

Estimating high spatiotemporal terrestrial carbon flux by using geostationary and polar-orbiting satellites: CArbon Simulator from Space (CASS)

Background

- plant functional type (PFT) dependent variables can lead to biased result.
- establishment.

Objective

reducing uncertainty and dependence on vegetation classification groups

Method



• The comparing result of CASS and other respiration model (LinT, expT, EVIexpT) also showed the improvement in R^2 , RMSE, especially it fitted well in ENF.

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BLE 1. Perf	formance of VPRM estimated GP	Ρ		
IGBP	IGBP		Correlation	
CODE	Class name	Fluxnet	Coefficient	RMSE
DBF	Deciduous Broadleaf Forests	19	0.69	0.69
ENF	Evergreen Needleleaf Forests	30	0.58	0.57
ble 2. Performance of CASS_V1 estimated GPP				gC m ⁻² h ⁻¹
IGBP	IGBP		Correlation	
CODE	Class name	Fluxnet	Coefficient	RMSE
CRO	Croplands	19	0.464	0.692
CSH	Closed Shrublands	1	0.362	0.531
DBF	Deciduous Broadleaf Forests	19	0.734	0.601
EBF	Evergreen Broadleaf Forests	2	0.544	0.581
ENF	Evergreen Needleleaf Forests	30	0.671	0.507
GRA	Grasslands	23	0.622	0.439
MF	Mixed Forests	4	0.712	0.580
OSH	Open Shrublands	8	-3.747	0.330
WET	Permanent Wetlands	12	-0.017	0.561
WSA	Woody Savannas	2	0.556	0.321
				gC m ⁻² h ⁻¹



- average of absorbing 7.50 tC ha⁻² yr⁻¹

CASS_V1 out(GPP, RECO, NEP) in district scale

- administrative district and the amount of carbon change (NEP).

Conclusion

- structure of VPRM and machine learning methods
- 250m by using data from stationary orbit satellites as input data for the model.
- estimating terrestrial ecosystem flux

When applying CASS_V1 to the metropolitan area in 2019, it was found that during the growing period (4-9 months), GPP ranged from 8.0 to 32.43 and RECO ranged from 17.79 to 22.01, with an

Even during the non-growth period (10-3 months), although GPP had an average of 4.09, the amount of RECO relatively increased to 5.70, indicating carbon emission (tC ha⁻² yr⁻¹).

district with poor vegetation, carbon uptake was only as 0.1 gC m-2 h-1. • A clear positive correlation was found between the proportion of vegetation area in the

In this study, we developed CASS_V1, which shows improved performance compared to existing models by combining the

The model was validated using flux observation data. Particularly, we produced high-resolution space-time data (1 hour,

The CASS, near real time and high spatio-temporal resolution, is expected to be applied in the practical use for "carbon neutral" by