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Quality assurance of in-situ measurements of land surface albedo: A model-based approach

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This paper presents the development of a model-based framework for assessing the quality of in-situ measurements of albedo used to validate land surface albedo products. Using a 3D Monte Carlo Ray Tracing (MCRT) radiative transfer model, a quality assurance framework is built based on simulated field measurements of albedo within complex 3D canopies and under various illumination scenarios. This method provides an unbiased approach in assessing the quality of field measurements, and is also able to trace the contributions of two main sources of uncertainty in field-measurements of albedo; those resulting from 1) the field measurement protocol, such as height or placement of field measurement within the canopy, and 2) intrinsic factors of the 3D canopy under specific illumination characteristics considered, such as the canopy structure and landscape heterogeneity, tree heights, ecosystem type and season.