



Solar PV Nowcasting based on multiple Skycamera Observations

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In recent years the installation of PV systems has increased dramatically in many countries around the globe. Annual global installed power has already reached about 400 GW. Also in Austria the percentage of solar energy within the power system is constantly increasing and has reached about 1 GW in 2016. A major challenge for operators is that PV system output is highly fluctuating due to cloud movements and other atmospheric influences. Forecasting of solar irradiation and PV power on different time scales will therefore become more and more important for different users. In particular, grid operators need PV power output forecasts for stabilizing the grid, PV power plant operators can apply forecast information for energy trading, and residential users can use solar forecast information for energy management and efficient battery storage usage of their homes. As part of the Austrian PV-go-Smart project several skycameras have been installed in the region of Upper Austria. Since 2015, a meteorological skycamera is operated in Wels, Austria, that takes images on a 30 second interval. In 2018 several different low-cost fisheye cameras have been installed and tested. In this paper we show results of global irradiation and PV power forecasts for different types of skycams. Differences and advantages of various skycams and their image qualities are presented. Algorithms for the detection of clouds, cloud movement, and GHI forecasting have been developed and validated with ground observation at the Wels site. We will present latest results of algorithm improvements for GHI and PV power forecasting and validation. Also, error sources for irradiance forecasting such as raindrops on the camera surface will be elaborated.