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# The effect of vapor pressure deficit on the carbon-water coupling based on solar-induced chlorophyll fluorescence

Nan Shan
NJU, ESSI, ESSI, China (nshan@nju.edu.cn)

The effect of vapor pressure deficit on the carbon-water coupling based on solar-induced chlorophyll fluorescence Stomatal conductance governs plant water use and carbon uptake and is fundamental to larger-scale regional prediction of carbon-water cycle and their feedbacks to climate change. However, the nonlinear effect of vapor pressure deficit (VPD) on carbon-water coupling induces large uncertainty in modeling the stomatal conductance. In this study, we propose a new pathway to model the stomatal conductance at the subdaily time scale and this hysteresis model minimize time lags among stomatal conductance (gs), solar-induced chlorophyll fluorescence (SIF) and VPD, even though under the water stress situation. Half–hourly data were used to validate our model for forest, crop and grass ecosystems. Correlation analysis shows that the gs and SIF relationship is better after adding their influence factor of VPD. Our results suggest the potential use of remotely-sensed SIF for estimating stomatal conductance and plant transpiration.