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Satellite Evidence for Divergent Forest Responses within Close Vicinity to Climate Fluctuations in a Complex Terrain

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Supplementary Materials:

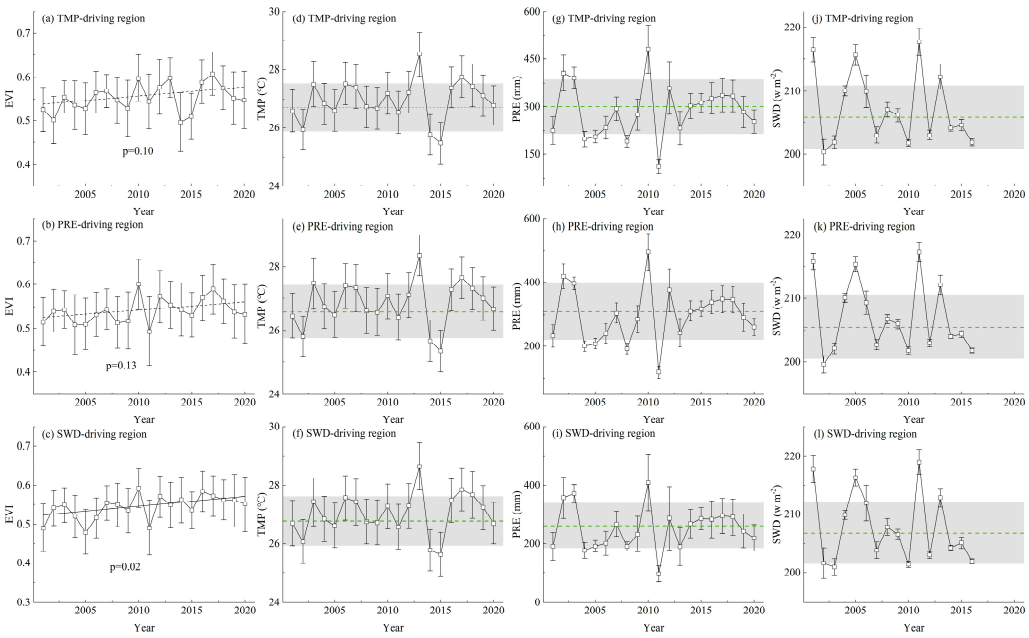

Figure S1: Time series of monthly average EVI (enhanced vegetation index, panel a-c), monthly average temperature (TMP (°C), panel d-f), monthly accumulative precipitation (PRE (mm), panel g-i), and monthly average solar radiation (SWD (w m^{-2}), panel j-l) in regions dominated by different climate factors (panel a, d, g, j are TMP-driving; panel b, e, h, k are PRE-driving, and panel c, f, i, l are SWD-driving). Error bars indicate annual mean ± 1 standard deviation; Black dashed lines indicate non-significant trend of change while black solid lines indicate a significant trend of change based on Mann-Kendall test; Green dashed lines are 30-year average of TMP (1991-2020), PRE (1991-2020), and SWD (1987-2016); Gray areas indicate 30-year average ± 1 standard deviation. Based on this graph, hot (2013) vs cold (2015) year were chosen to be contrasted with adjacent normal temperature year (2011); and wet (2010) vs dry (2011) year were chosen to be contrasted with adjacent normal precipitation year (2009).

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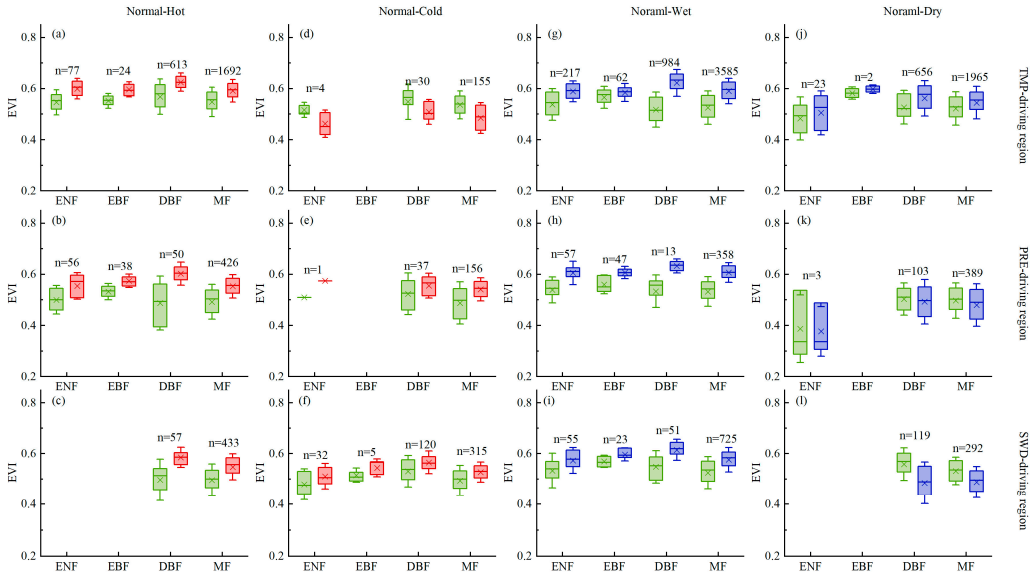

Figure S2: Responses of regional Enhanced Vegetation Index (EVI) to temperature and precipitation changes mainly driven by temperature (TMP), precipitation (PRE) and solar radiation (SWD) within each forest type (ENF: evergreen needle-leafed forest; EBF: evergreen broad-leafed forest; DBF: deciduous broad-leafed forest; MF: mixed forest) in regions predominantly driven by different climate factors. In panel a-c, EVI in high-temperature year (hot, in red, year 2013) vs normal-temperature year (normal, in green, year 2011) within each forest type in TMP-driving (a), PRE-driving (b), and SWD-driving (c) regions. In panel d-f, EVI in low-temperature year (cold, in red, year 2015) vs normal-temperature year (normal, in green, year 2011) within each forest type in TMP-driving (d), PRE-driving (e), and SWD-driving (f) regions. In panel g-i, EVI in high-precipitation year (wet, in blue, year 2010) vs normal- precipitation year (normal, in green, year 2009) within each forest type in TMP-driving (g), PRE-driving (h), and SWD-driving (i) regions. In panel j-l, EVI in low-precipitation year (dry, in blue, year 2011) vs normal- precipitation year (normal, in green, year 2009) within each forest type in TMP-driving (j), PRE-driving (k), and SWD-driving (l) regions. n represents the number of pixels.

Table S1: The maximum and minimum annual mean of temperature (TMP, ℃), precipitation (PRE, mm), or radiation (SWD, w m^{-2}), near 30-year average, and their corresponding years during 2001-2020 in regions driven by TMP, PRE and SWD.

Climate Factors	Regions driven	Maximum		Minimum		near 30-year average	
		Year	Value	Year	Value	Year	Value
TMP (℃)	TMP	2013	28.52	2015	25.47	2011	26.54
	PRE	2013	28.36	2015	25.35	2011	26.42
	SWD	2013	28.65	2015	25.63	2011	26.58
PRE(mm)	TMP	2010	481.38	2011	113.20	2009	274.90
	PRE	2010	497.02	2011	118.74	2009	285.70
	SWD	2010	408.62	2011	95.72	2009	232.78
SWD(w m^{-2})	TMP	2011	217.68	2002	200.33	2009	206.17
	PRE	2011	217.33	2002	199.63	2009	206.04
	SWD	2011	219.02	2003	200.94	2009	206.62

Table S2: The 30-year average of temperature (TMP, ℃), precipitation (PRE, mm), or radiation (SWD, w m^{-2}), and their standard deviation in regions driven by TMP, PRE and SWD.

Climate Factors	Regions driven	30-year average	standard deviation
TMP (℃) (1991-2020)	TMP	26.71	0.83
	PRE	26.59	0.83
	SWD	26.77	0.84
PRE(mm) (1991-2020)	TMP	300.78	86.91
	PRE	310.45	89.64
	SWD	262.33	76.85
SWD(w m^{-2}) (1987-2016)	TMP	205.84	5.09
	PRE	205.54	5.05
	SWD	206.84	5.32