Monthly mean river flows simulated by the Grid-to-Grid hydrological model
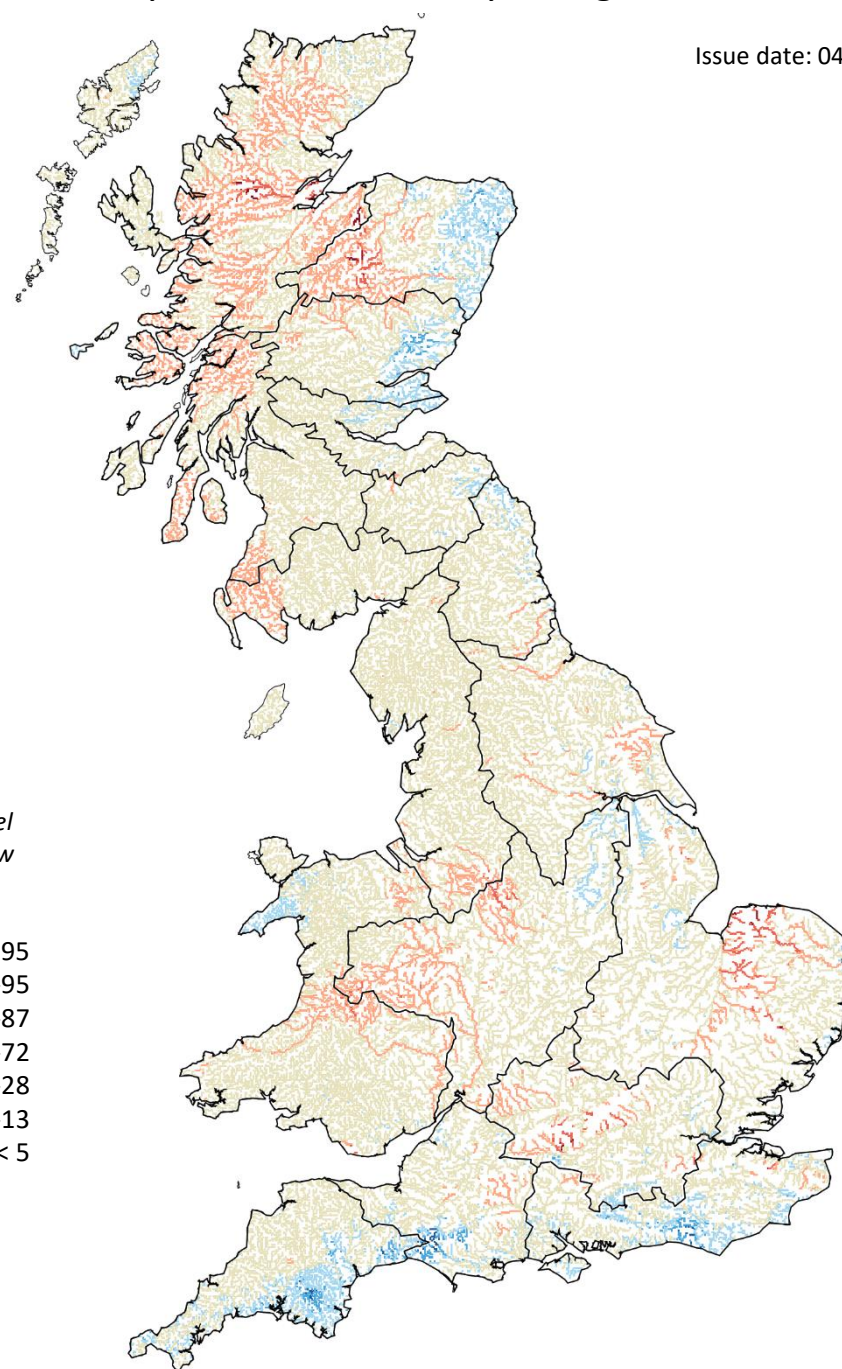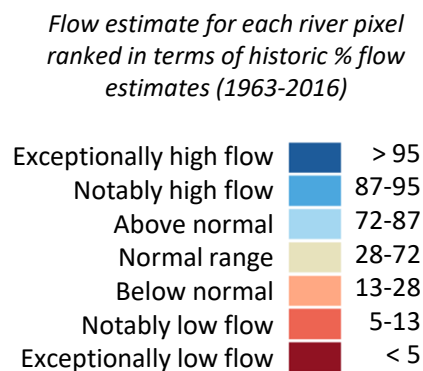
UK Centre for Ecology & Hydrology

Period: December 2022

Issue date: 04.01.2023

This map shows the simulated monthly mean flow across Great Britain for last month, ranked in terms of 54 years of historical flow estimates (1963 – 2016).

These flows are produced by the 1km resolution Grid-to-Grid (G2G) hydrological model, which is run up to the end of each calendar month using observed rainfall and MORECS potential evaporation as input.

Note that the G2G model provides estimates of natural flows.

Flow estimate for each river pixel ranked in terms of historic % flow estimates (1963-2016)

Exceptionally high flow	> 95
Notably high flow	87-95
Above normal	72-87
Normal range	28-72
Below normal	13-28
Notably low flow	5-13
Exceptionally low flow	< 5

January 2023

Current Daily Simulated Subsurface Water Storage Conditions

Based on subsurface water storage estimated for 31st December 2022

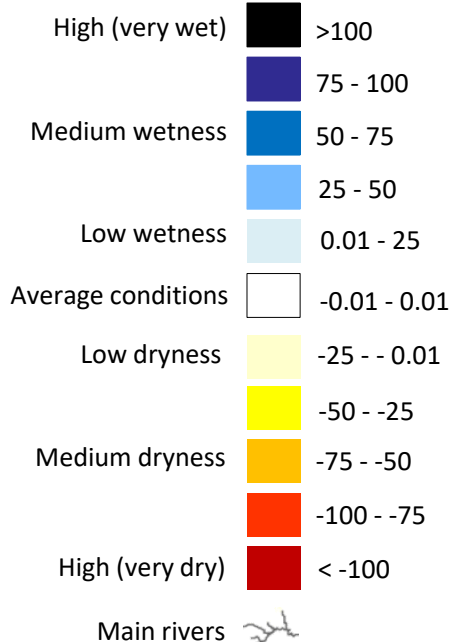Issue date: 04.01.2022

UK Centre for Ecology & Hydrology

These maps are based on Grid-to-Grid (G2G) hydrological model simulated subsurface water storage, expressed as an anomaly from the historical monthly mean. To highlight areas that are particularly wet or dry, the storage anomaly is presented here using a colour scale highlighting water storage relative to historical extremes. The maps below show the "relative wetness" which combines maps previously shown separately as the "relative wetness" and "relative dryness".

These maps do not provide a forecast and are not maps of soil moisture. Instead they indicate areas which are particularly wet or dry. Rainfall in areas with high positive relative wetness could result in flooding in the coming days/weeks. Areas of negative relative wetness provide an indication of locations which are particularly dry, and little or no rain in these areas could potentially lead to (or prolong) a drought.
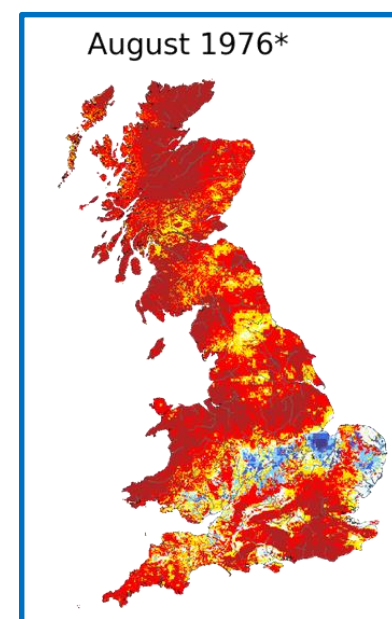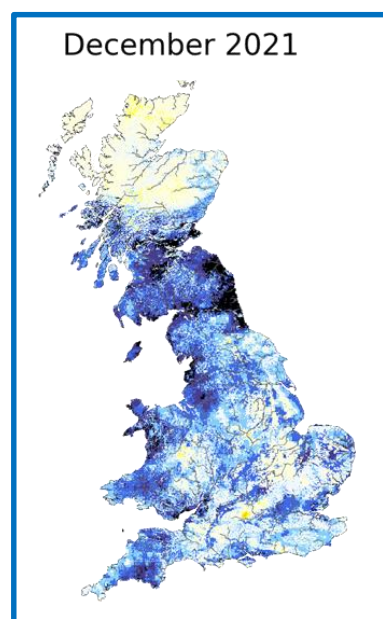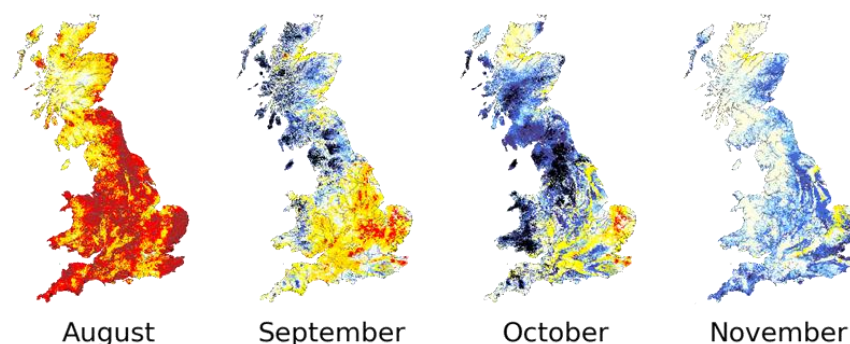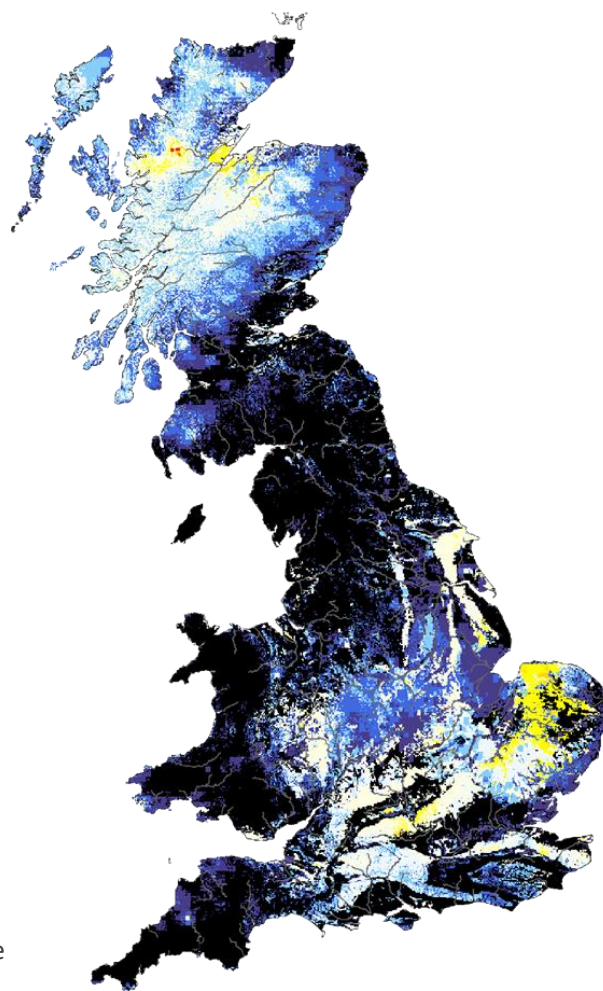
SUMMARY: At the end of December, subsurface water levels were much higher (wetter) than normal across northern and south-western England and in Wales, but more typical in much of Scotland and central England.

January 2023

Relative wetness

Water storage anomaly as a % of maximum (positive wetness) or minimum (negative wetness) storage anomaly (zero indicates average value)

High (very wet)	⬛	>100
	🟦	75 - 100
Medium wetness	🟦	50 - 75
	🟦	25 - 50
Low wetness	🟦	0.01 - 25
Average conditions	⬜	-0.01 - 0.01
Low dryness	🟨	-25 - -0.01
	🟨	-50 - -25
Medium dryness	🟧	-75 - -50
	🟥	-100 - -75
High (very dry)	🟥	< -100
Main rivers	〰️	

Labels refer to estimated storage on final day of named month

August   September   October   November

December 2021

August 1976*

*Example month displaying extreme negative wetness

The Hydrological Outlook UK provides an outlook for the water situation for the UK over the next three months and beyond. For guidance on how to interpret the outlook, a wider range of information, and a full description of underpinning methods, please visit the website: www.hydoutuk.net

Return Period of Rainfall Required to Overcome Dry Conditions

UK Centre for Ecology & Hydrology

Period: January 2023 – June 2023

Issue date: 04.01.2023

These maps show the **return period** of the rainfall required to overcome dry conditions simulated using the Grid-to-Grid (G2G) hydrological model. The maps are coloured according to the return period of accumulated rainfall required to overcome the estimated current subsurface water storage deficit over the next few months.

These maps do not provide a drought forecast. Instead they indicate the return period of rainfall required to overcome the dry conditions for the following 6 months based on current conditions.

SUMMARY: During January to June, Great Britain will not require particularly unusual rainfall (<5 year return periods) to return to average conditions for the time of year.
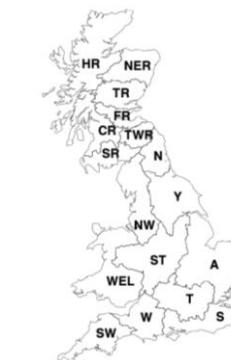
SCOTLAND
HR   Highlands Region
NER   North East Region
TR   Tay Region
FR   Forth Region
CR   Clyde Region
TWR   Tweed Region
SR   Solway Region
ENGLAND
N   Northumbria
NW   North West
Y   Yorkshire
ST   Severn Trent
A   Anglian
T   Thames
S   Southern
W   Wessex
SW   South West
WALES
WEL   Welsh

NORTHERN IRELAND
This method cannot currently be used in Northern Ireland

Jan   Feb   Mar

Apr   May   Jun

Rainfall amount / Probability		Return period (years)
Low (this rain is likely to occur)	> 20%	< 5
	< 20%	5 - 10
	< 10%	10 - 25
	< 4%	25 - 50
High (less likely)	< 2%	50 - 100
	< 1%	100 - 200
Extreme (unlikely but still possible)	< 0.5%	> 200

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UK Centre for Ecology & Hydrology

Estimate of Additional Rainfall Required to Overcome Dry Conditions

Based on subsurface water storage estimated for 31st December 2022

Issue date: 04.01.2022

These maps show the Grid-to-Grid (G2G) hydrological model simulated subsurface water storage, expressed as an anomaly from the historical monthly mean (1981-2010), presented on a 1km grid and as regional means.
Subsurface storage deficits, i.e. where the subsurface water storage anomaly is less than zero, **are highlighted by the red/pink colours**.

The **subsurface storage deficit (mm)** can be interpreted as an estimate of additional rainfall that would be required in future months to overcome dry conditions (i.e. rainfall in addition to what is expected on average). Regional mean values of additional rainfall required are provided in the table below.

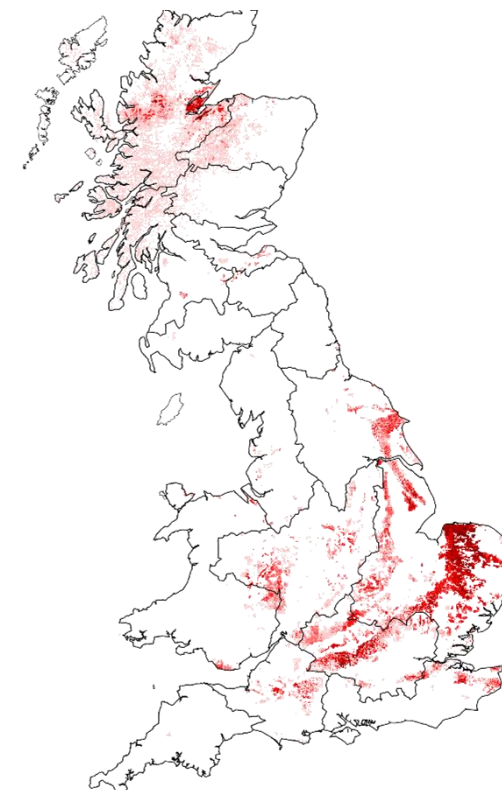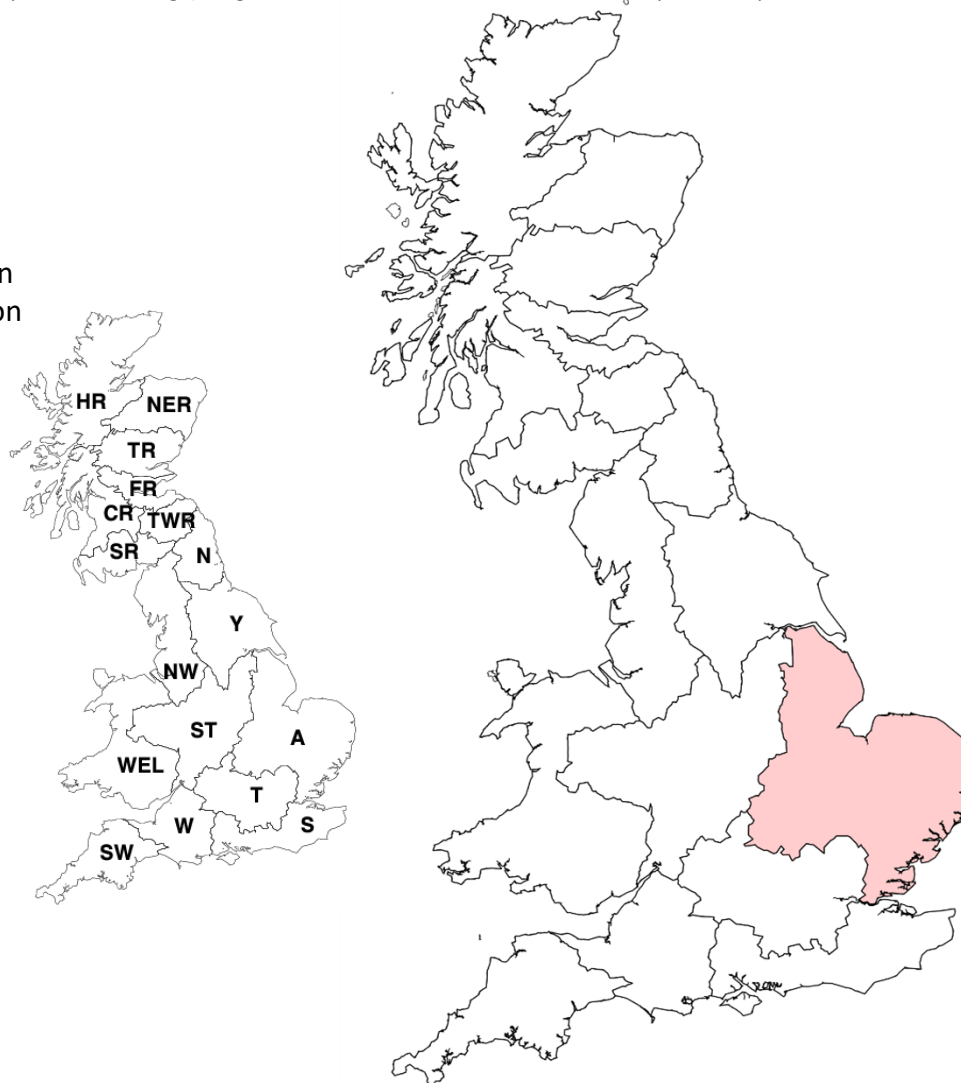*Regional estimate of additional rainfall required (mm)*

SCOTLAND
0	HR	Highlands Region
0	NER	North East Region
0	TR	Tay Region
0	FR	Forth Region
0	CR	Clyde Region
0	TWR	Tweed Region
0	SR	Solway Region

ENGLAND
0	N	Northumbria
0	NW	North West
0	Y	Yorkshire
0	ST	Severn Trent
4	A	Anglian
0	T	Thames
0	W	Wessex
0	S	Southern
0	SW	South West

WALES
0	WEL	Welsh

Water storage deficit (anomaly, mm)

�	>125
	100-125
	75-100
	50-75
	25-50
	0.1-25
	≤0

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