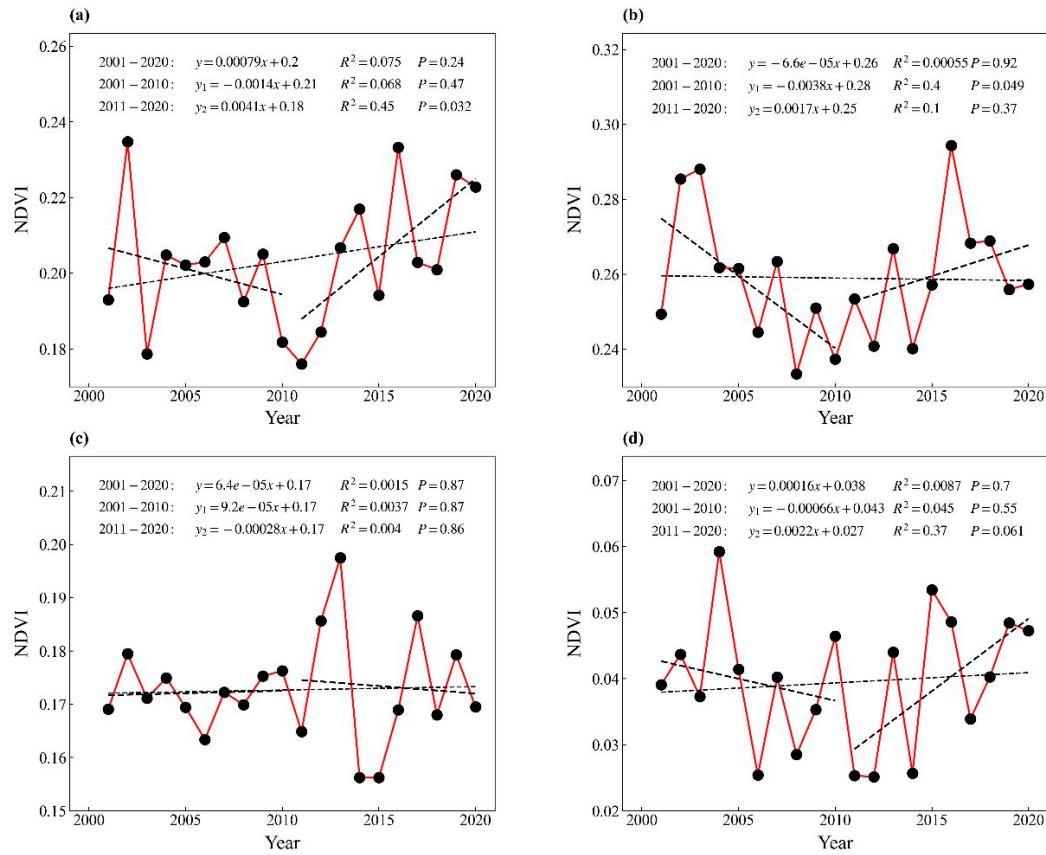
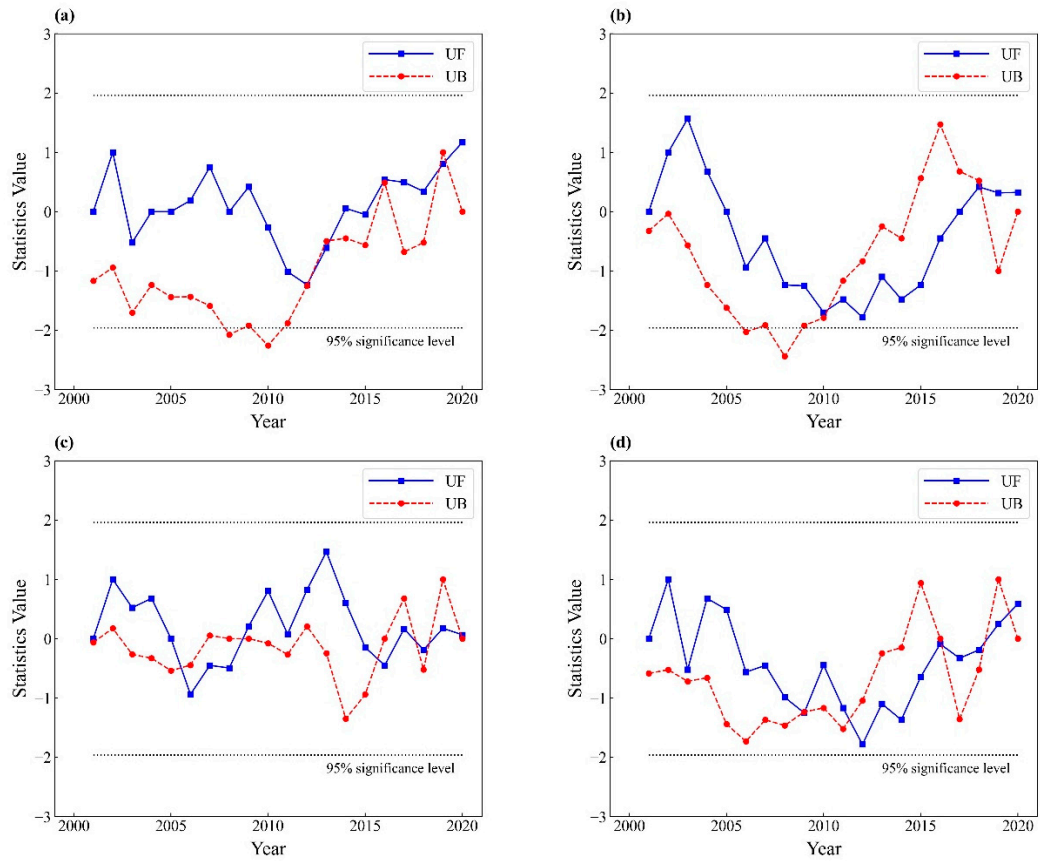


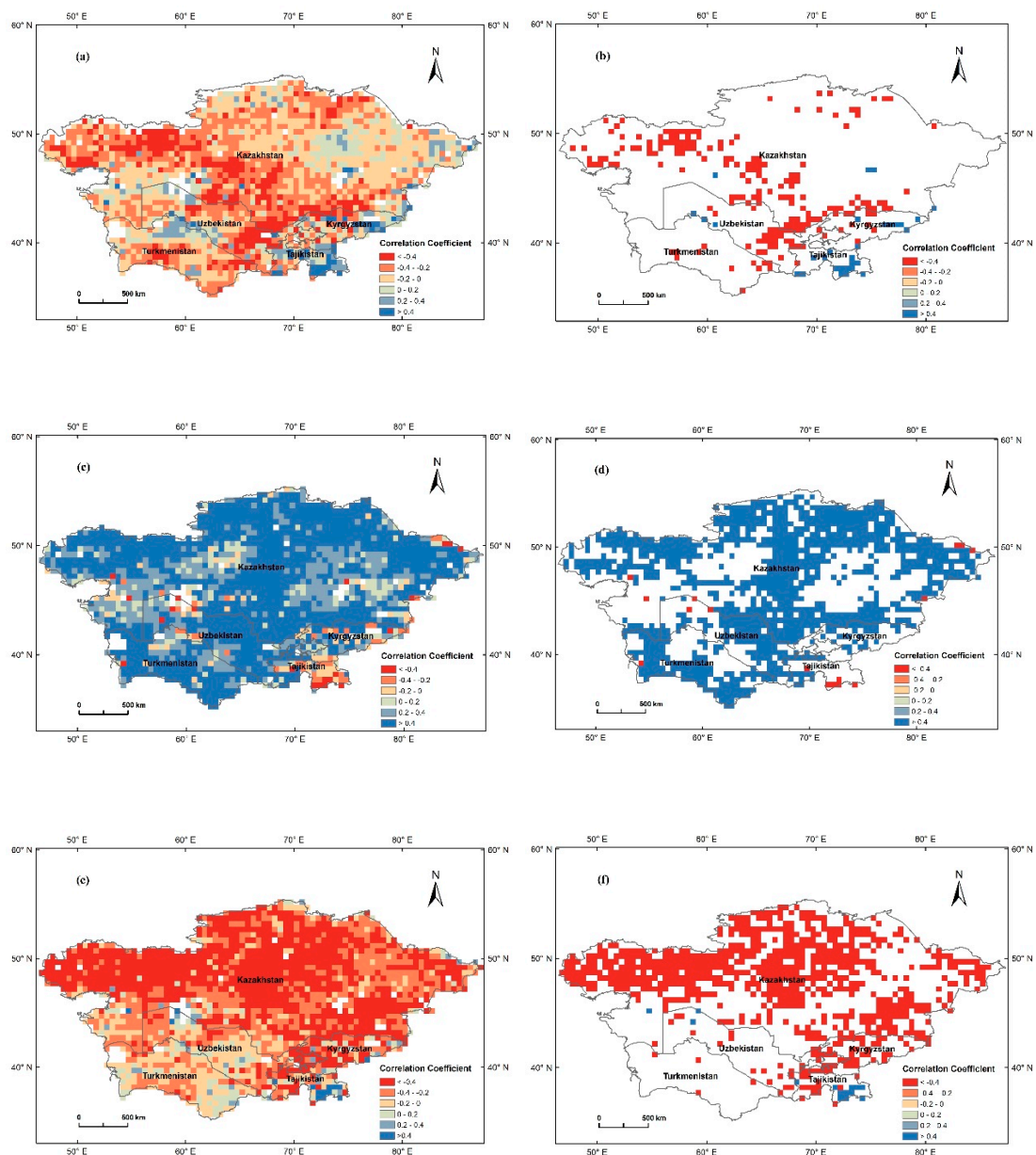
Supplemental Material



Supplementary Figure S1: Seasonal variation of vegetation in Central Asia from 2001 to 2020. (a), (b), (c), (d) represent the spring, summer, autumn, and winter, respectively.



Supplementary Figure S2: Abrupt change point detection for the seasonal NDVI time series. (a), (b), (c), (d) represent the results of spring, summer, autumn, and winter, respectively.



Supplementary Figure S3. Correlation analysis of climate variables and NDVI at pixel level. (a,c,e) represent the correlation of temperature, precipitation and solar radiation, respectively. (b,d,f) represent the significant regions identified by significance test (95%).

Supplementary Table S1. Comprehensive details regarding the data sources for vegetation and the potential driving factors in Central Asia.

Respects	Variables	Abbreviation	Datasets	Time Period	Resolution	Download time
Vegetation	NDVI	NDVI	MODIS13Q1	2001-2020	250m	2021/12
Climate	Wind speed	Ws	TerraClimate	2001-2020	1/24°	2022/5
	Vapor pressure deficit	Vpd				
	Precipitation	Pre				
	Soil water content	Swc				
	Maximum temperature	Tmax				
	Minimum temperature	Tmin				
	Average temperature	Tavg	CRU		0.5°	2022/6
	Surface shortwave radiation	Srad	MERRA-2		0.5°	2022/9
Geographic	Soil type	St	HWSD	2012	1km	2022/5
	Land use type	Lut	MCD12Q1	2001,2020	500m	2022/5
Anthropogenic	Land use conversion type	Luct	MCD12Q1	/	500m	2022/5
	Population	Pop	LandScan	2001-2020	1km	2022/5

Supplementary Table S2. Correlation between different NDVI change regions and Precipitation (Pre), Temperature (Tmn), and Radiation (Srad).

Variation Classes	Pre		Tmn		Srad	
	r	p	r	p	r	p
Continue decrease	0.86	0.00	-0.29	0.22	-0.68	0.00
Decrease to increase	0.68	0.00	-0.37	0.11	-0.60	0.00
Increase to decrease	0.46	0.04	0.34	0.15	-0.52	0.02
Continue increase	0.58	0.01	0.00	0.99	-0.54	0.01