Supplementary Figure Captions

Figure S1. Blue Carbon Ecotones Health Index (EHI). BCE is categorized into three classes (High/Medium/Low) at global and continental scales by the natural breakpoint method. (a)Mangrove; (b)Saltmarsh; (c)Seagrass.

Figure S2. Global map and latitudinal pattern of coastal wetland EHI. EHI is calculated as the sum of Mangroves', Salt marshes', and Seagrasses' EHI.

Figure S3. Pair plots for estimated climate hypervolumes of three blue carbon ecotones in Africa. (red:mangrove; blue:seagrass; green:salt marsh.) Hypervolumes were constructed using a Gaussian kernel density estimate with the Silverman method. All variables have been log10-transformed. The colored points for each ecotone reflect the stochastic description of each hypervolume.

Figure S4. Pair plots for estimated climate hypervolumes of three blue carbon ecotones in Asia. (red:mangrove; blue:seagrass; green:salt marsh.) Hypervolumes were constructed using a Gaussian kernel density estimate with the Silverman method. All variables have been log10-transformed. The colored points for each ecotone reflect the stochastic description of each hypervolume.

Figure S5. Pair plots for estimated climate hypervolumes of three blue carbon ecotones in Europe. (red:salt marsh; green:seagrass.) Hypervolumes were constructed using a Gaussian kernel density estimate with the Silverman method. All variables have been log10-transformed. The colored points for each ecotone reflect the stochastic description of each hypervolume.

Figure S6. Pair plots for estimated climate hypervolumes of three blue carbon ecotones in North America. (red:salt marsh; green:seagrass.) Hypervolumes were constructed using a Gaussian kernel density estimate with the Silverman method. All variables have been log10-transformed. The colored points for each ecotone reflect the stochastic description of each hypervolume.

Figure S7. Pair plots for estimated climate hypervolumes of three blue carbon ecotones in Oceania. (red:salt marsh; green:seagrass.) Hypervolumes were constructed using a Gaussian kernel density estimate with the Silverman method. All variables have been log10-transformed. The colored points for each ecotone reflect the stochastic description of each hypervolume.

Figure S8. Pair plots for estimated climate hypervolumes of three blue carbon ecotones in South America (red:salt marsh; green:seagrass.) Hypervolumes were constructed using a Gaussian kernel density estimate with the Silverman method. All variables have been log10-transformed. The colored points for each ecotone reflect the stochastic description of each hypervolume.

Figure S9. Global map of mangrove soil organic carbon content.

Figure S10. Pearson correlation coefficient between ecotone health index (EHI) and its determinants. Red represents positive relationships and blue negative, with the color intensity indicating relationship strength. AGB:Aboveground Biomass; SOC:Soil Organic carbon; Pspecies:species pressure; Pland:land pressure; Pclimate:climate pressure; Pmarine:marine pressure; PAR:photosynthetic active radiation; sst:sea surface temperature. (a) Mangrove; (b) Salt marsh; (c) Seagrass.

Figure S11. Relationship between ecotone health index (EHI) and latitude, and linear fit. (a) Mangrove; (b) Salt marsh; (c) Seagrass.

Figure S12. Relationship between soil organic carbon and Mangrove ecotone health index (EHI), and linear fit.

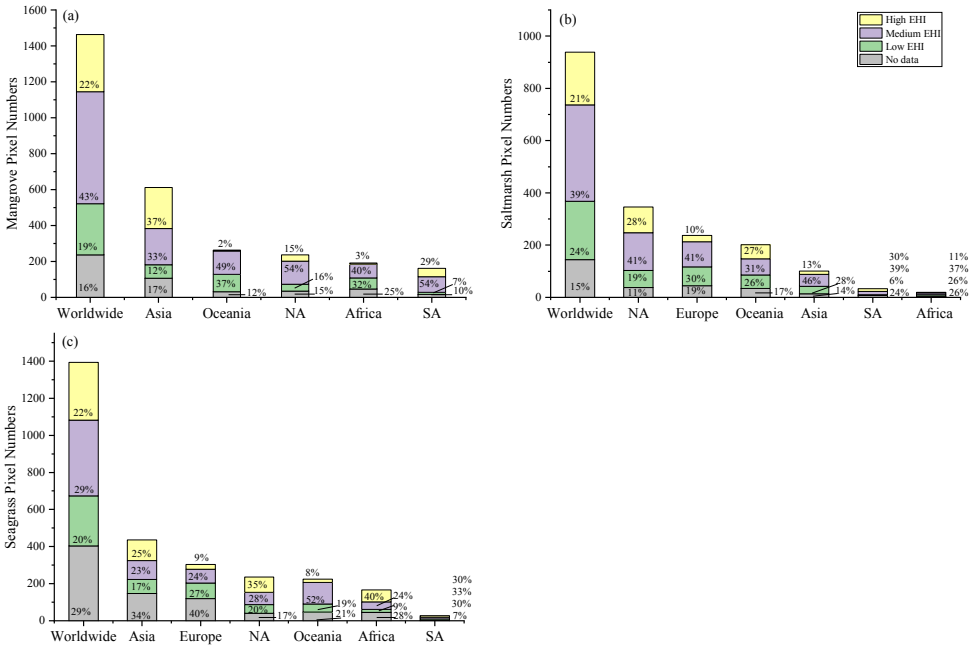
(a)
Mangrove Pixel Numbers
Worldwide
Asia
Oceania
NA
Africa
SA
(b)
Saltmarsh Pixel Numbers
High EHI
Medium EHI
Low EHI
No data
Worldwide
NA
Europe
Oceania
Asia
SA
Africa
(c)
Seagrass Pixel Numbers
Worldwide
Asia
Europe
NA
Oceania
Africa
SA

Figure S1:

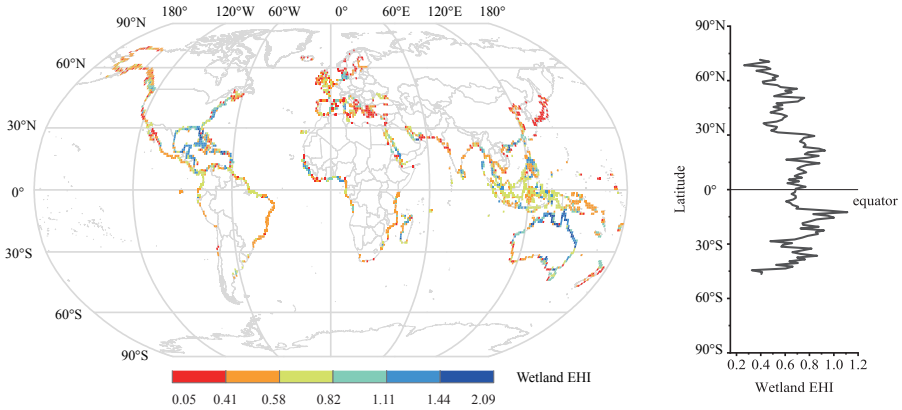
180°
120°W
60°W
0°
60°E
120°E
180°
90°N
60°N
30°N
0°
30°S
60°S
90°S
Wetland EHI
0.05
0.41
0.58
0.82
1.11
1.44
2.09
Latitude
equator
0.2
0.4
0.6
0.8
1.0
1.2
Wetland EHI

Figure S2:

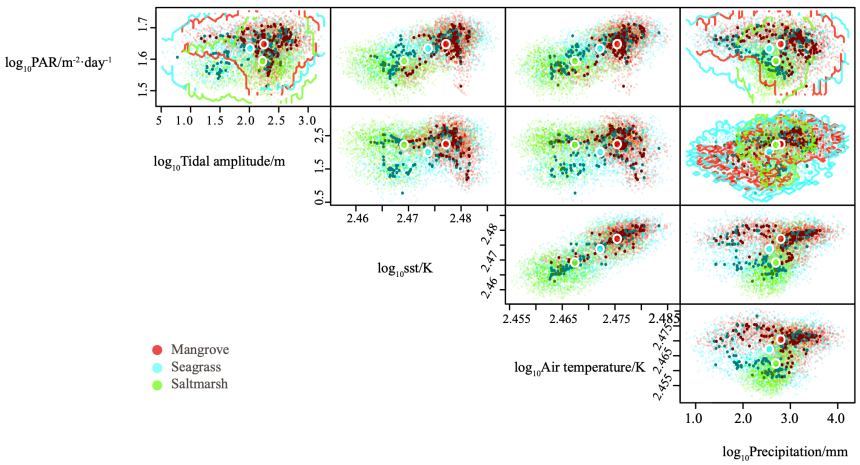
log10PAR/m-2·day-1
log10Tidal amplitude/m
log10sst/K
log10Air temperature/K
log10Precipitation/mm
Mangrove
Seagrass
Saltmarsh

Figure S3:

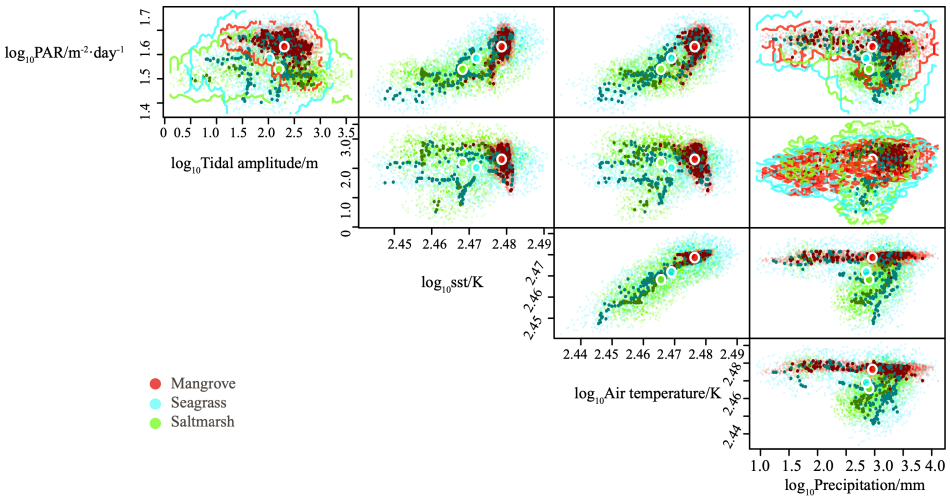
log10PAR/m-2·day-1
log10Tidal amplitude/m
log10sst/K
log10Air temperature/K
log10Precipitation/mm
Mangrove
Seagrass
Saltmarsh

Figure S4:

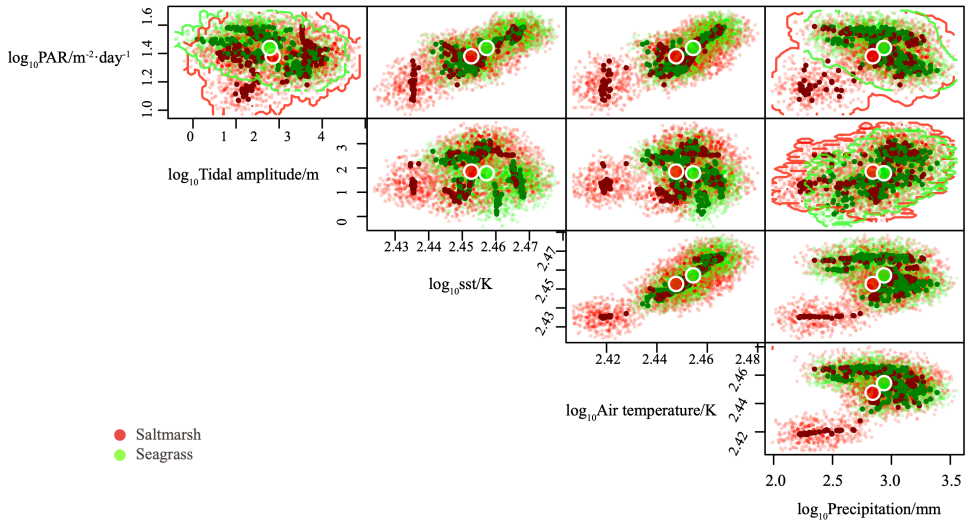
log10PAR/m-2·day-1
log10Tidal amplitude/m
log10sst/K
log10Air temperature/K
log10Precipitation/mm
Saltmarsh
Seagrass

Figure S5:

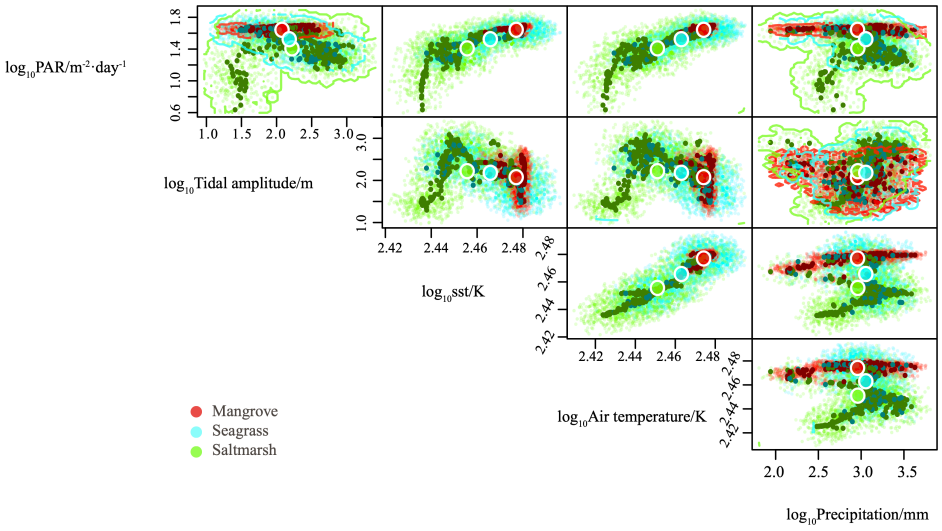
log10PAR/m-2·day-1
log10Tidal amplitude/m
log10sst/K
log10Air temperature/K
log10Precipitation/mm
Mangrove
Seagrass
Saltmarsh

Figure S6:

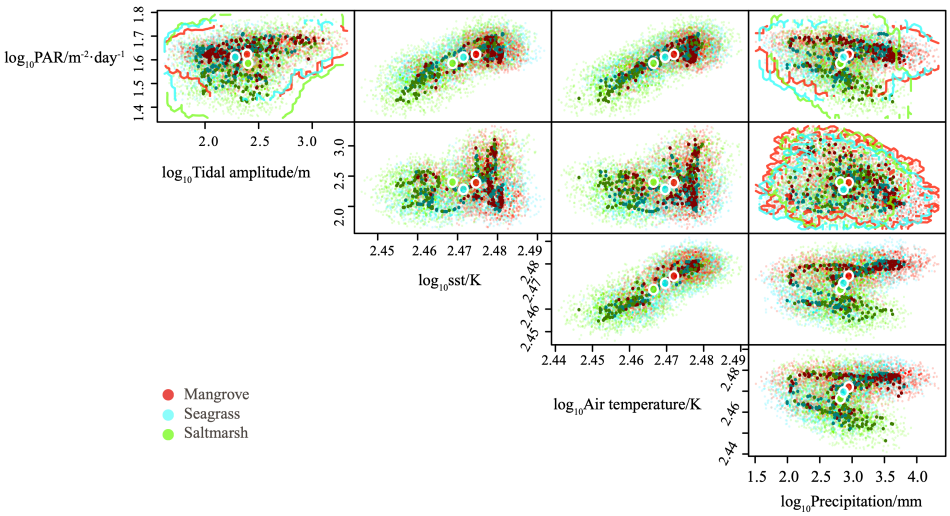
log10PAR/m-2·day-1
log10Tidal amplitude/m
log10sst/K
log10Air temperature/K
log10Precipitation/mm
Mangrove
Seagrass
Saltmarsh

Figure S7:

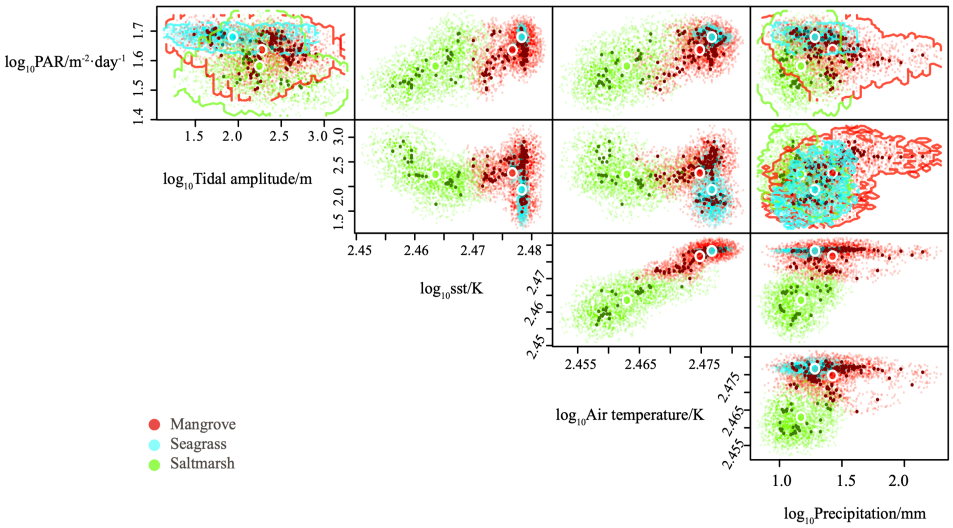
log10PAR/m-2·day-1
log10Tidal amplitude/m
log10sst/K
log10Air temperature/K
log10Precipitation/mm
Mangrove
Seagrass
Saltmarsh

Figure S8:

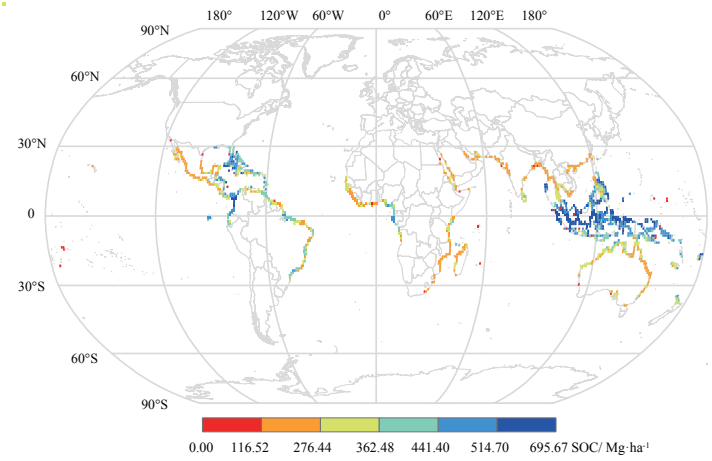
180°
120°W
60°W
0°
60°E
120°E
180°
90°N
60°N
30°N
0
30°S
60°S
90°S
0.00
116.52
276.44
362.48
441.40
514.70
695.67 SOC/ Mg·ha⁻¹

Figure S9:

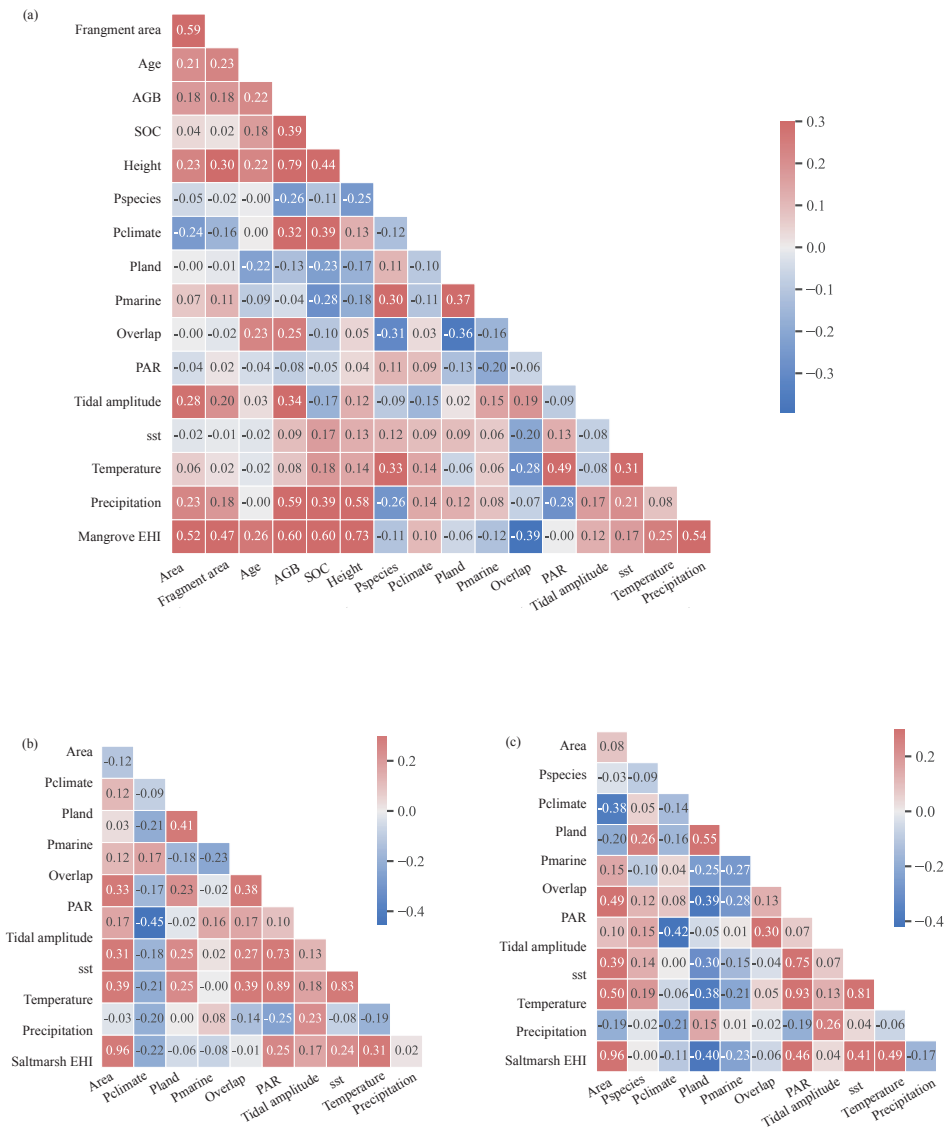
(a)
Frangment area
Age
AGB
SOC
Height
Pspecies
Pclimate
Pland
Pmarine
Overlap
PAR
Tidal amplitude
sst
Temperature
Precipitation
Mangrove EHI
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
(b)
Area
Pclimate
Pland
Pmarine
Overlap
PAR
Tidal amplitude
sst
Temperature
Precipitation
Saltmarsh EHI
0.2
0.0
−0.2
−0.4
(c)
Area
Pspecies
Pclimate
Pland
Pmarine
Overlap
PAR
Tidal amplitude
sst
Temperature
Precipitation
Saltmarsh EHI
0.2
0.0
−0.2
−0.4

Figure S10:

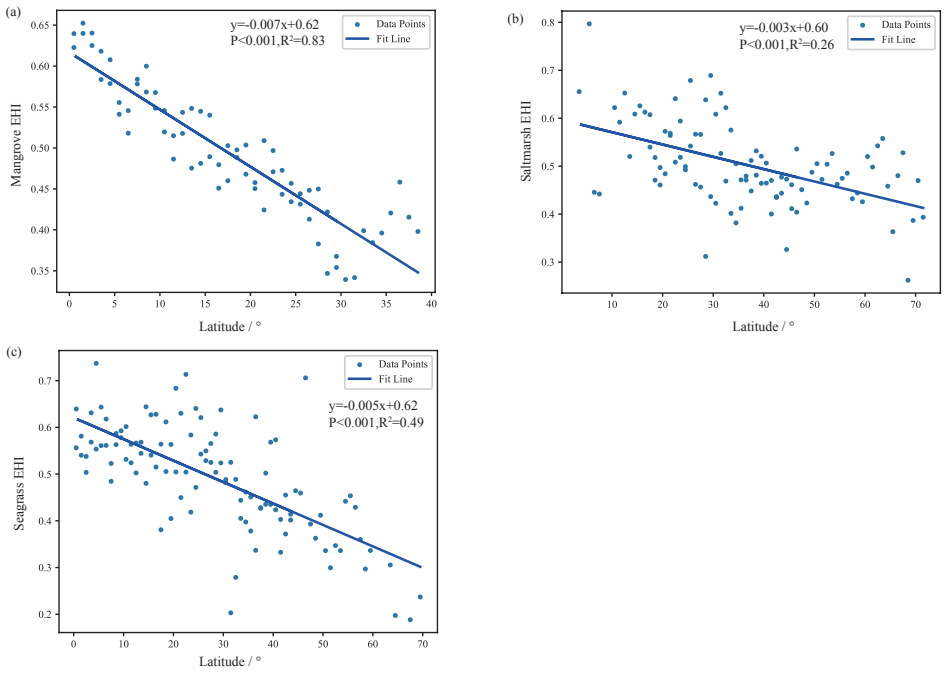
(a)
y=-0.007x+0.62
P<0.001,R²=0.83
Data Points
Fit Line
Mangrove EHI
Latitude / °
(b)
y=-0.003x+0.60
P<0.001,R²=0.26
Data Points
Fit Line
Saltmarsh EHI
Latitude / °
(c)
y=-0.005x+0.62
P<0.001,R²=0.49
Data Points
Fit Line
Seagrass EHI
Latitude / °

Figure S11:

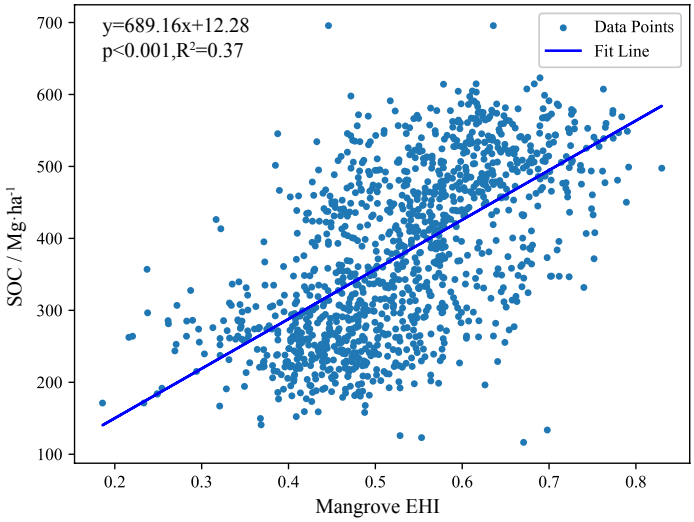
y=689.16x+12.28
p<0.001,R²=0.37
Data Points
Fit Line
SOC / Mg·ha⁻¹
Mangrove EHI
700
600
500
400
300
200
100
0.2
0.3
0.4
0.5
0.6
0.7
0.8

Figure S12: