

Supplement

Table S1. Broadband Vegetation indices used for vegetation drought monitoring (Xiao et al. 2023; Zhu et al. 2024)

Index	Long name	Formula	Reference
ARVI	Atmospherically Resistant Vegetation Index	$(N - 2 \cdot R + B) / (N + 2 \cdot R - B)$	(Kaufman and Tanre 1992)
EVI	Enhanced Vegetation Index	$g \cdot (N - R) / (N + C1 \cdot R - C2 \cdot B + L)$	(Huete et al. 2002)
GVMi	Global Vegetation Moisture Index	$((N + 0.1) - (S2 + 0.02)) / ((N + 0.1) + (S2 + 0.02))$	(Ceccato et al. 2002)
MSI	Moisture Stress Index	$S1/N$	(Hunt and Rock 1989)
NDDI	Normalized Difference Greenness Index	$((((N - R)/(N + R)) - ((G - N)/(G + N)))) / (((N - R)/(N + R)) + ((G - N)/(G + N)))$	(Gu et al. 2007)
NDWI	Normalized Difference Water Index	$(G - N) / (N + G)$	(McFEETERS 1996)
NDVI	Normalized Difference Vegetation Index	$(N - R)/(N + R)$	(Rouse et al. 1974)
RVI	Ratio Vegetation Index	N / R	(Jordan 1969)
SAVI	Soil-Adjusted Vegetation Index	$(1.0 + L) \cdot (N - R) / (N + R + L)$	(Huete 1988)
VSDI	Visible and Shortwave infrared Drought Index	$1 - ((S1 - B) + (R - B))$	(Zhang et al. 2013)
SWIRR	Shortwave Infrared Ratio	$S1/S2$	(Arango et al. 2017)
LSWI	Land Surface Water Index	$(N - S1) / (N + S1)$	(Xiao et al. 2004)

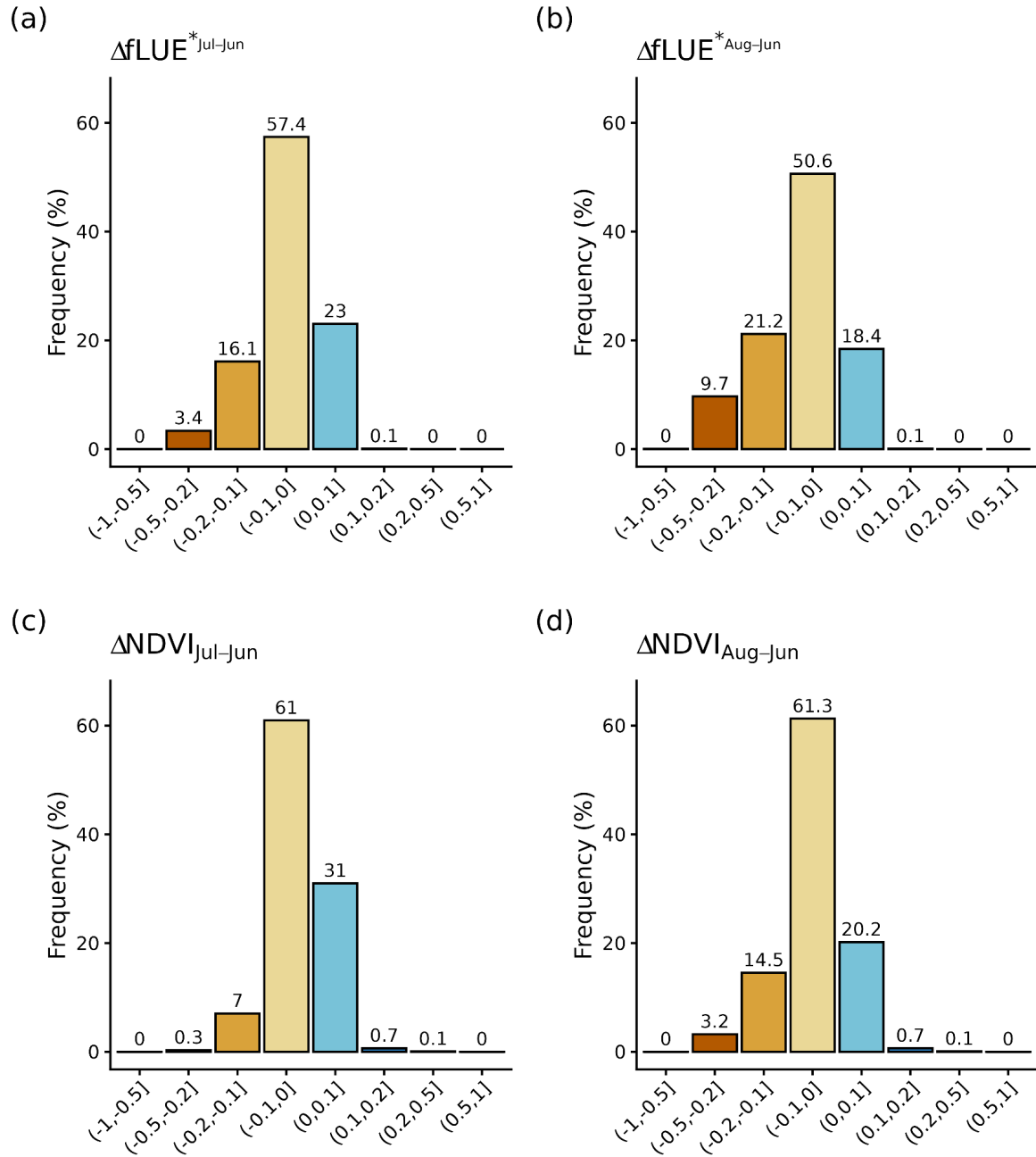


Fig. S1. The distribution frequency of $\Delta fLUE^*$ and $\Delta NDVI$ between July and June (a,c) and between August and June of 2018 (b,c) in the study area.

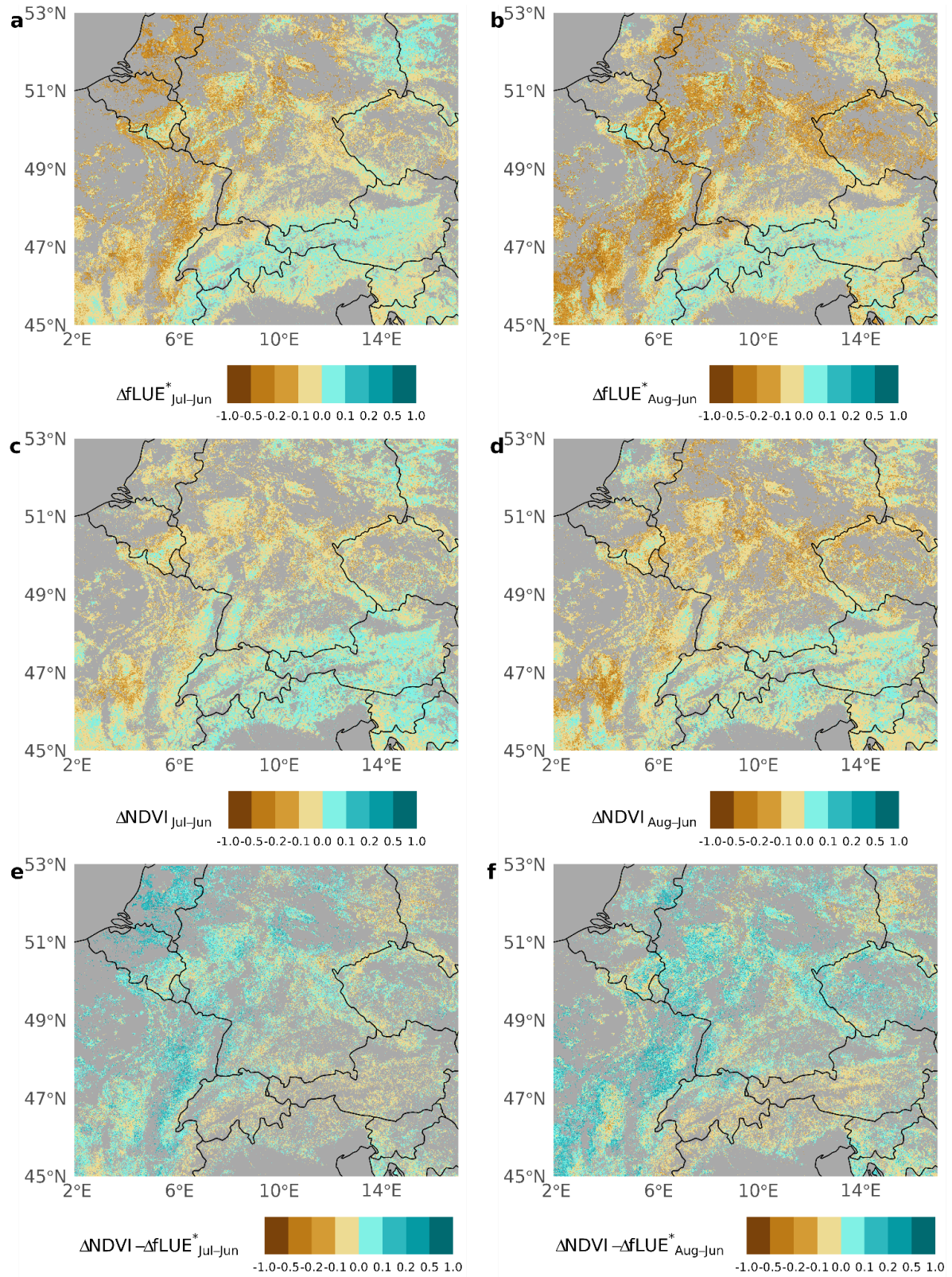


Fig. S2. Spatial patterns of changes in fLUE from June to July (a) and from June to August (b), changes in NDVI for the same periods are shown in (c) and (d), respectively, and the difference between changes in NDVI and fLUE* for the periods June to July (e) and June to August (f) during the summer of 2020.

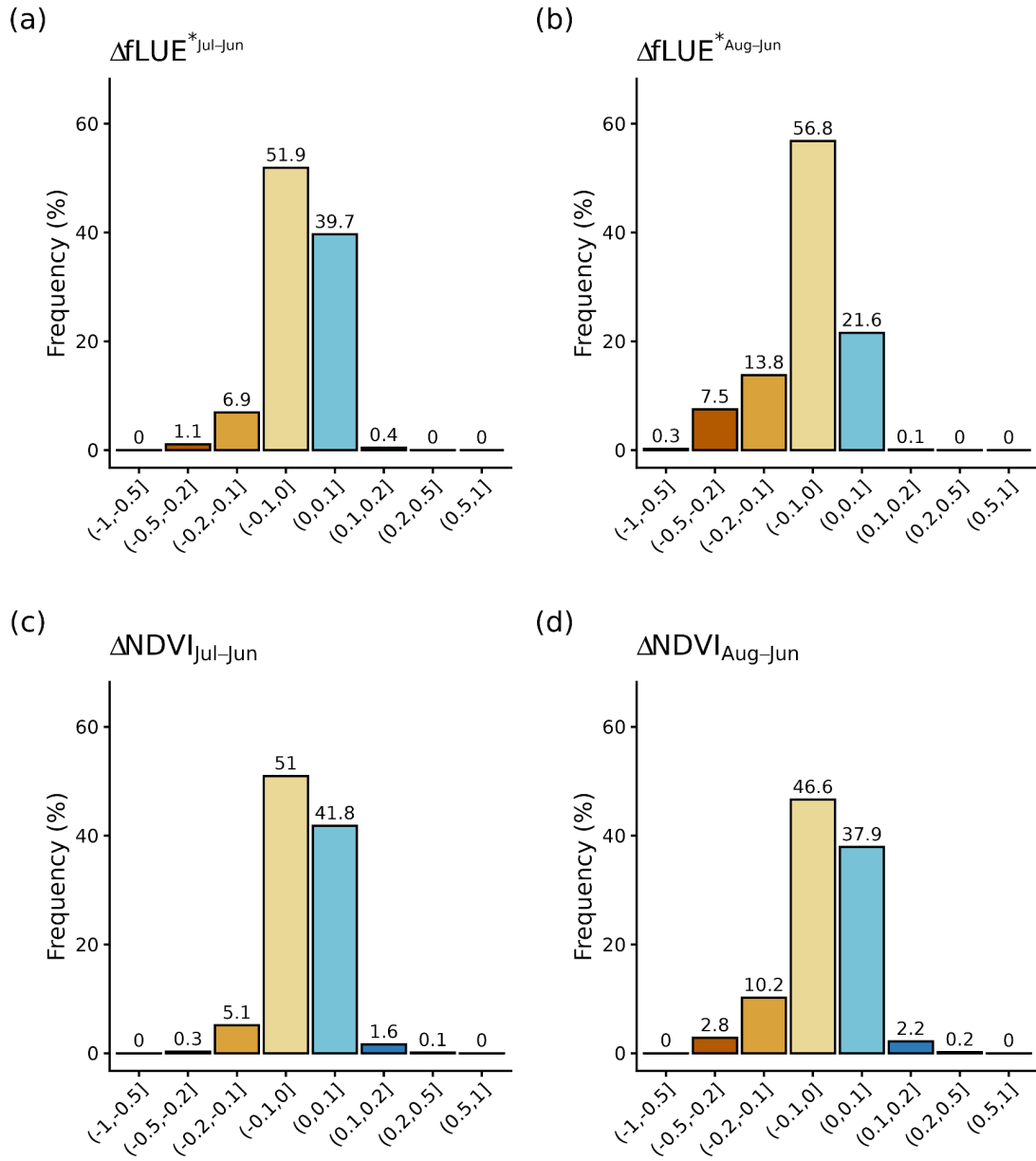


Fig. S3. The distribution frequency of $\Delta fLUE^*$ and $\Delta NDVI$ between July and June (a,c) and between August and June of 2020 (b,c) in the study area.

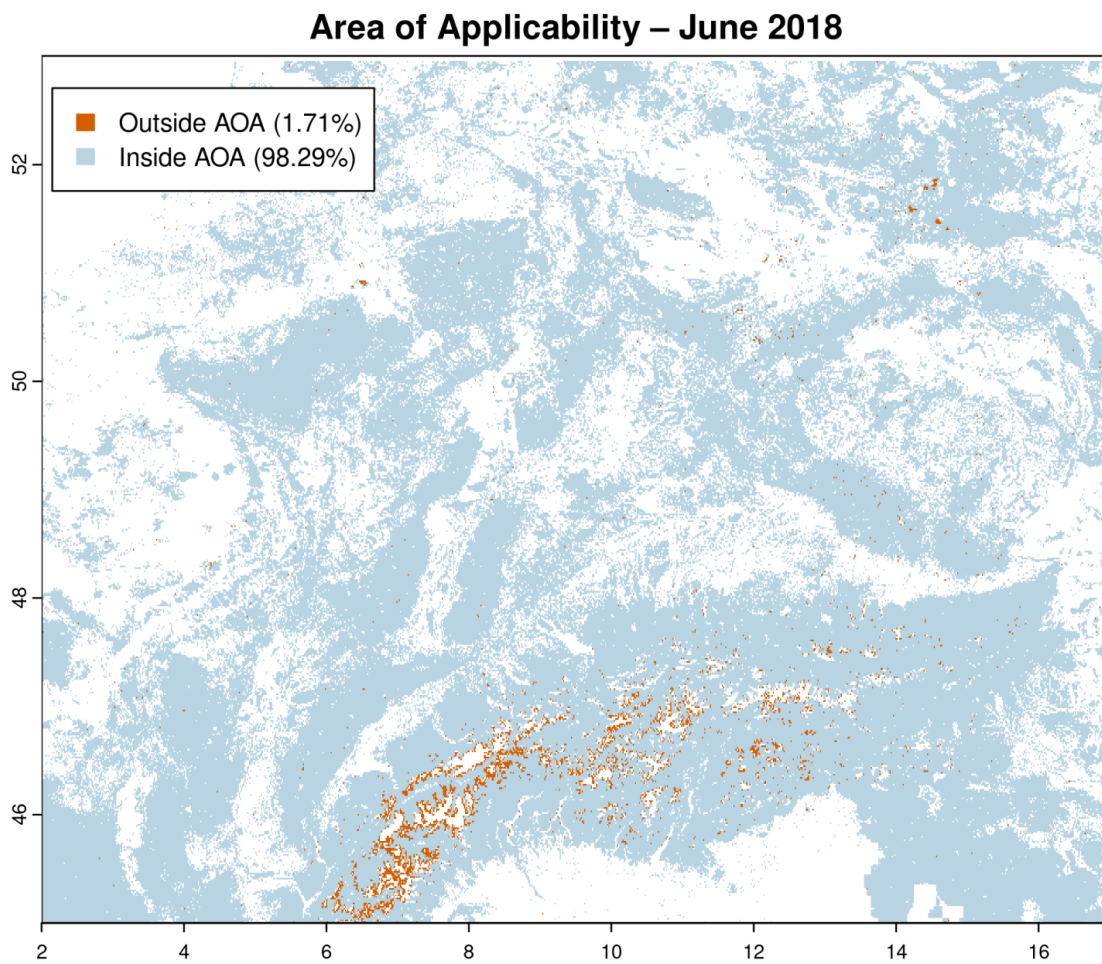


Fig. S4. Area of Applicability (AOA) of the random-forest model for June 2018. Blue pixels indicate areas within the AOA, whereas orange pixels indicate extrapolation beyond the predictor conditions present in the training data.

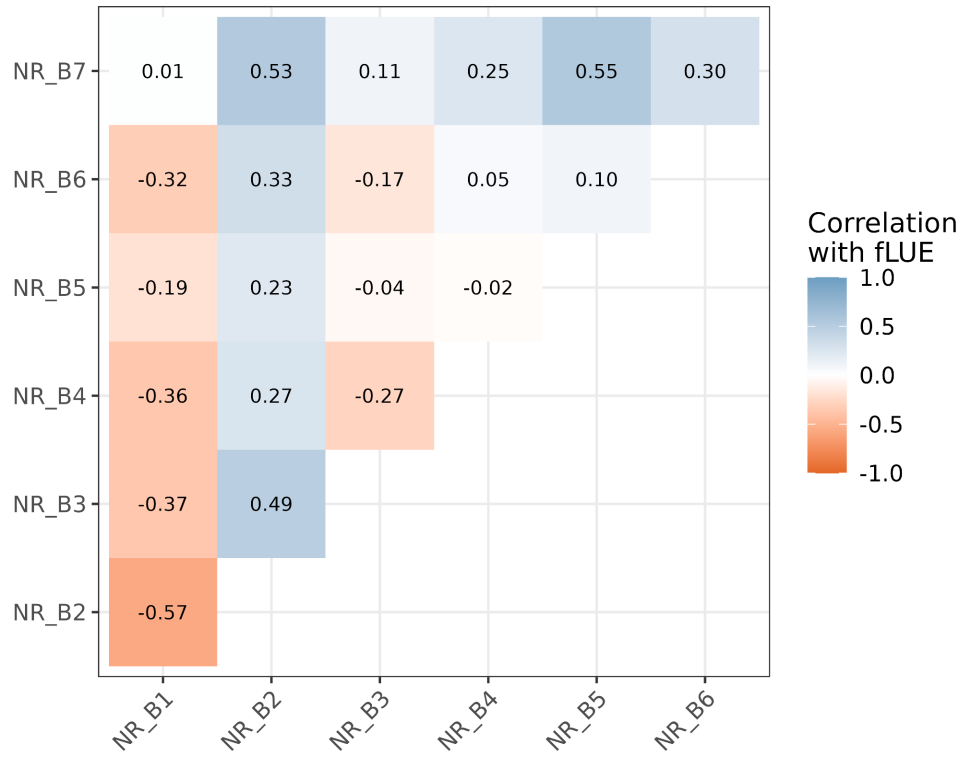


Fig. S5. Correlation analysis between vegetation indices, from all band combinations, and the fractional reduction of LUE due to soil moisture (fLUE).