



Supplement of

Assessing the sensitivity of multi-frequency passive microwave vegetation optical depth to vegetation properties

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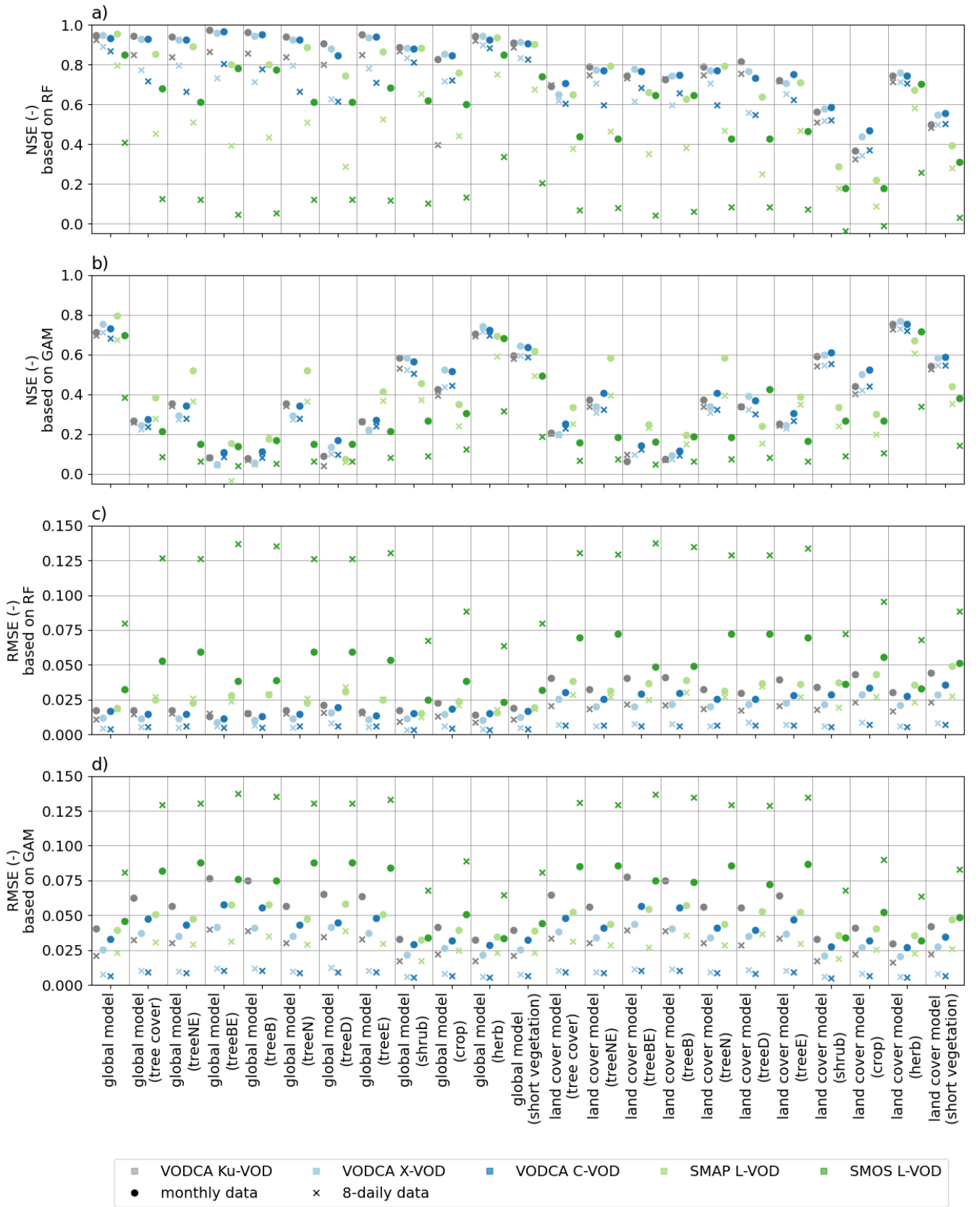


Figure S1: Performance (NSE: a/b), RMSE: c/d) of the random forest (RF, a/c) and generalized additive models (GAM, b/d) in predicting VOD of different wavelengths on an 8-daily (crosses) and monthly data basis (circle). The global model uses PFTs as predictors, contrary to the land cover-specific models, which were calibrated and applied only to the spatial extent of a certain dominant land cover class. ‘Global model (land cover)’ uses results of the global model, but filtered by dominant land cover class.

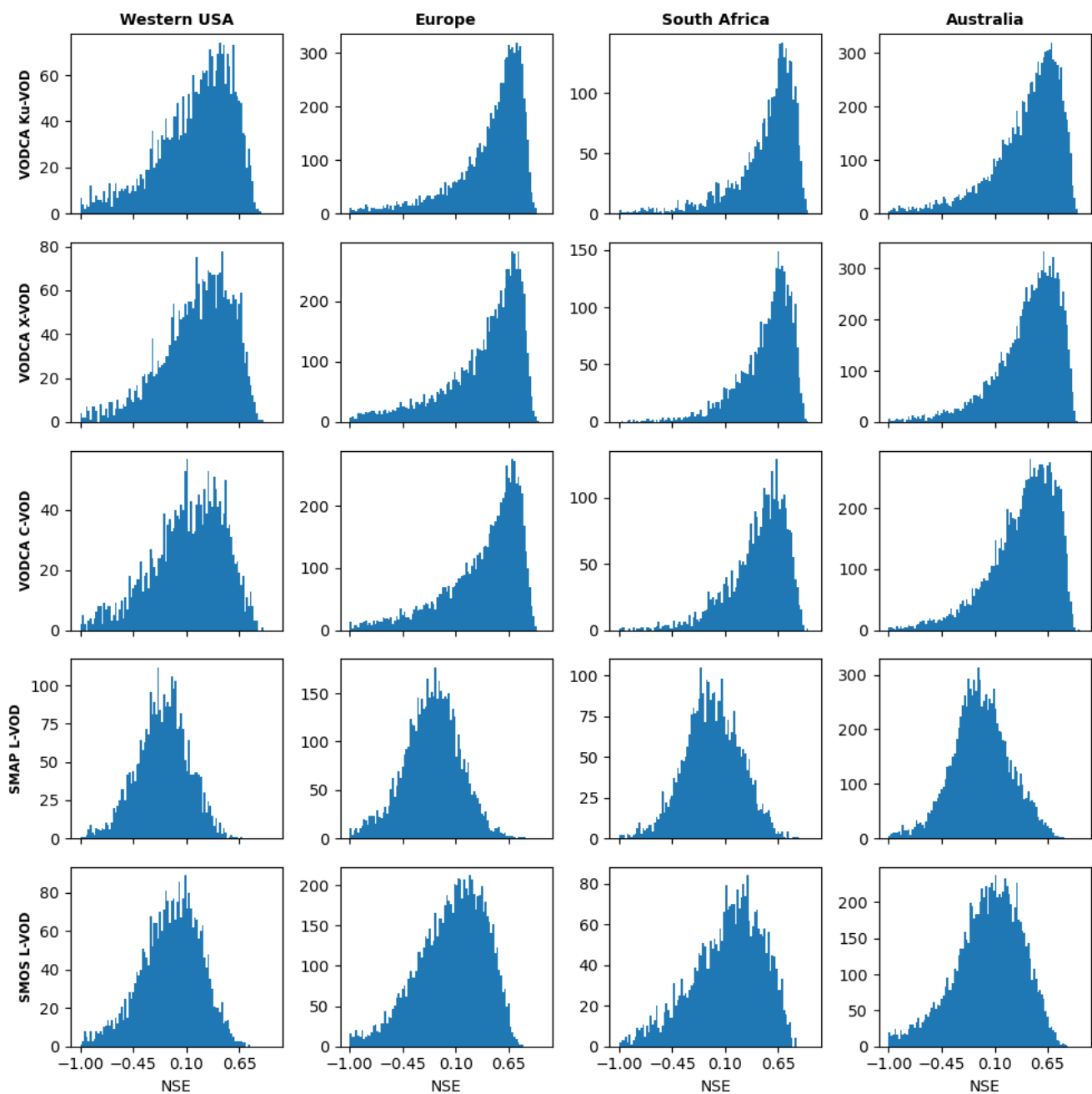


Figure S2: Histograms of the performance (NSE) of the global random forest model based on monthly values per pixel (i.e. of the time series per pixel) for the four regions (columns) and VOD dataset (rows)

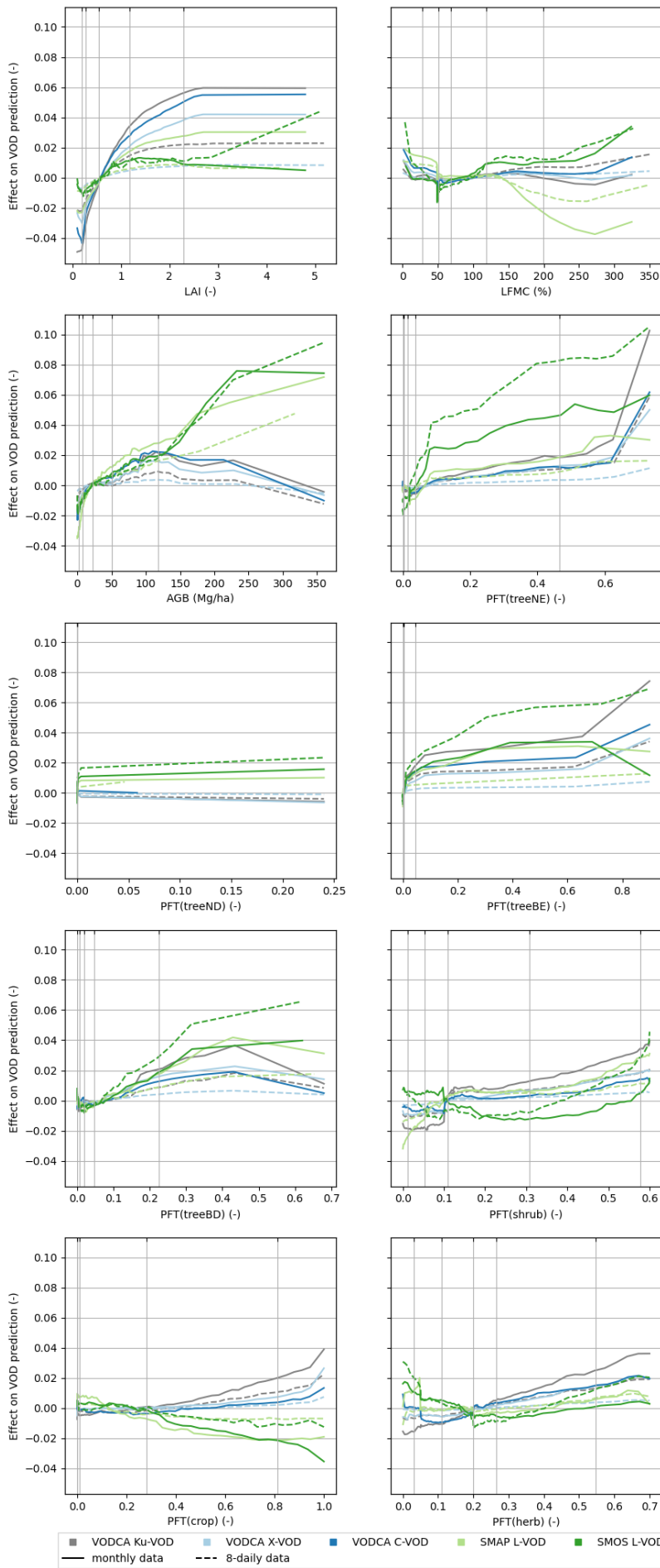
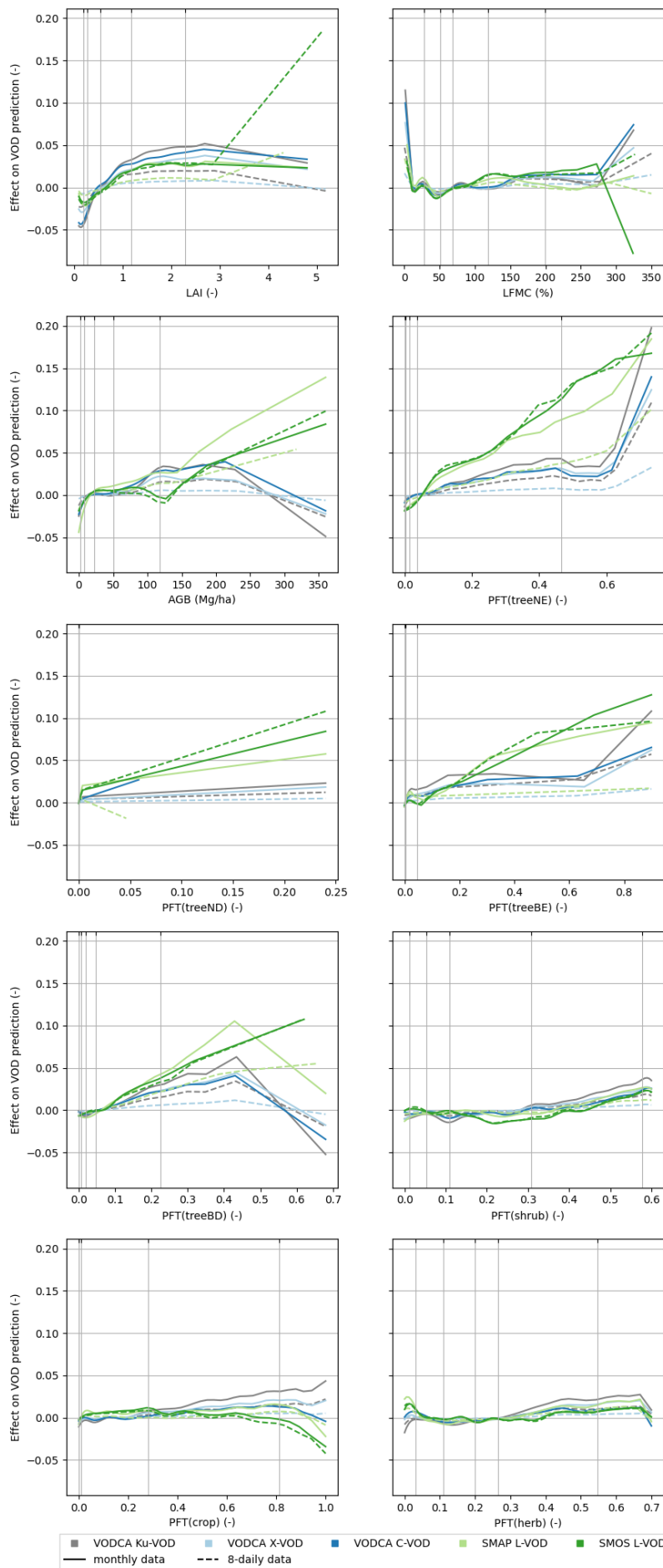


Figure S3: ALE plots of normalised VOD to ecosystem properties based on the global monthly or 8-daily RF model for all predictors with PFT = plant functional type, N = needleleaf, B = broadleaf, E = evergreen, D = deciduous. Vertical lines indicate the quantiles of the data sample size 0.05, 0.25, 0.5, 0.75 and 0.95, respectively.



15 **Figure S4: ALE plots of normalised VOD to ecosystem properties based on the global monthly or 8-daily GAM model for all predictors with PFT = plant functional type, N = needleleaf, B = broadleaf, E = evergreen, D = deciduous. Vertical lines indicate the quantiles of the data sample size 0.05, 0.25, 0.5, 0.75 and 0.95, respectively.**

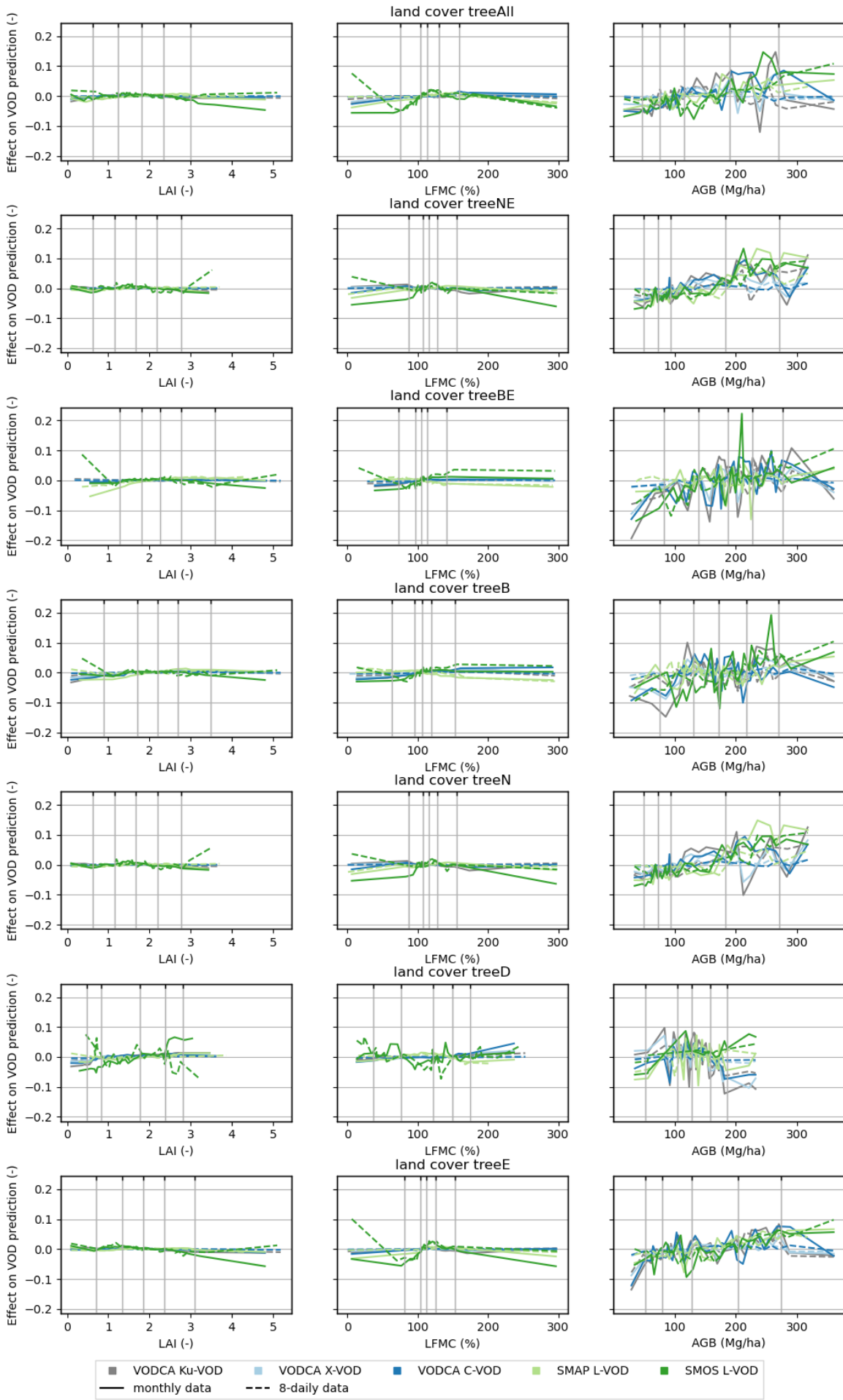


Figure S5: ALE plots of normalised VOD to ecosystem properties based on the land cover-specific monthly or 8-daily RF models for tree land covers. Vertical lines indicate the quantiles of the data sample size 0.05, 0.25, 0.5, 0.75 and 0.95, respectively.

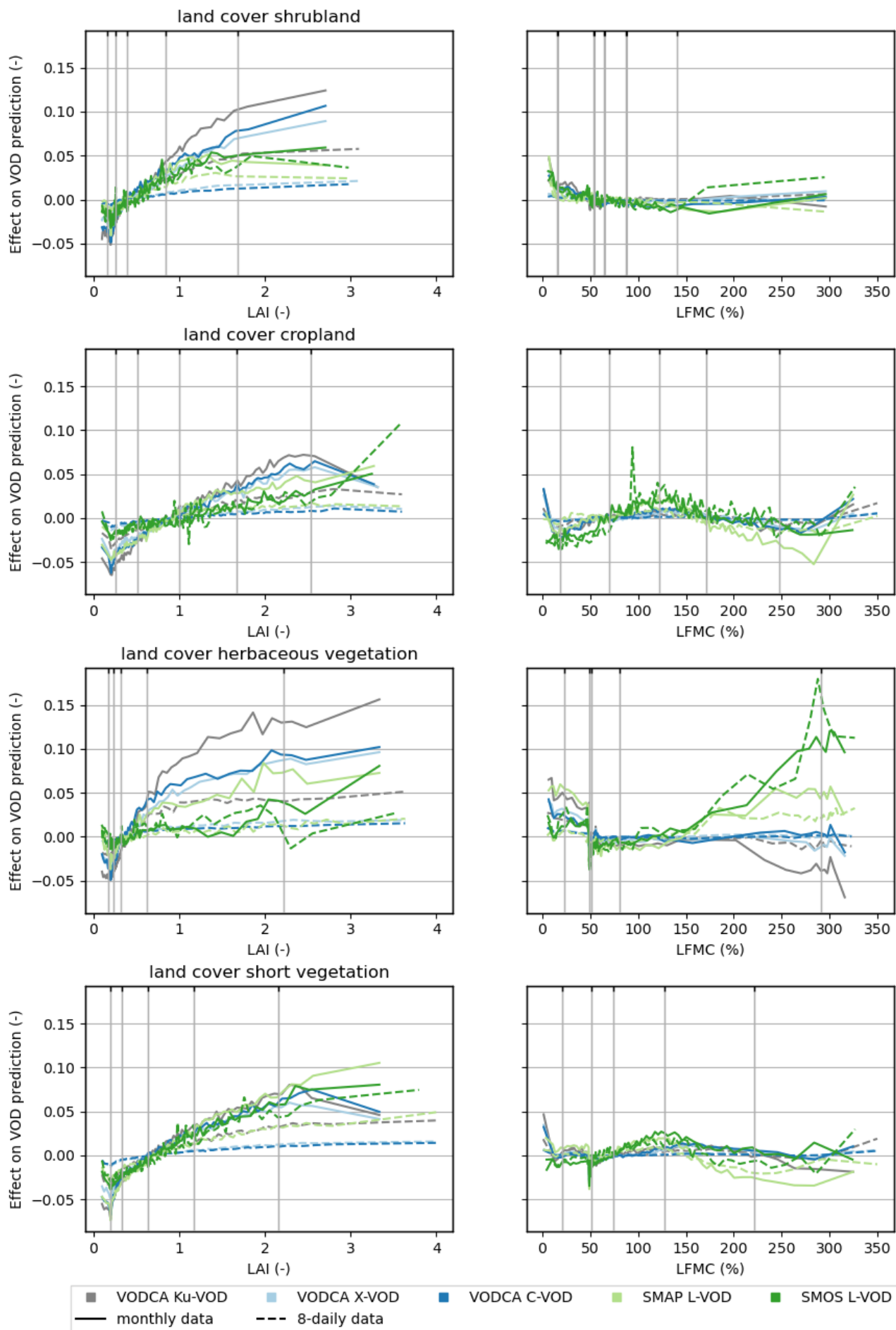
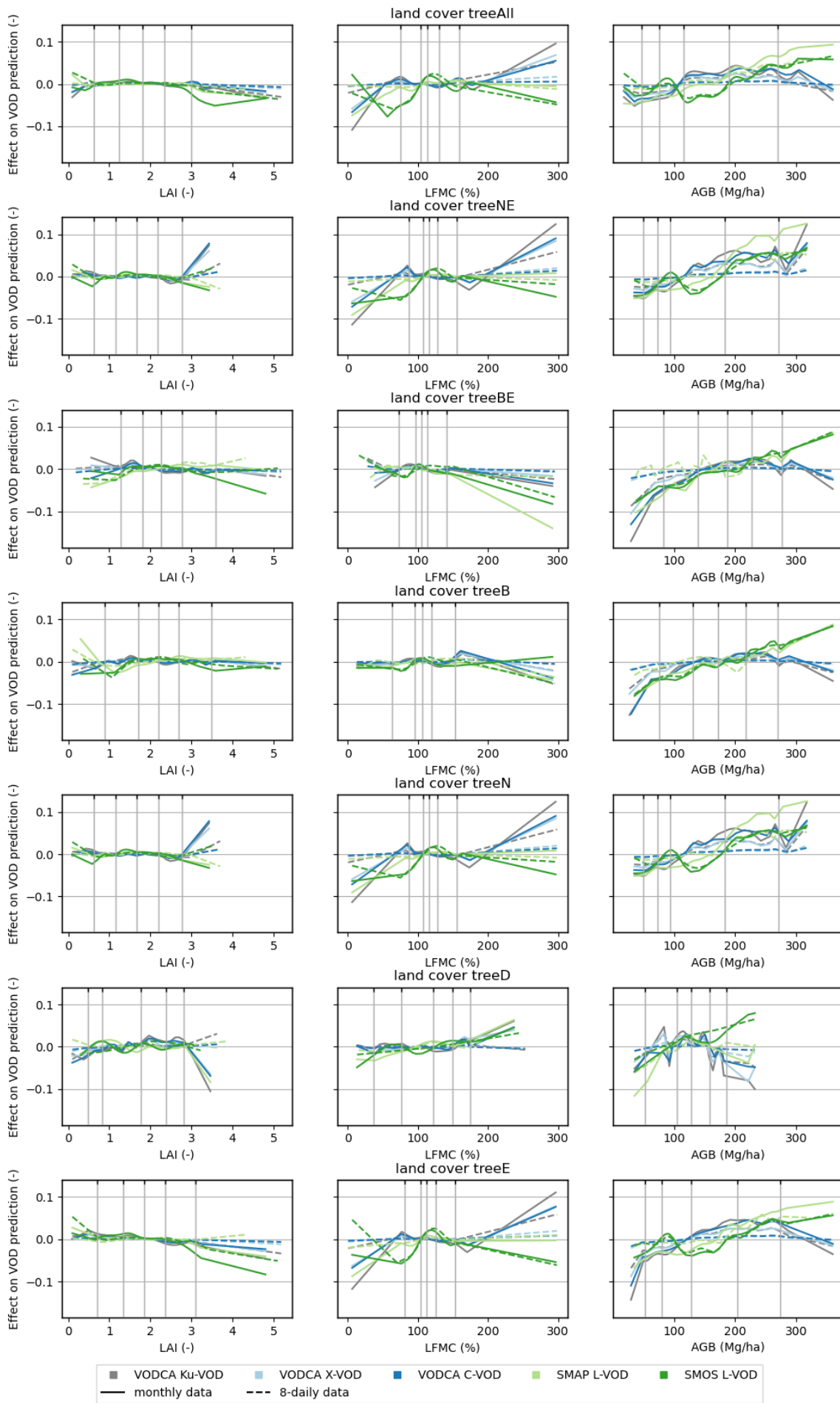


Figure S6: ALE plots of normalised VOD to ecosystem properties based on the land cover-specific monthly or 8-daily RF models for short vegetation land covers. Vertical lines indicate the quantiles of the data sample size 0.05, 0.25, 0.5, 0.75 and 0.95, respectively.



25 **Figure S7: ALE plots of normalised VOD to ecosystem properties based on the land cover-specific monthly or 8-daily GAM models for tree land covers. Vertical lines indicate the quantiles of the data sample size 0.05, 0.25, 0.5, 0.75 and 0.95, respectively.**

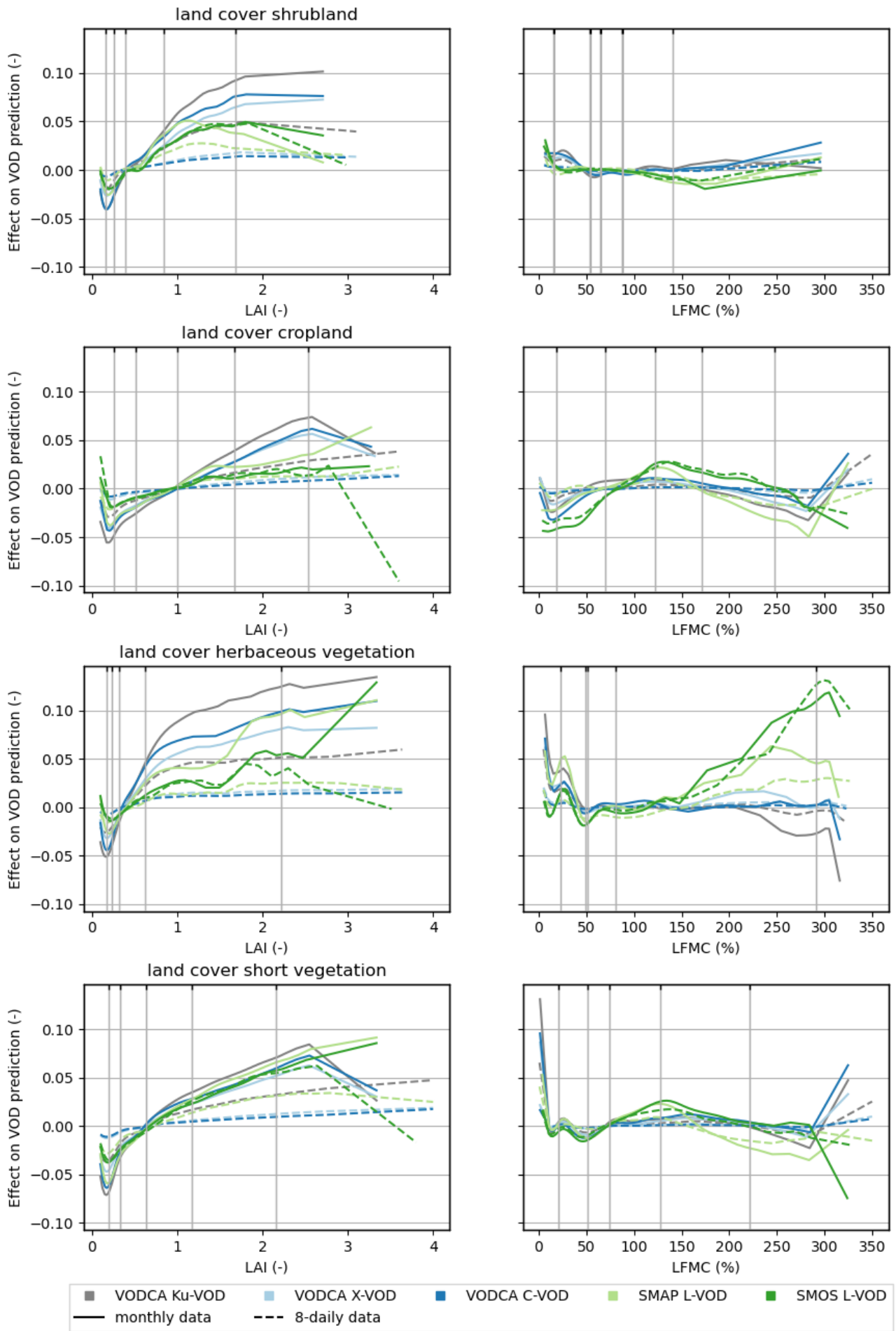


Figure S8: ALE plots of normalised VOD to ecosystem properties based on the land cover-specific monthly or 8-daily GAM models for short vegetation land covers. Vertical lines indicate the quantiles of the data sample size 0.05, 0.25, 0.5, 0.75 and 0.95, respectively.