



Fish-eye cameras: a new meteorological instrument of high potential for meteorology and energy

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In recent years, the scientific community in solar energy and meteorology has published many papers describing various usages of time series of hemispherical images of the sky acquired by fish-eye cameras.

Without being exhaustive, in the domain of solar energy, these fish-eye cameras have been used for short-term solar forecasting, pyranometric measurements, sky radiance, sunshape and aerosol optical depth estimations. For meteorology purposes, they have been used for cloud fraction estimation, cloud type classification and cloud velocity and base height estimations, the latter with two or more fish-eye cameras in stereoscopic mode. Olivier Boucher won the Harry Otten prize for innovation in meteorology, in 2015, by using fish-eye cameras to measure high altitude atmospheric wind and humidity, observing changes in aircraft contrails.

The diversity, the innovation and the promising results presented in these papers combined with their availability at relatively low cost, their ease to setup and their robustness in operation make these fish-eye cameras fully-fledged meteorological instruments of very high potential.

To promote this new meteorological instrument, an international initiative must be launched, comprising research institutions and industries, whose aims will be

- a review of existing fish-eye cameras with standardized key characteristics (angular resolution, radiometric dynamic and noise, etc.)
- publishing guidelines for the setup, the calibration, the operation and maintenance,
- describing case studies and best practices for solar energy and meteorology applications,
- defining reference databases of hemispherical sky images and associated meteorological variables for benchmarking purposes,
- drafting a new dedicated chapter in the part “Observing systems” in the guide to meteorological instruments and methods of observation of the WMO.

This international action may be supported by a COST Action –European Operation in Science and Technology– and the proposed keynote is a first call to stakeholders for the creation of a dedicated network.