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Multi-resolution analysis of high density spatial and temporal cloud inhomogeneity fields from HOPE campaign

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Clouds are the most complex structures in both spatial and temporal scales of the Earth's atmosphere that effect the downward surface reaching fluxes and thus contribute to large uncertainty in the global radiation budget. Within the framework of **H**igh Definition Clouds and Precipitation for advancing Climate Prediction (HD(CP)^2) **O**bservational **P**rototype **E**xperiment (HOPE), a high density network of 99 pyranometer stations was set up around Jülich, Germany ($\sim 10 \times 12$ km^2 area) during April to July 2013 to capture the small-scale variability in cloud induced radiation fields at the surface. In this study, we perform multi-resolution analysis of the downward solar irradiance variability at the surface from the pyranometer network to investigate the dependence of temporal and spatial averaging scales on the variance and spatial correlation for different cloud regimes. Preliminary results indicate that correlation is strongly scale-dependent where as the variance is dependent on the length of averaging period. Implications of our findings will be useful for quantifying the effect of spatial collocation while validating the satellite inferred solar irradiance estimates, and also to explore the link between cloud structure and radiation. We will present the details of our analysis and results.