Supplementary Materials

Table S1. Overall and Factor-Specific Average Vegetation Sensitivity Index (VSI) Across Different Ecosystem Zones of the Qinghai-Tibet Plateau (2000–2023). Where: VSI_mean denotes the average vegetation sensitivity index; VSpre_mean denotes the average precipitation sensitivity index; VSRad_mean denotes the average solar radiation sensitivity index; VStemp_mean denotes the average temperature sensitivity index.

Tibetan Plateau Ecosystem Zone	VSI mean	VSpre mean	VSrad mean	Vstemp mean
IC2	26.54	22.22	21.54	19.81
IIAB1	24.45	17.33	19.62	21.81
IIC2	24.31	18.33	16.69	23.00
IB1	23.40	17.45	20.27	18.79
IID3	22.82	16.64	18.99	19.42
ID1	22.75	15.43	22.05	17.89
IC1	22.16	17.03	22.11	14.90
IID2	19.79	17.51	17.05	13.46
IID1	18.54	17.41	15.14	12.41
IIC1	17.87	15.70	15.33	12.52

Table S2. Temporal trends in overall vegetation sensitivity index (VSI) and average VSI for different factors across various ecosystem zones of the Tibetan Plateau (2000–2023). Where: VSI_mean_trend denotes the temporal trend of the overall mean vegetation sensitivity index; VSpre_mean_trend denotes the temporal trend of the mean vegetation sensitivity to precipitation; VSRad_mean_trend denotes the temporal trend of the mean vegetation sensitivity to solar radiation; VStemp_mean_trend denotes the temporal trend of the mean vegetation sensitivity to temperature.

Tibetan Plateau Ecosystem Zone	VSI mean trend	VSpre mean trend	VSrad mean trend	Vstemp mean trend
IC2	0.044	-0.108	0.555	-0.358
IIAB1	0.060	-0.050	0.065	0.128
IIC2	0.055	0.104	-0.194	0.224
IB1	0.146	0.144	0.286	-0.068
IID3	0.170	0.265	0.071	0.087
ID1	0.255	-0.308	0.783	0.184
IC1	0.189	0.241	0.372	-0.144
IID2	0.195	0.177	0.189	0.122
IID1	0.420	0.676	0.137	0.271
IIC1	0.050	0.042	0.077	-0.010

Table S3. Overall and Factor-Specific Average Vegetation Sensitivity Index (VSI) Along the Altitude Gradient of the Qinghai-Tibet Plateau (2000–2023), grouped by kilometer intervals. Where: VSI_mean_trend denotes the temporal trend of the overall average vegetation sensitivity index; VSpre_mean_trend denotes the temporal trend of average vegetation precipitation sensitivity; VSRad_mean_trend denotes the temporal trend of average vegetation solar radiation sensitivity; VStemp_mean_trend denotes the temporal trend of average vegetation temperature sensitivity.

Elevation	VSI mean	VSpre mean	VSrad mean	Vstemp mean
<3.0	17.12	15.88	15.10	10.86
3.0-3.2	16.87	16.38	14.30	10.47
3.2-3.4	16.88	15.83	14.87	10.57
3.4-3.6	17.90	16.22	15.50	11.90
3.6-3.8	19.06	16.28	16.44	13.60
3.8-4.0	20.15	16.61	17.11	15.09
4.0-4.2	21.14	17.17	17.79	16.17
4.2-4.4	21.45	17.11	17.91	16.83
4.4-4.6	22.25	16.95	18.85	17.96
4.6-4.8	23.62	17.90	20.47	18.65
4.8-5.0	25.55	19.57	21.91	20.02
5.0-5.2	27.58	20.95	23.00	22.19
5.2-5.4	30.31	22.13	23.10	26.98
>5.4	31.95	21.48	21.16	32.95

Table S4. Time trends of the overall and factor-specific average vegetation sensitivity index (VSI) along the altitude gradient of the Qinghai-Tibet Plateau (2000–2023), grouped by kilometer intervals. Where: VSI_mean_trend denotes the time trend of the overall average vegetation sensitivity index; VSpre_mean_trend denotes the temporal trend of the precipitation sensitivity index; VSRad_mean_trend denotes the temporal trend of the solar radiation sensitivity index; VStemp_mean_trend denotes the temporal trend of the temperature sensitivity index.

Elevation	VSI mean trend	VSpre mean trend	VSrad mean trend	Vstemp mean trend
<2.9	0.181	0.188	0.237	0.188
2.9-3.2	0.119	-0.004	0.175	-0.004
3.2-3.5	0.145	0.005	0.228	0.005
3.5-3.8	0.120	0.073	0.134	0.073
3.8-4.1	0.104	0.063	0.131	0.063
4.1-4.4	0.118	0.118	0.146	0.118
4.4-4.7	0.137	0.152	0.176	0.152
4.7-5	0.106	0.070	0.275	0.070
5.0-5.3	0.050	-0.047	0.470	-0.047
5.3-5.6	0.059	0.125	0.429	0.125
>5.6	-0.016	0.092	0.343	0.092

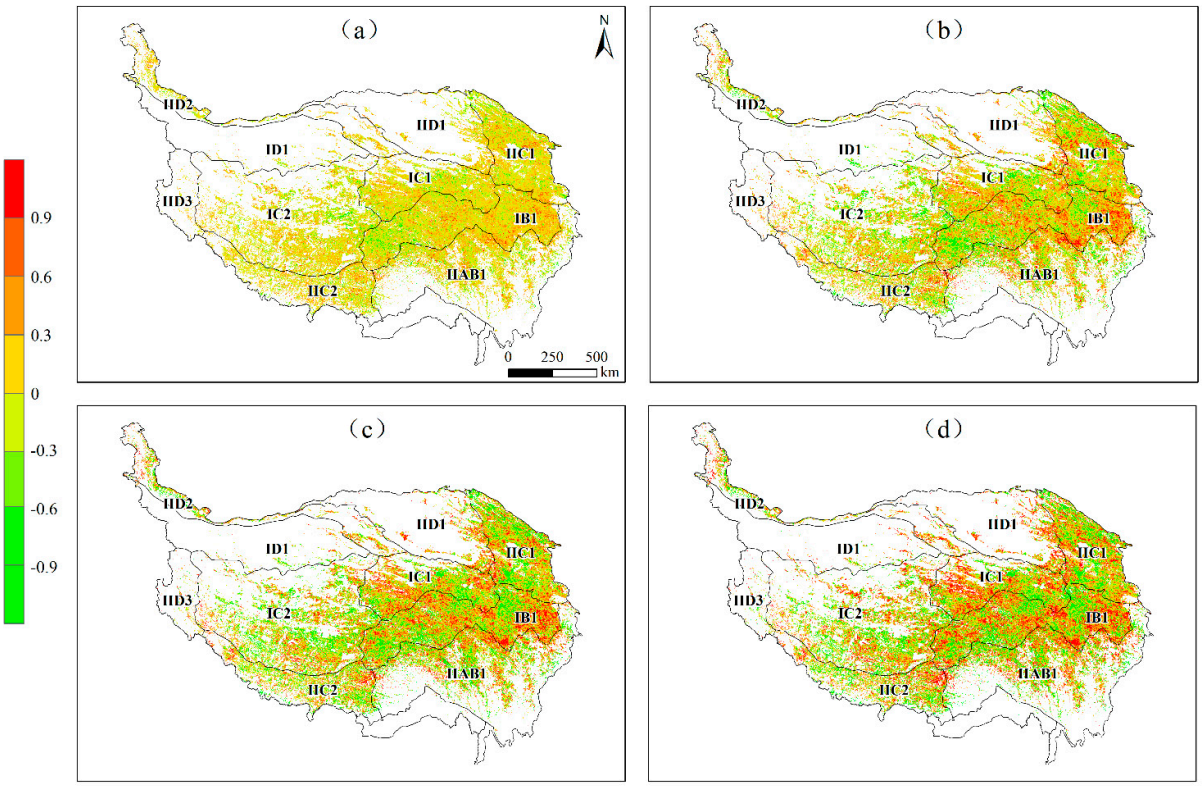


Figure S1. Spatial distribution of mean vegetation sensitivity index (VSI) on the Tibetan Plateau under different moving time windows. (a) 7-year moving window; (b) 9-year moving window; (c) 11-year moving window; (d) 13-year moving window.

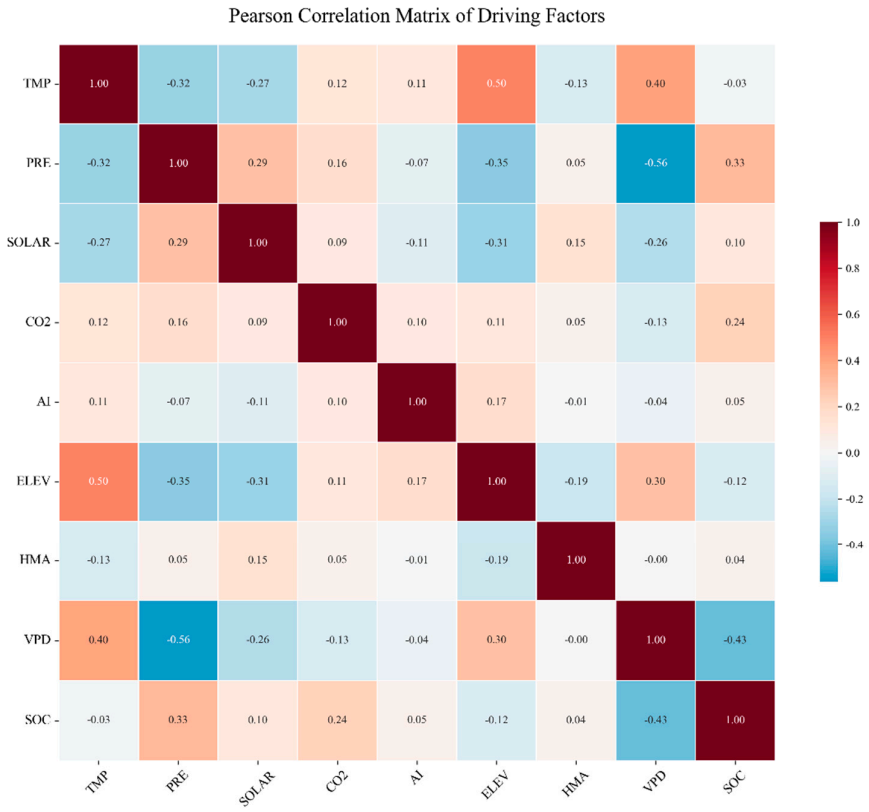


Figure S2. Correlation Matrix Plot of All Variables. Where: TMP denotes Temperature; PRE denotes Precipitation; SOLAR denotes Solar Radiation; CO_2 denotes Carbon Dioxide; AI denotes Aridity Index; ELEV denotes Elevation; HMA denotes Human Activity Intensity; VPD denotes Vapor Pressure Deficit; SOC denotes Soil Organic Carbon.