

Supplement of

**Towards impact-based early warning of drought: development,
validation and application of a generic framework for drought
5 impact prediction in the UK**

Burak Bulut et al.

Correspondence to: Burak Bulut (burbul@ceh.ac.uk)

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Table S1 Model Parameters found in calibration of the models in R caret package

Model	Resampling Strategy	Folds	Repeats	Best Tuning Parameters	Preprocessing (Threshold / ICA Components)	Adaptive Resampling (Min / Alpha)
RF_CV1	Repeated CV	10	3	mtry = 5		
RF_CV2	CV	44	-	mtry = 5		
QRF	Repeated CV	10	3	mtry = 5		
XGBoost	Repeated CV	10	3	nrounds = 50 max_depth = 5 eta = 0.1 gamma = 0.1 colsample_bytree = 0.75 min_child_weight = 1 subsample = 0.5	Threshold = 0.95 ICA Components = 3	Min = 5 Alpha = 0.05
Lasso_CV	Repeated CV	10	3	alpha = 1, lambda = 0		
Lineer Reg.	Repeated CV	10	5	intercept = FALSE		

15 **Table S2 Information about NUTS1 Regions; post-processed (PP) total number of impact occurrences (NI), Number of months with observed impact data, Arable Area Ratio (AAR) and Population Ratio (PopR)**

NUTS1 ID	Name	NI (PP)	# Months (NI>0)	AAR (%)	PopR (%)
DE1	Baden-Württemberg	980	136	7.35	13.28
DE6	Hamburg	10	4	0.04	2.12
DE7	Hessen	85	31	4.09	7.58
DE8	Mecklenburg-Vorpommern	43	25	8.65	1.84
DE9	Niedersachsen	87	32	16.23	9.72
DEA	Nordrhein-Westfalen	87	27	9.77	21.8
DEB	Rheinland-Pfalz	116	33	3.35	5.1
DEC	Saarland	7	3	0.28	1.18
DED	Sachsen	187	38	5.81	4.83
DEE	Sachsen-Anhalt	44	22	8.44	2.64
DEF	Schleswig-Holstein	30	14	5.33	3.48
DEG	Thüringen	13	4	5.15	2.53
DE2	Bayern	790	27	17.41	15.98
DE3	Berlin	15	11	0.03	3.99
DE4	Brandenburg	199	51	8.07	3.17
DE5	Bremen	12	3	0.01	0.76
DE	Germany	2705	461	100.0	100

*Highlighted with bold NUTS1 regions are selected to use in the independent validation.

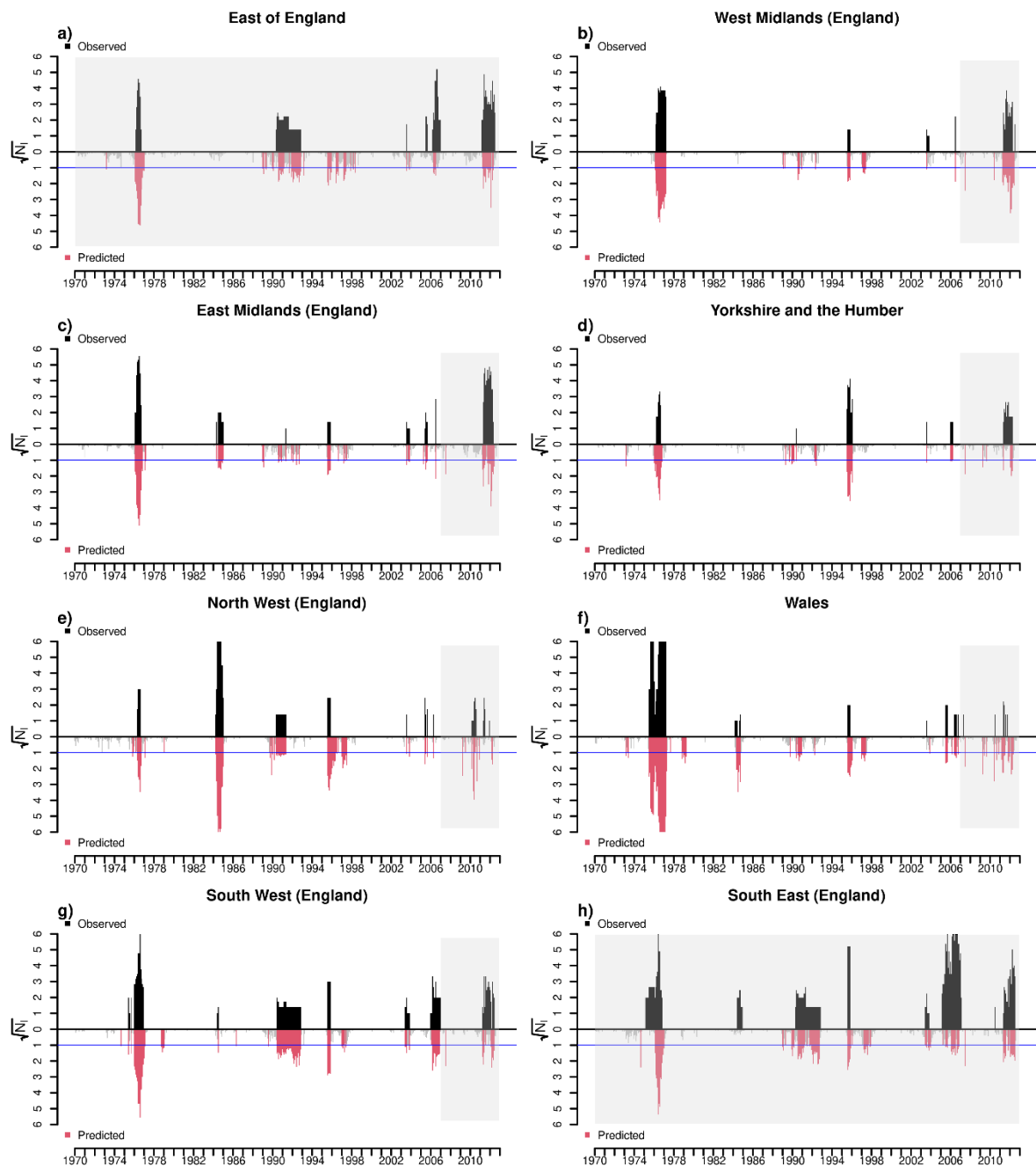


Figure S1 Observed and predicted NI values. Similar to Figure 1 Panel (a) in the main text but for all remaining UK NUTS1 regions.

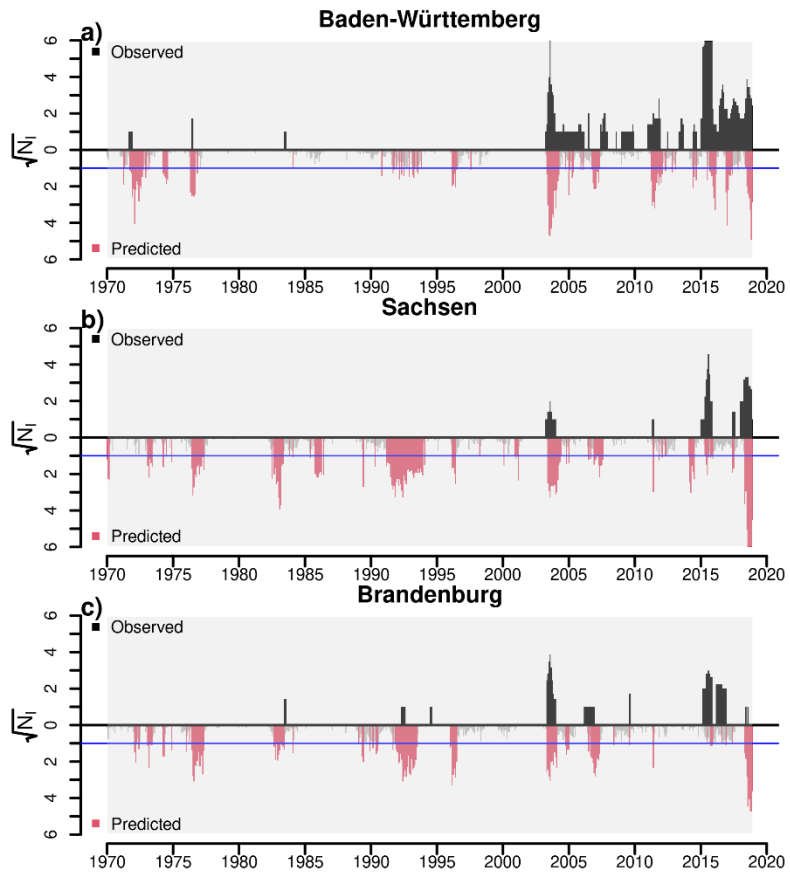


Figure S2 Observed and predicted NI values. Similar to Figure 1 Panel (a) in the main text but for selected DE NUTS1 regions.