

Comparison of the simulated the canopy scale sun-induced chlorophyll fluorescence and satellite-based SIF measurements in northern high latitudes

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Recent studies show that the terrestrial plant canopy sun-induced chlorophyll fluorescence (SIF) can be observed from satellites and the several SIF products have been produced. The potential application of these new products is being investigated. In this study, we performed a canopy and leaf level radiative transfer simulation to understand how leaf-level SIFs from sunlit and shaded leaves contribute to the canopy scale SIF that is observed by satellites. We also investigated how the sunlit and shaded SIF contributions varied with the observed angles. The results showed the large variations in sunlit and shaded leaf contribution regarding the observation angles. In particular, the SIF observation near the solar disc contains more sunlit leaf SIF information. We also found that the SIF emission after multiple scattering within canopy cannot be negligible.