposes. In that sense, a great variety of resources are available in the market, and whole-sky cameras with fisheye lens have supposed a novel procedure for the solar resource assessment. The hemispherical vision of this kind of cameras provides real-time sky images where the different atmospheric features can be identified. However, saturations in the sun area provoke situations where the pixels can be mistakenly identified as clouds when the sky is free of clouds. In this work, two sky cameras with two different image processing have been used to identify clouds in the solar area: firstly, a sky camera (TSI-880 model) with rotating shadow band was used to identify clouds in the sun area following an algorithm based on direct normal irradiance (DNI); whereas the second methodology is based on a low-cost sky camera without the use of DNI. For two cameras, the solar area was processed to identify clouds according to an image processing based on the different channels from the images. In this case, both methodologies presented a cloud identification success rate higher than 90% for all sky conditions, being more accurate the low-cost camera in some particular situations.

Biography

Joaquín Alonso-Montesinos has completed his PhD from the University of Almería, Spain and Post-doctoral studies from the same University. He is member of a research group 'Solar Energetic Resources, Climatology and Atmospheric Physics' at the University of Almería. He has published more than 10 papers in reputed journals, has authored and coauthored different conference papers, both national and international, and has participated in different projects related to solar radiation. Furthermore, he is serving as reviewer in different impact journals.

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