

Solar irradiance estimation from full sky polarization imaging

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Ground-based whole-sky cameras equipped with fish-eye lenses capture hemispherical images of the sky, providing a comprehensive view of atmospheric conditions. They are extensively used for the localized monitoring of clouds. Sky images contain information about cloud coverage and can be used to derive cloud movement.

In this work, we leverage the unique capabilities of ground-based whole-sky cameras equipped with and without polarization-sensitive sensors to understand and predict solar irradiance availability. Analysis of hemispherical color images of the sky at regular intervals using a fish-eye lens cameras and an a full-range field portable spectroradiometer will be shown. The spectroradiometer provides an accurate measurement of hyperspectral downwelling irradiance, covering 350 nm to 2500 nm range. The work will examine the solar irradiance estimation using solely those images as a first step towards a short-term forecasting of downwelling irradiance based on cloud movement.

References

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