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Skilful probabilistic predictions of UK flood risk months ahead using a large-sample machine learning model trained on multimodel ensemble climate forecasts

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This file contains 3 tables (Tables S1—S3)

Table S1: S2S prediction systems used in the analysis.

Forecast centre	**Model**	**Ensemble size**
NCEP	CFSv2	28
CMCC	CMCC-CM2	40
DWD	GCFS2.1	30
ECCC	GEM5-NEMO	10
Met Office	HadGEM3	25
ECMWF	SEAS5	28
Météo-France	System8	25
JMA	CPS3	10

Table S2: Dynamical predictor variables used in the ML models.

Variable	**Description**
Precipitation	Reforecast precipitation (1994-2016)
Temperature	Reforecast temperature (1994-2016)
Antecedent precipitation	Antecedent precipitation, drawn from forecasts of the month prior to the target month
Antecedent streamflow	Antecedent streamflow, drawn from observations of the month prior to forecast initialisation

Table S3: Static catchment descriptors included in the multi-site model with catchment attributes. Median and range are computed from the subset of 580 basins used in our analysis. All indices were drawn from CAMELS-GB (Coxon et al., 2020). Median and range are given for the 579 catchments included in our study.

Variable	**Description**	**Median**	**Range**
area	Catchment area (km2)	157	[2, 9931]
elev_mean	Mean elevation (masl)	177	[32, 682]
dpsbar	Slope of the catchment mean drainage path (m km-1)	86	[11, 488]
sand_perc	Percent sand (%)	43	[19, 86]
silt_perc	Percent silt (%)	30	[9, 42]
clay_perc	Percent clay (%)	23	[4, 50]
porosity_hypres	Soil porosity from hypres pedotransfer function (-)	46	[32, 81]
conductivity_hypres	Soil conductivity from hypres pedotransfer function (cm h-1)	1.39	[0.60, 3.13]
soil_depth_pelletier	Depth to bedrock (m)	1.23	[0.6, 42]
dwood_perc	Percent cover of deciduous woodland (%)	6	[0, 37]
ewood_perc	Percent cover of evergreen woodland (%)	2	[0, 93]
crop_perc	Percent cover of cropland (%)	10	[0, 88]
urban_perc	Percent cover of urban (%)	3	[0, 83]
reservoir_cap	Reservoir capacity (ML)	0	[0, 8×10^7]