Responses to comments: our replies are all in magenta color.

Dear,
We would like to thank you for taking your time again to assess our work and more importantly for your useful comments, remarks and suggestions. We tried to answer to your questions.

Responses to Reviewer 1:

The revised version of the manuscript did have some improvement in some aspects. However, the authors' two main problems remain without an answer: the first one is the forcing of linear relation between the SIFd and GPP data. As the data demonstrated, in most of the sites at the high SIFd values (>~0.5) the GPP is already saturated. Referring it as a linear relation (even though what the authors actually have is a correlation…), is problematic. A simple plot of the observed data residuals over the fitted line will demonstrate it. The authors have many ways to solve this issue: normalize the values to get linear correlation, fit another equation to the data or even simply try to explain why they prefer to describe it as a linear regression, but they did not do it. The title of the work is talking about "…understanding the dynamics of gross primary productivity…", however the work doesn't try to understand this dynamic. In my opinion, analysing the sites or PFT real SIF-GPP dynamic (not always linear) can improve this paper.

This was added to page 6, line 185-192: "We used a hyperbolic model to relate GPP to SIF_d following Damm et al. (2015). This hyperbolic model approximates only the data behaviour and supports the theoretical argument that GPP saturates at moderate and high SIF_d level: $GPP = a \times \frac{SIF_d}{SIF_d + b}$; where a and b are fitted parameters. It is worth noting that a linear model between GPP and SIF_d was also investigated, and the results are provided in supplementary materials. Before relating GPP to SIF_d using this hyperbolic model at each site, SIF values equal or less than zero were discarded. Afterward, the same model was fitted on PFT scale by pooling all data across all sites for the same PFT."

This was added to page 7, line 231-232: "evaluate the strength of the relationships between tower-based GPP and SIF_d encompassing different vegetation types at site level. To do so, a hyperbolic model was used to relate GPP to SIF_d at each site."

This was added to page 7, line 233-234: "Overall, the results revealed a hyperbolic relationship with relatively saturating GPP in presence of moderate to high SIF_d."

This was added to page 7, line 236-240: "The strongest relationships were found at DK-Sor, FR-Fon, DE-Tha, SE-Nor and BE-Bra, which are DBF, ENF and MF vegetation type sites, with R^2 values being between 0.64 and 0.87 (p<0.0001). The weakest relationships were recorded at FI-Var, FR-EM2 and DE-RuW sites, and no significant relationship was found at GF-Guy, IT-Cp2 and FR-Mej."

This was added to page 7, line 242-245: "Note that the independent assessment considering the linear model to relate SIF_d to GPP at each site, and each PFT and on data pooled across all sites revealed a relatively consistent lower goodness of fit, justifying the use of a hyperbolic model (see Supplementary Material Tab S4 and S5, Figures S1, S2 and S3)."

This was added to page 8, line 251: "The black dotted line represents the hyperbolic fit between GPP and SIF_d."

This was added to page 9, line 252-254: "the hyperbolic relationship between GPP and SIF_d was strongest for OSH, DBF and MF, with R^2 of 0.61, 0.59 and 0.52, respectively, and the lowest for EBF with R^2 of 0.06. This result suggests that the relationships between GPP and SIF_d…"

This was added to page 10, line 275-277: "These findings support that the GPP and SIF_d relationship is considerably influenced by the site PFT and the interannual variations in SIF_d."

This was added to page 15, line 372-373: "However, the hyperbolic fit between tower-based GPP and SIF_d vary significantly across sites, which suggests a site-specific relationship."

This was added to page 15, line 387-394: "Furthermore, these results are also in good agreement with several studies carried out with instantaneous ground-based measurements at different vegetation types, sites and locations (Kim et al., 2021, Damm et al., 2015; He et al., 2020, Gu, Han, et al., 2019). For instance, Kim et al. (2021) pointed out that a hyperbolic model could explained better the relationships between GPP and SIF in an evergreen needle forest and Damm et al. (2015) showed similar results in croplands, mixed temperate forests and grassland vegetation types. One of the most plausible explanations is that GPP might reach saturation at high light, while SIF tends to keep increasing with PAR. It is also paramount to mention that the saturation of optical signal is a common issue in remote sensing, which can explain part of the lower relationships found in the EBF sites."

This was added to page 15, line 396-399: "Yet, the hyperbolic relationships between GPP and SIF_d vary considerably across PFT, suggesting a PFT-specific relationship. The relationship between GPP and SIF_d is driven by the ratio of canopy photosynthesis and fluorescence yield, along with the canopy escape probability fraction of SIF photons from canopy to sensor "

………
………

Responses to reviewer 2:

Dear Dr. Mukund Palat Rao,
We would like to thank you for taking your time again to evaluate our work and foremostly for your interesting comments, remarks and suggestions so far.
We integrated your structural and grammatical suggestions into the manuscript (all answers and changes are in magenta color).

Page 6, Line 190 & Page 9 Line 267 Generalizability and not genericity

Page 6, line 190 & page 9 Line 267 'genericity' has changed to "generalizability"

Tab S3, the caption "NIR denotes for near-infrared, SWNIR for shortwave near-infrared, SWIR shortwave infrared, and VNIR visible near-infrared." Is not needed for this table. It is however needed for Table S2 instead.

Tab S3, caption "NIR denotes for near-infrared, SWNIR for shortwave near-infrared, SWIR shortwave infrared, and VNIR visible near-infrared." Has transferred to Tab S2.

NB: It is worth noting that the order number of the figures and Tables has changed in the supplementary material and all changes are underlined in magenta color.

Some others minor modifications were made by rereading the MS:

This was added to page 1, line 27-29: "The synergy between SIF_d and MODIS based reflectance (R) and VIs to improve GPP estimates using a data-driven modelling approach was also evaluated."

This was added to page 1, line 32-33: "Using Random Forest Regression models (RF) with GPP as output and the aforementioned variables as predictors (R, SIFd and VIs),…"

This was added to page 1, line 36: "the relative variable importance of predictors of GPP…"

This was added to page 4, line 134: "located in French Guiana."

This was added to page 11, line 315: "even if the R^2 remain statistically significant at 5% probability level"

In page 15, line 368 "**Strength of the linear relationship between GPP and SIF$_d$ at site level and PFT scale**" was changed to "**Strength of the relationship between GPP and SIF$_d$ at site and PFT levels**"

In page 16, line 434 "**Synergy between SIF, surface spectral reflectance, and reflectance based-indices for estimating GPP using Random Forest**" was changed to "**Synergy between SIF$_d$, R and VIs for estimating GPP using Random Forest**"