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New (sub-)seasonal GloFAS products

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Some background to the (sub-)seasonal product revision

Old EFAS sub-seasonal + seasonal

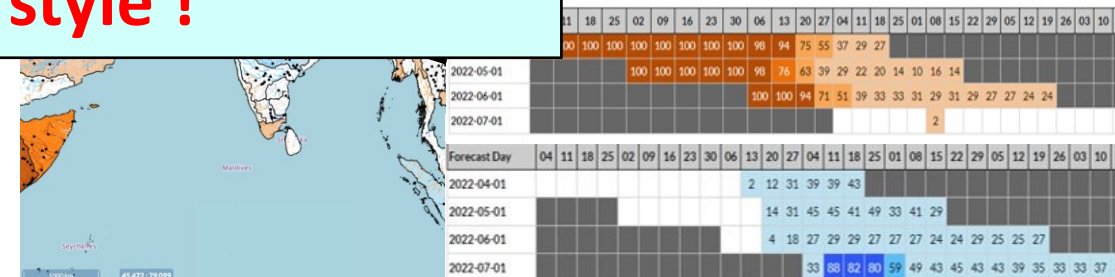
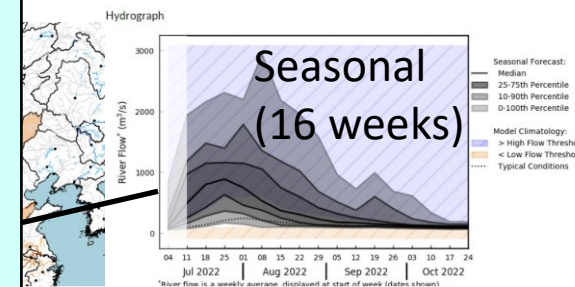
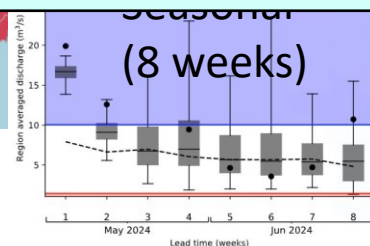
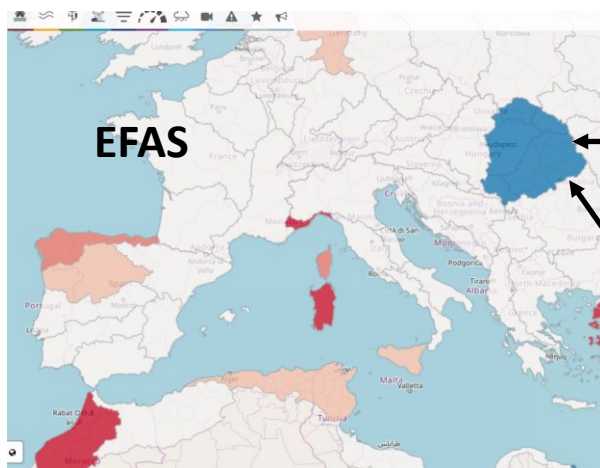
- Average discharge, out to 6 (sub-seasonal) and 8 (seasonal) weeks (from day1, so not calendar weeks)
- Reanalysis climatology (fixed for seasons and lead times)
- 'Max signal' basin summary map (area average)
- Hydrographs for the basins only (not for points)
- Lowest/highest deciles, low/medium/high probs (maps)

Old/current GloFAS seasonal

- Average discharge, out to 16 calendar weeks
- Season- and range-dependent climatology
- 'Max signal' basin and river network summary maps
- Hydrographs + probability tables for points
- Lowest/highest quintiles, 50-75%, 75-90% and 90<% probability categories

Lots of differences/inconsistencies !

We needed a common methodology and new style !



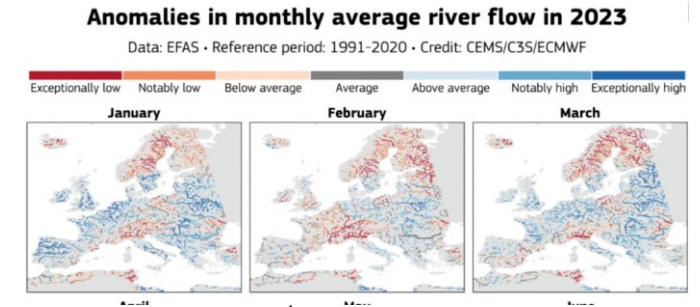
Main design elements

New generic design

- Same methodology/scripts/style/etc. for both EFAS/GloFAS and both sub-seasonal/seasonal

Main features

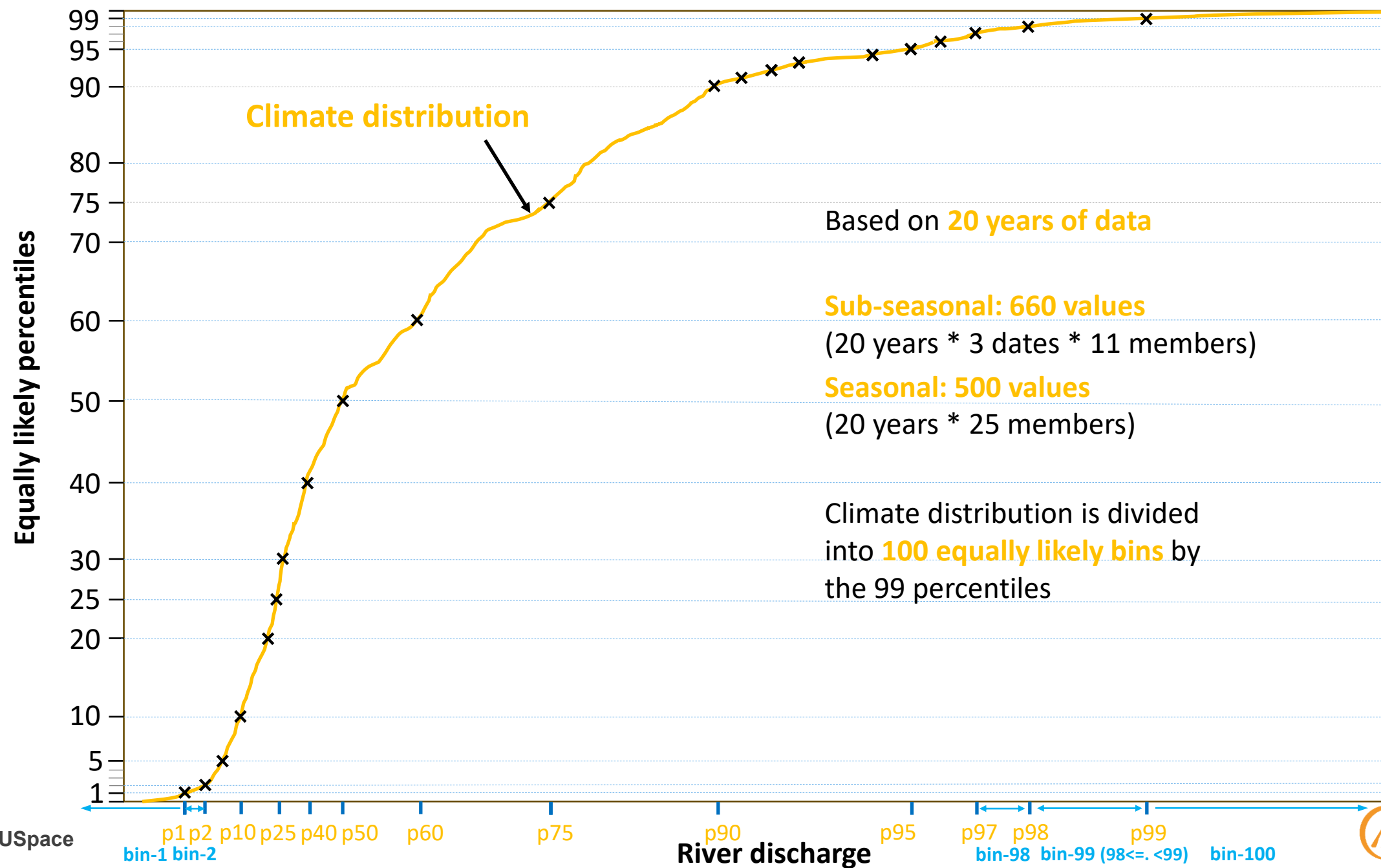
- Based on calendar weekly/monthly **mean river discharge**
- Out to **6 weeks / 7 months**; updated daily / monthly
- Reference: **reforecast-based climatologies** (20 years, 2004-2023 for all)
- **7 anomaly categories** (<10%, 10-25%, 25-40%, 40-60%, 60-75%, 75-90% and 90<%; same as in ESOTC)
- **3 uncertainty sub-categories** (low/medium/high)
- Anomaly/uncertainty based on the rank of each ensemble member in the 100-bin percentile climatology



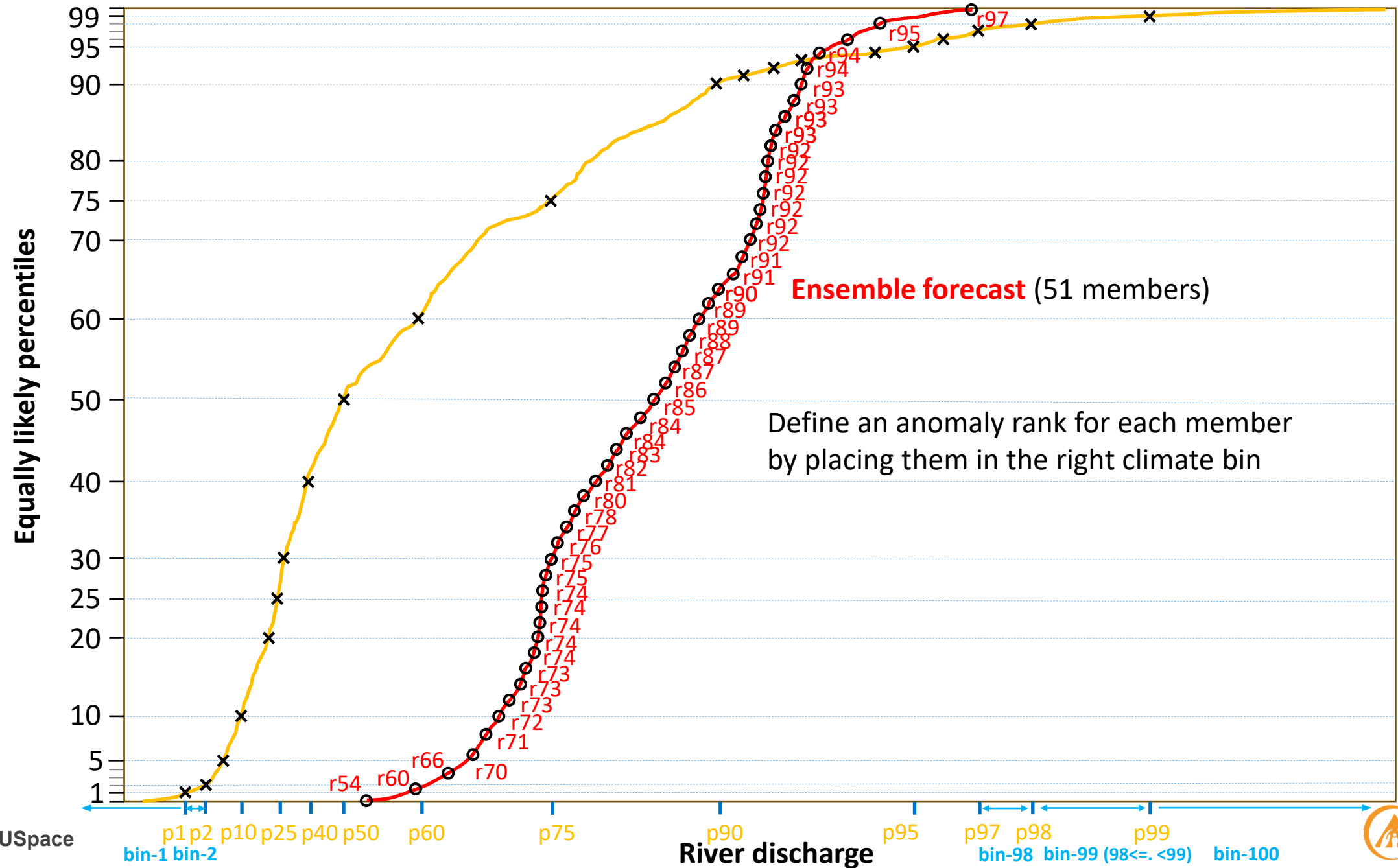
Web products

- **Outlook** (these two behaving as one layer):
 - River network summary (coloured river pixels)
 - Point information (hydrograph and probability evolution tables), at fixed and basin-representative points
- **Outlook - Basins**: basin summary (basins coloured by the area-average signal)
- Signal shown separately **for each lead time**

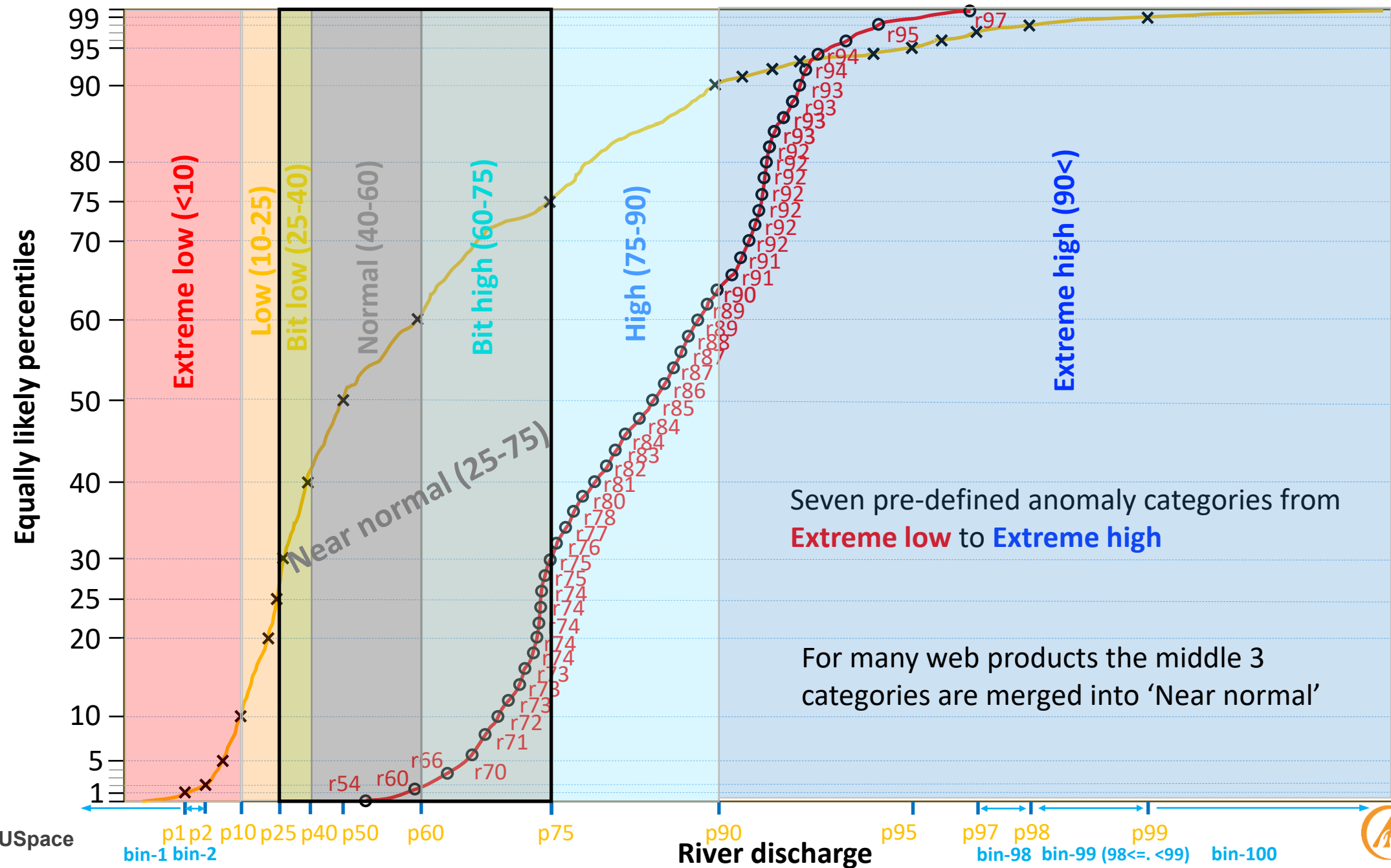
Anomaly computation methodology



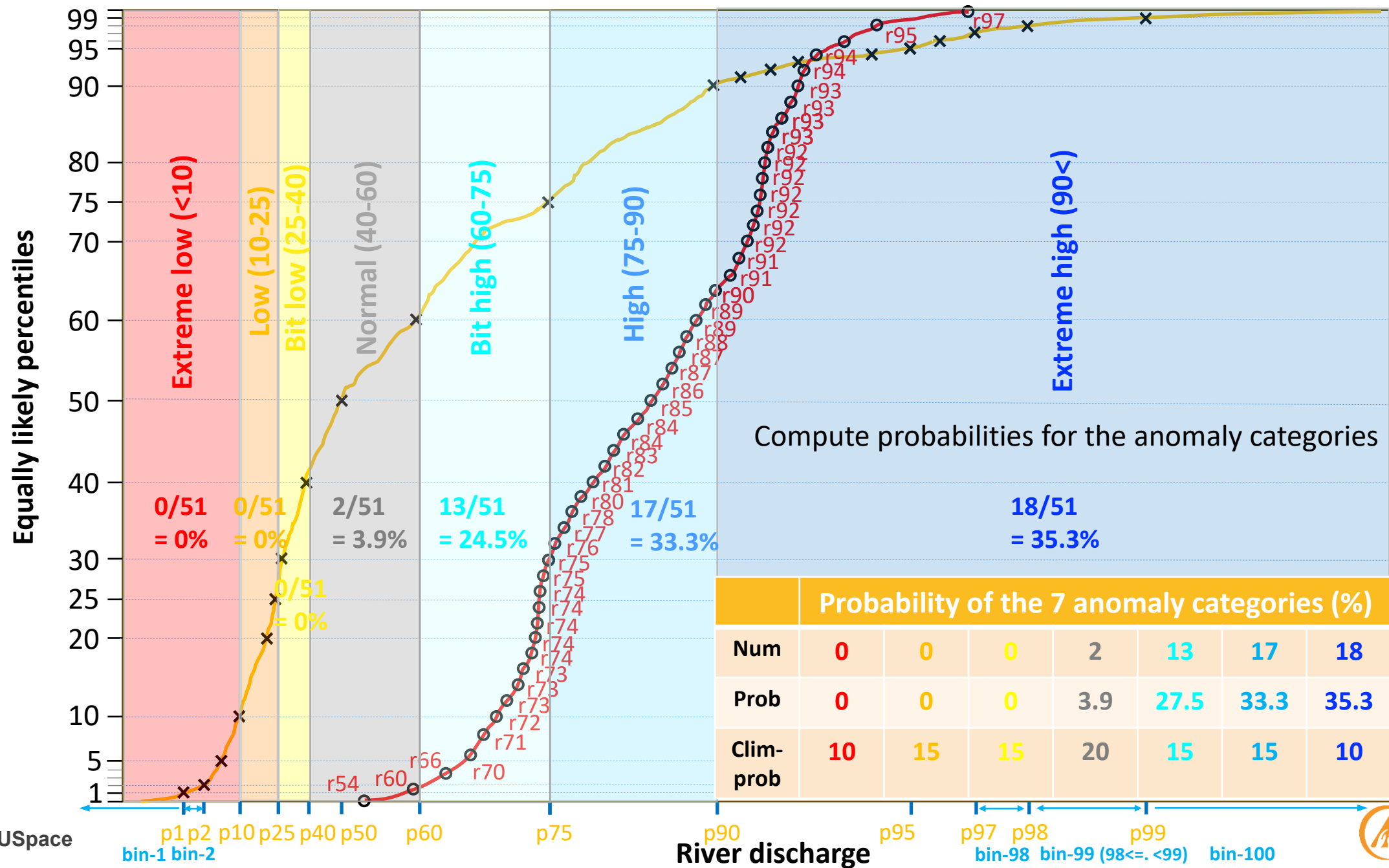
Anomaly computation methodology



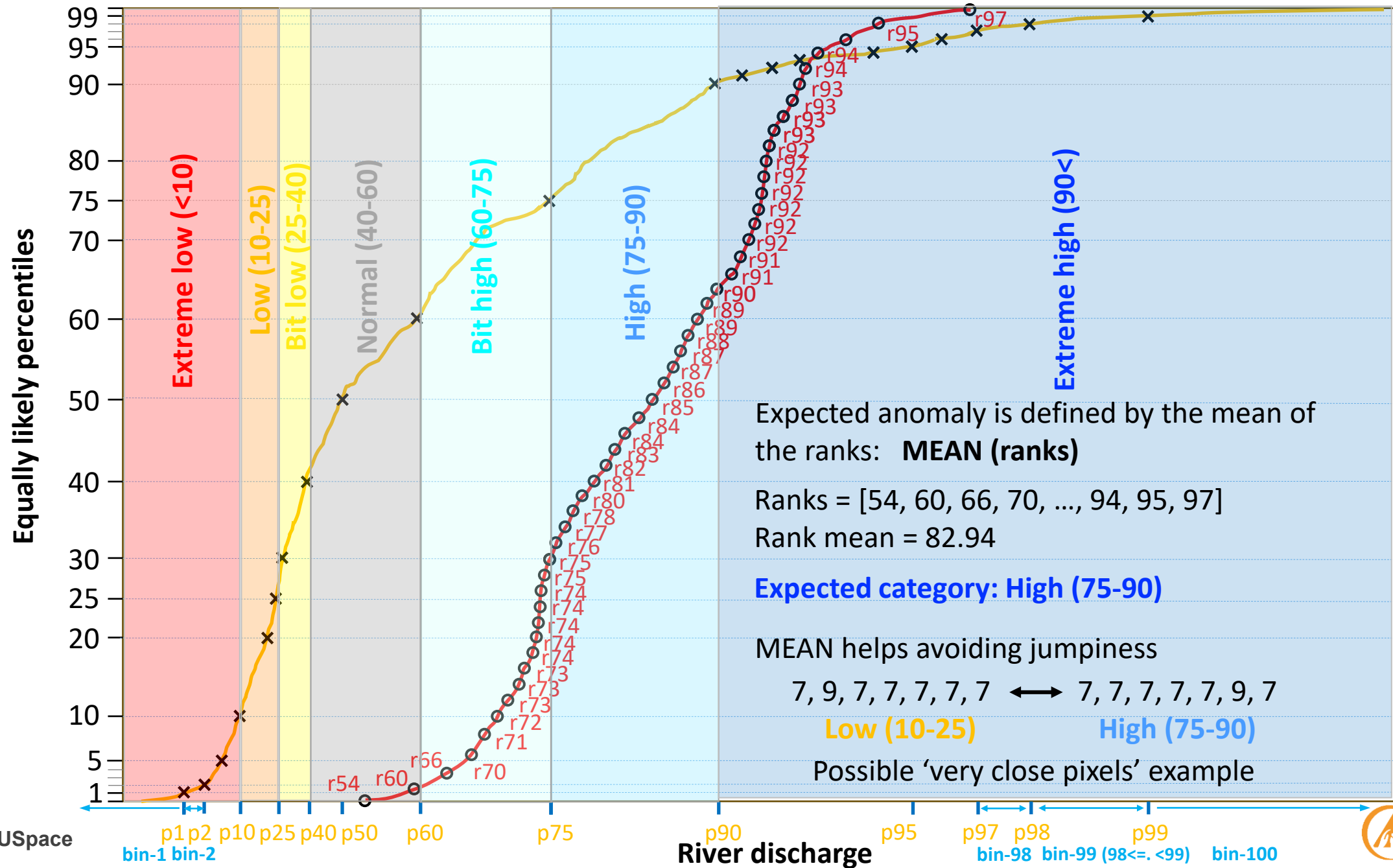
Anomaly computation methodology



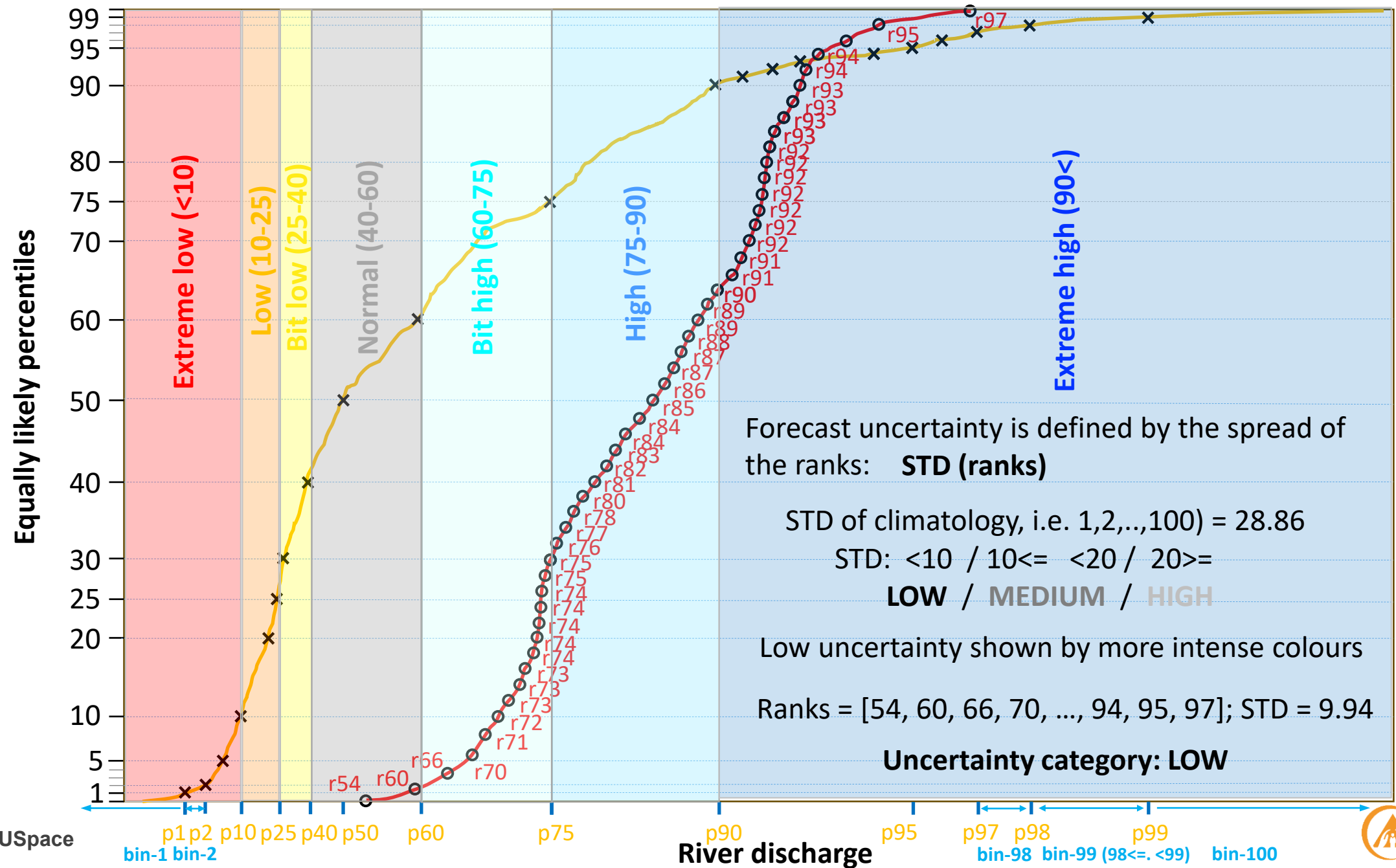
Anomaly computation methodology



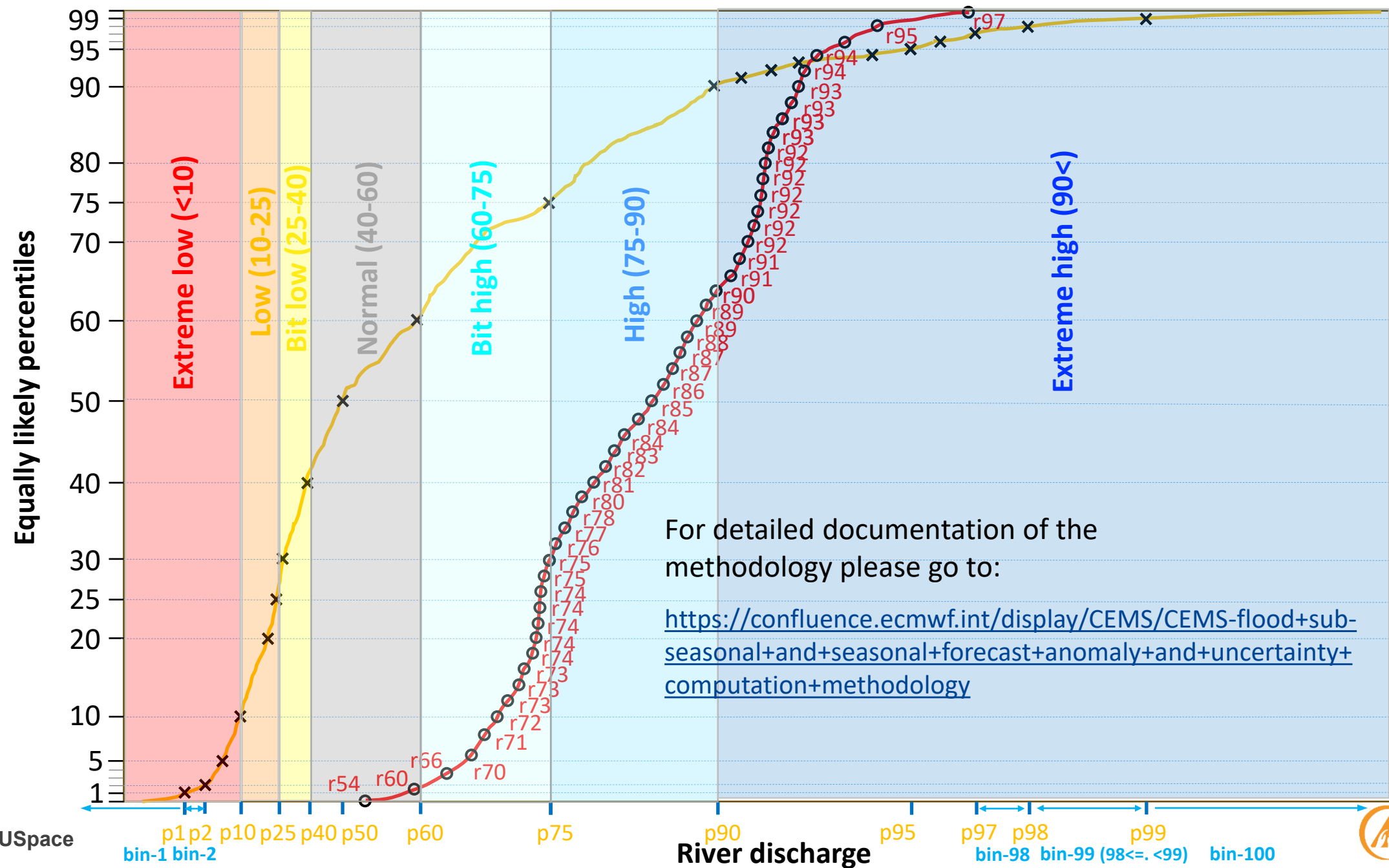
Anomaly computation methodology



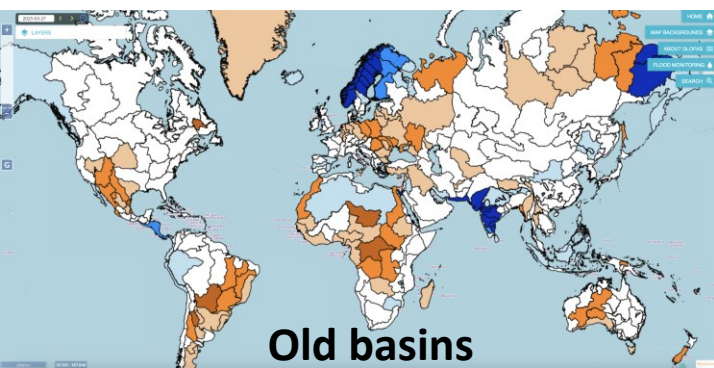
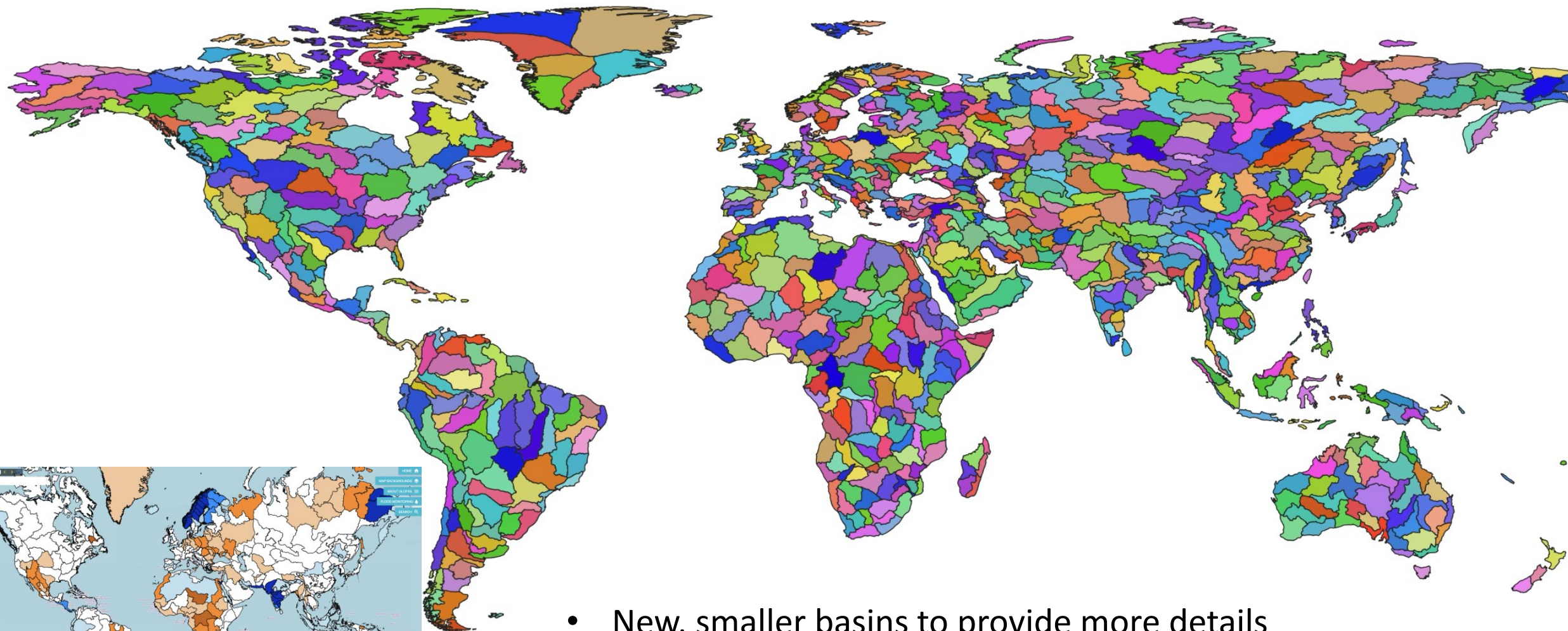
Anomaly computation methodology



Anomaly computation methodology

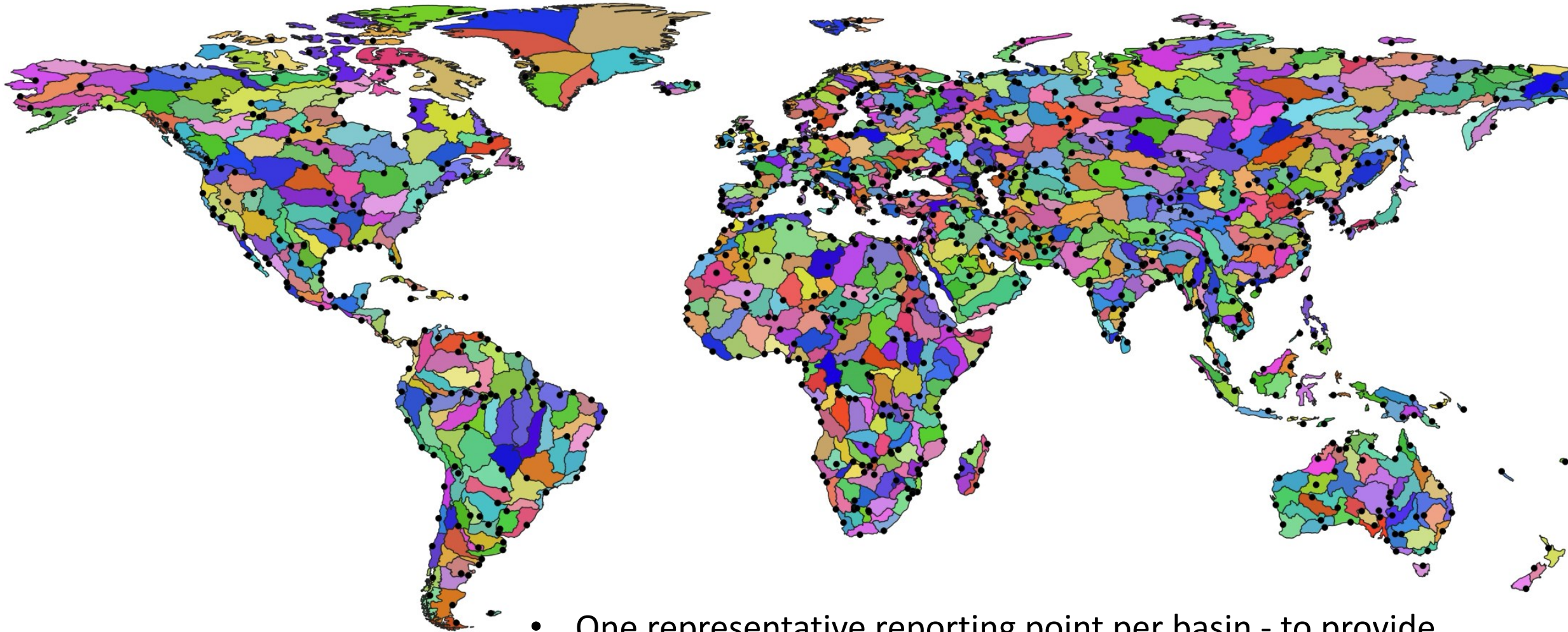


New (sub-)seasonal basins



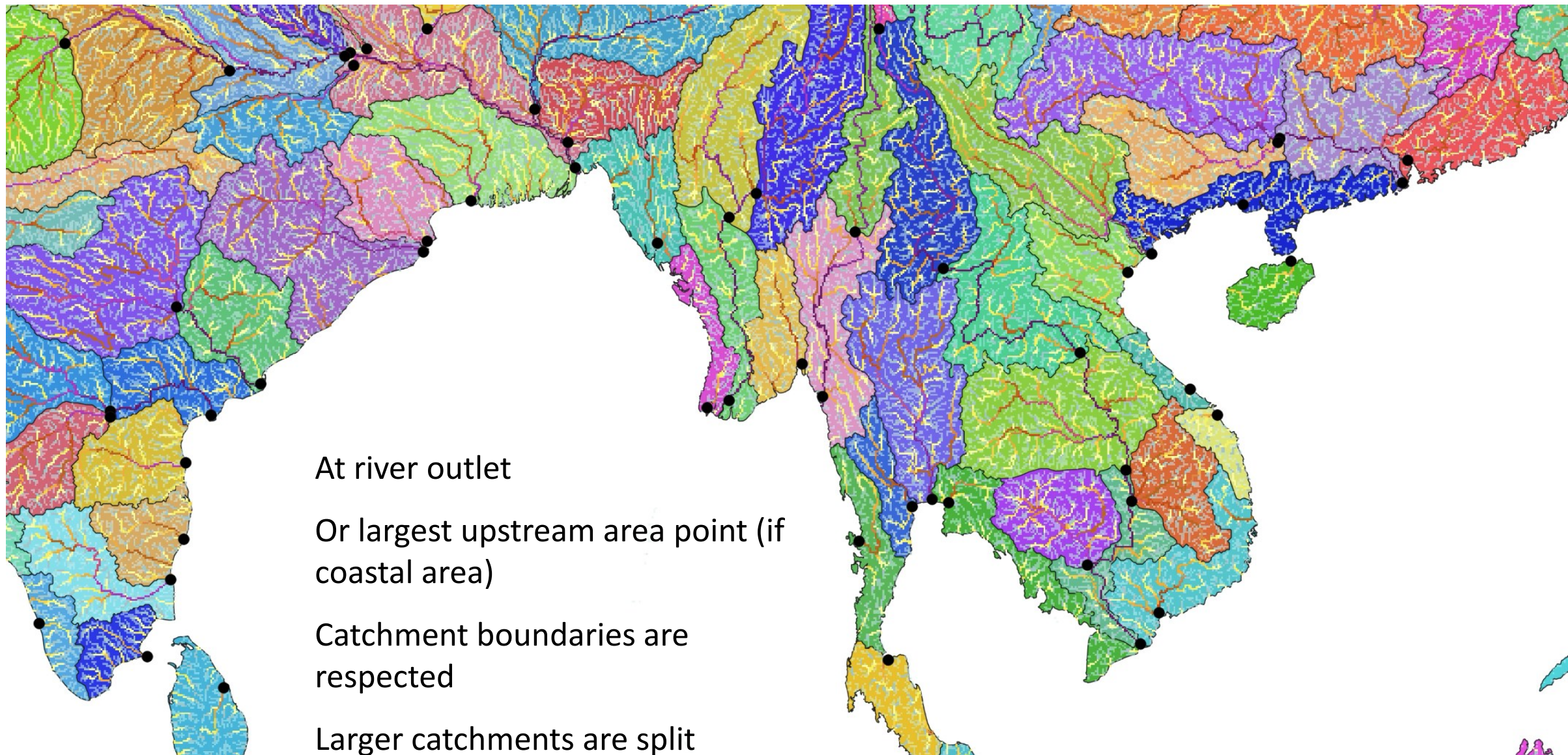
- New, smaller basins to provide more details
- Same basins used for EFAS

New (sub-)seasonal basins-representative points



- One representative reporting point per basin - to provide forecast details in all areas of the world
- Shown as extra on top of the fixed points (in 30-day forecasts)

New (sub-)seasonal basins and representative points



At river outlet

Or largest upstream area point (if
coastal area)

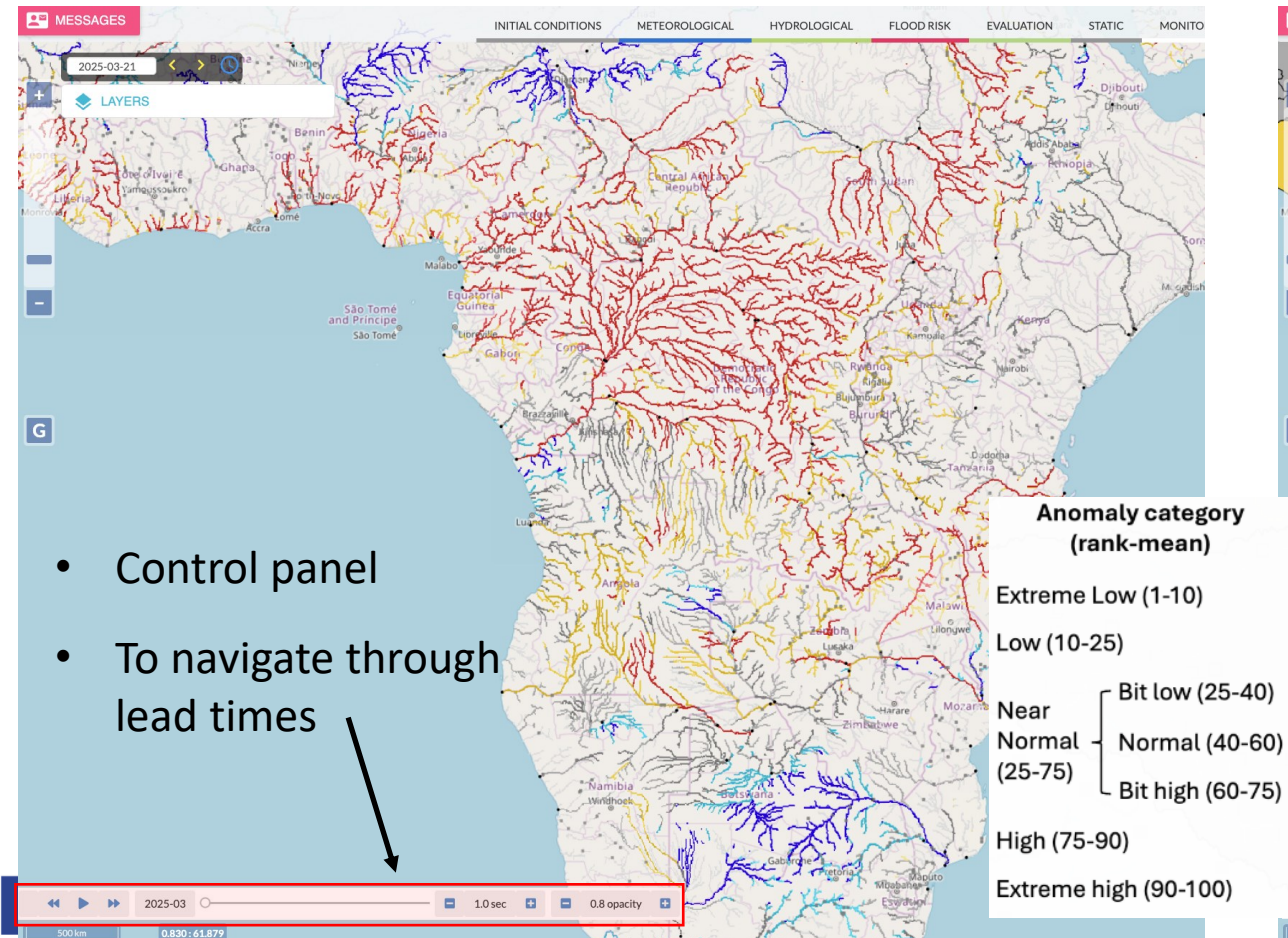
Catchment boundaries are
respected

Larger catchments are split

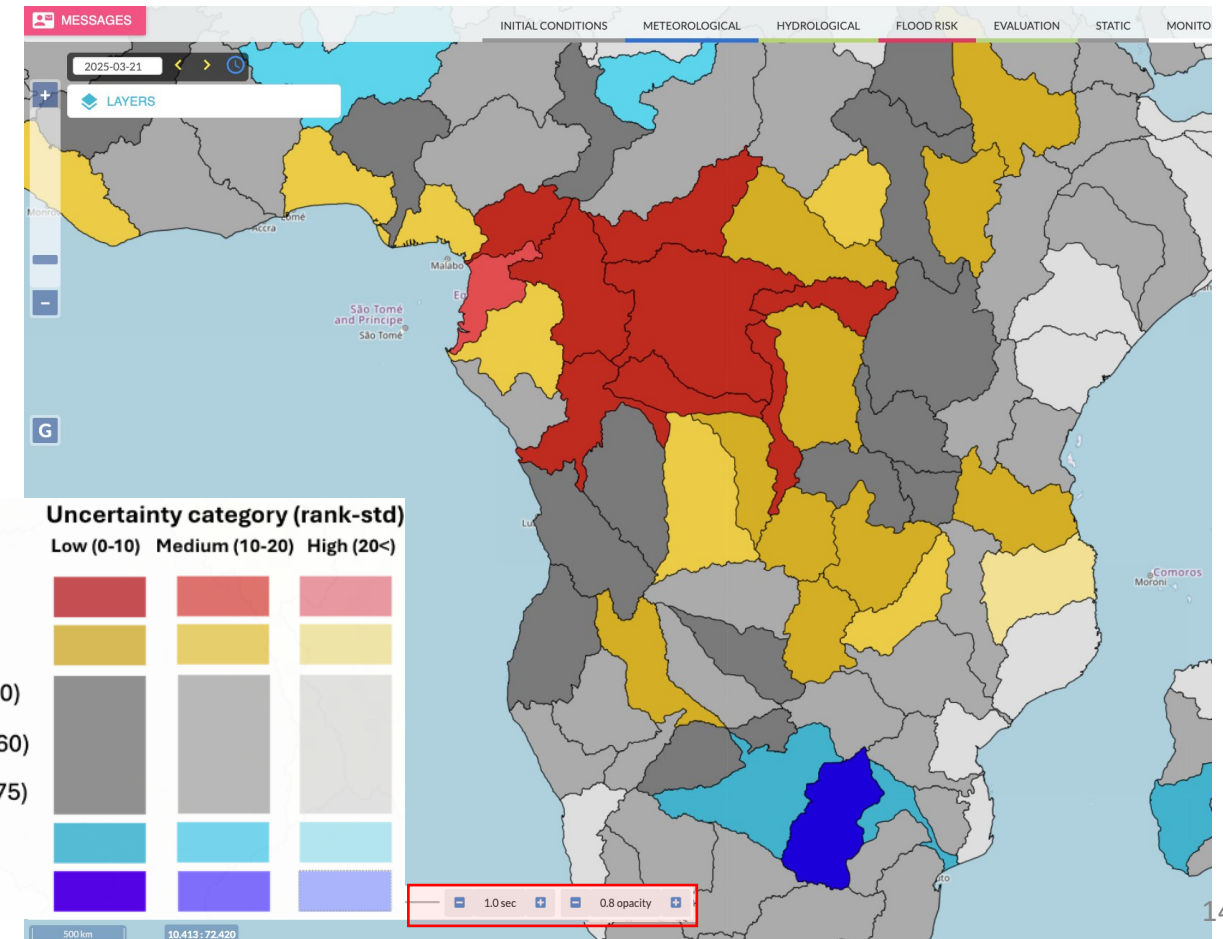
Web product layers

- 'Outlook' layer: Forecast signal on river pixels + reporting points (popup window with hydrograph and probability evolution)
- 'Outlook - Basins' layer: Forecast signal aggregated over basins
- Same 5*3 categories/colours used on both layers
- They are scrollable, so separate maps for all lead times

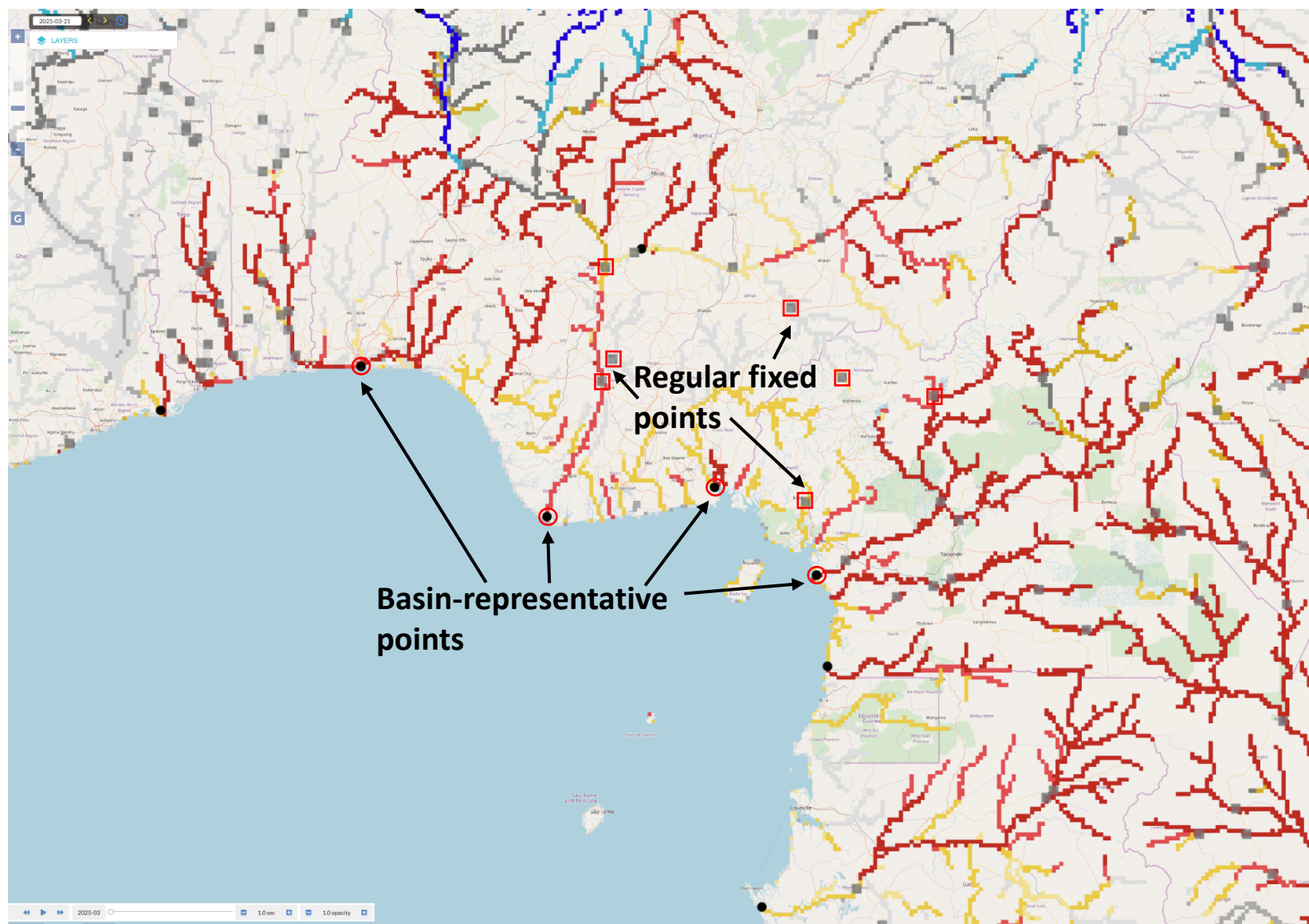
(Sub)-Seasonal 'Outlook'



(Sub)-Seasonal 'Outlook – Basins'

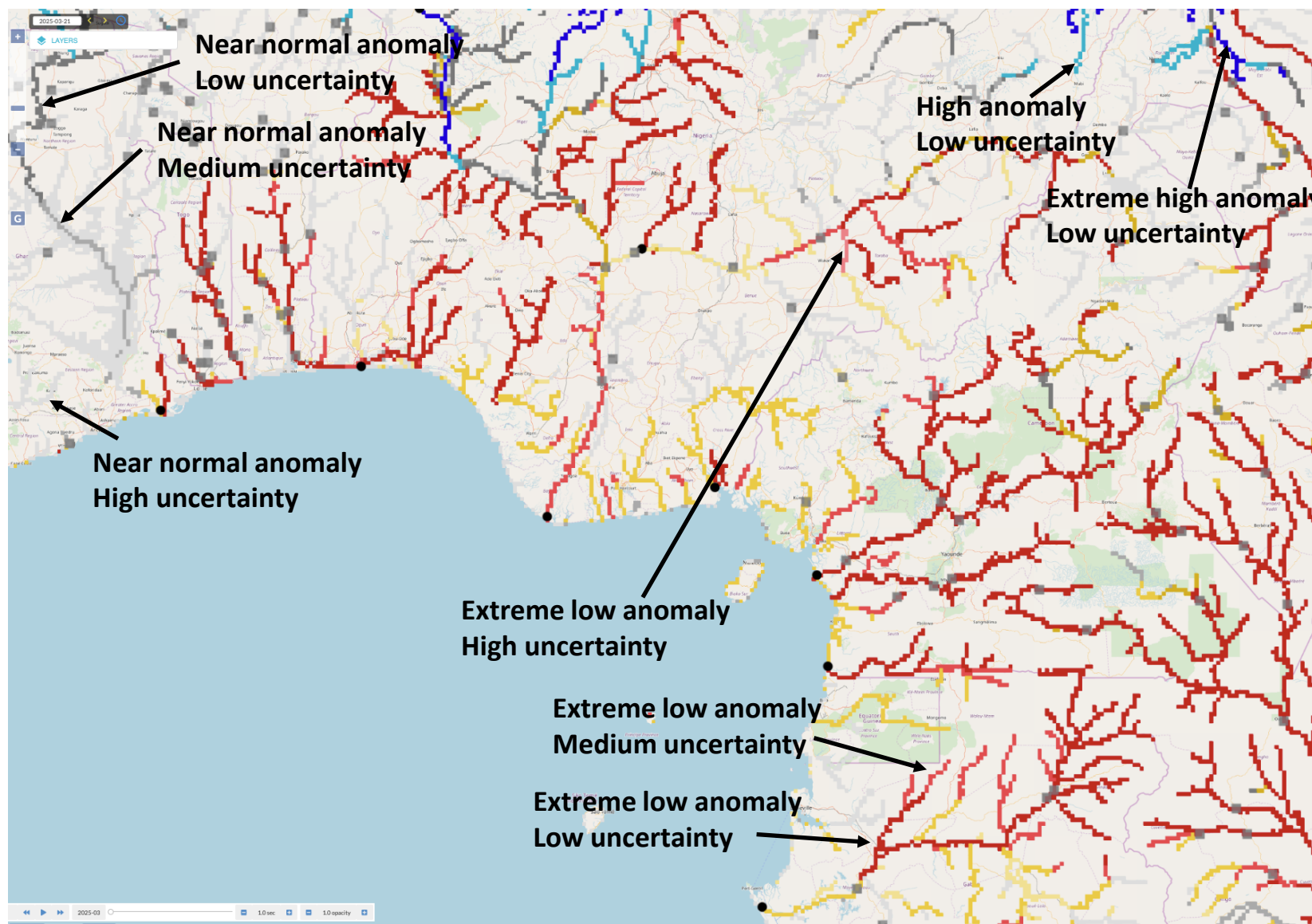


Outlook map with reporting points

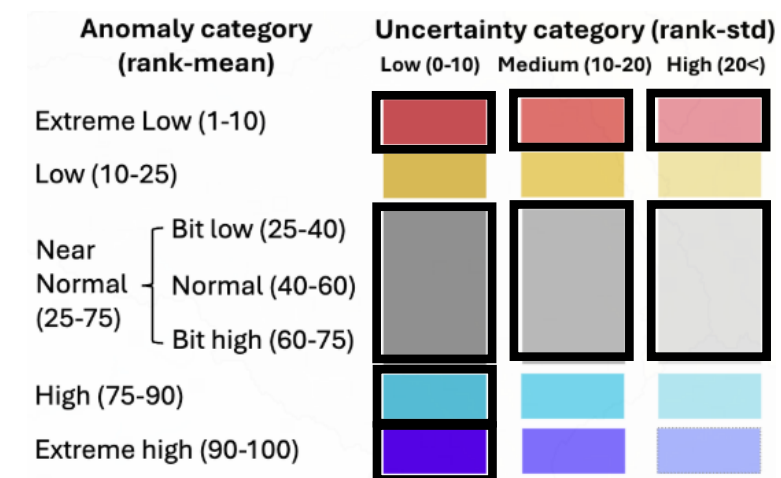


- Fixed points to show forecast details (the same as in the 30-day forecasts)
- Usual fixed reporting points (grey rectangles)
- New basin-representative points for the revised basins (black circles)

Outlook map with reporting points



- Combined anomaly/confidence
- 5*3 categories/colours (5 anomaly and 3 uncertainty categories combined)
- Pixels coloured above 1000 km²
- There is no such thing as 'no signal'!

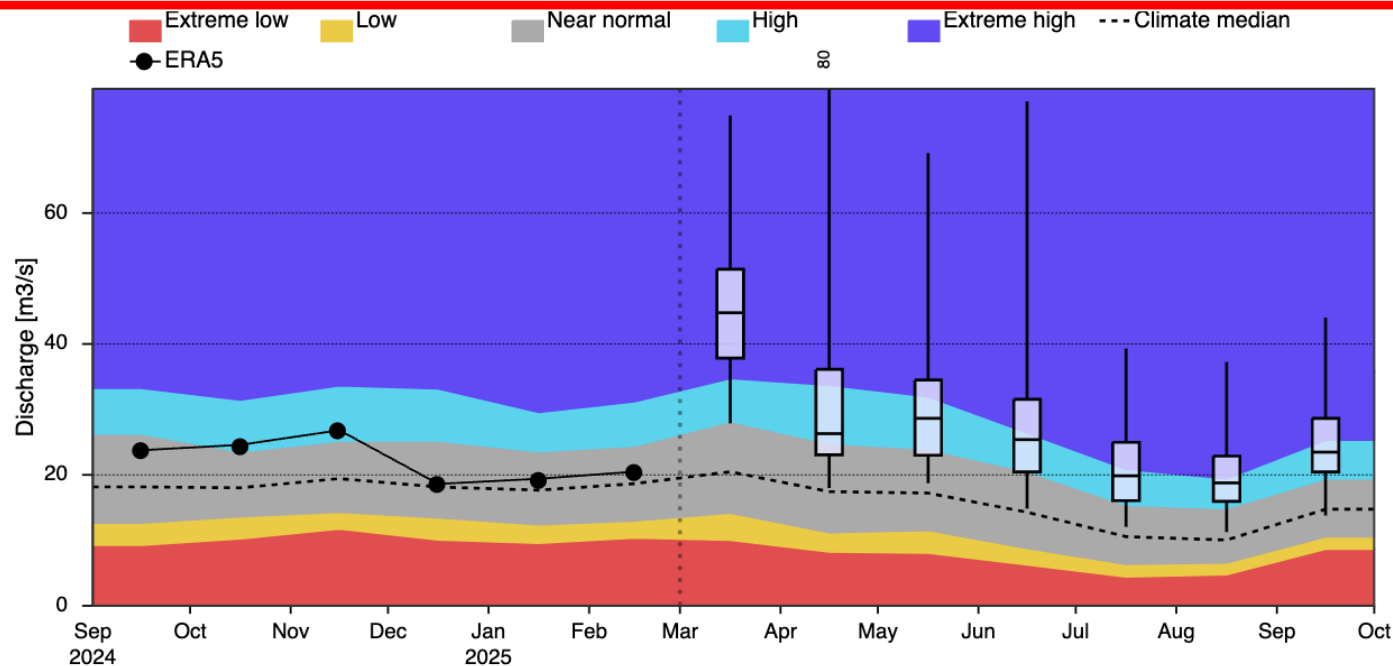


Reporting point products

Point Information

Station ID	Country	Basin	River	Station Name	Point ID	Drainage Area [km2]	Longitude [Deg]	Latitude [Deg]	LISFLOOD Drainage Area [km2]	LISFLOOD X [Deg]	LISFLOOD Y [Deg]
289	Spain	Spain, South and East Coast		NA	SR000289	NA	-0.2750	39.1750	21422	-0.2750	39.1750

Usual point metadata info



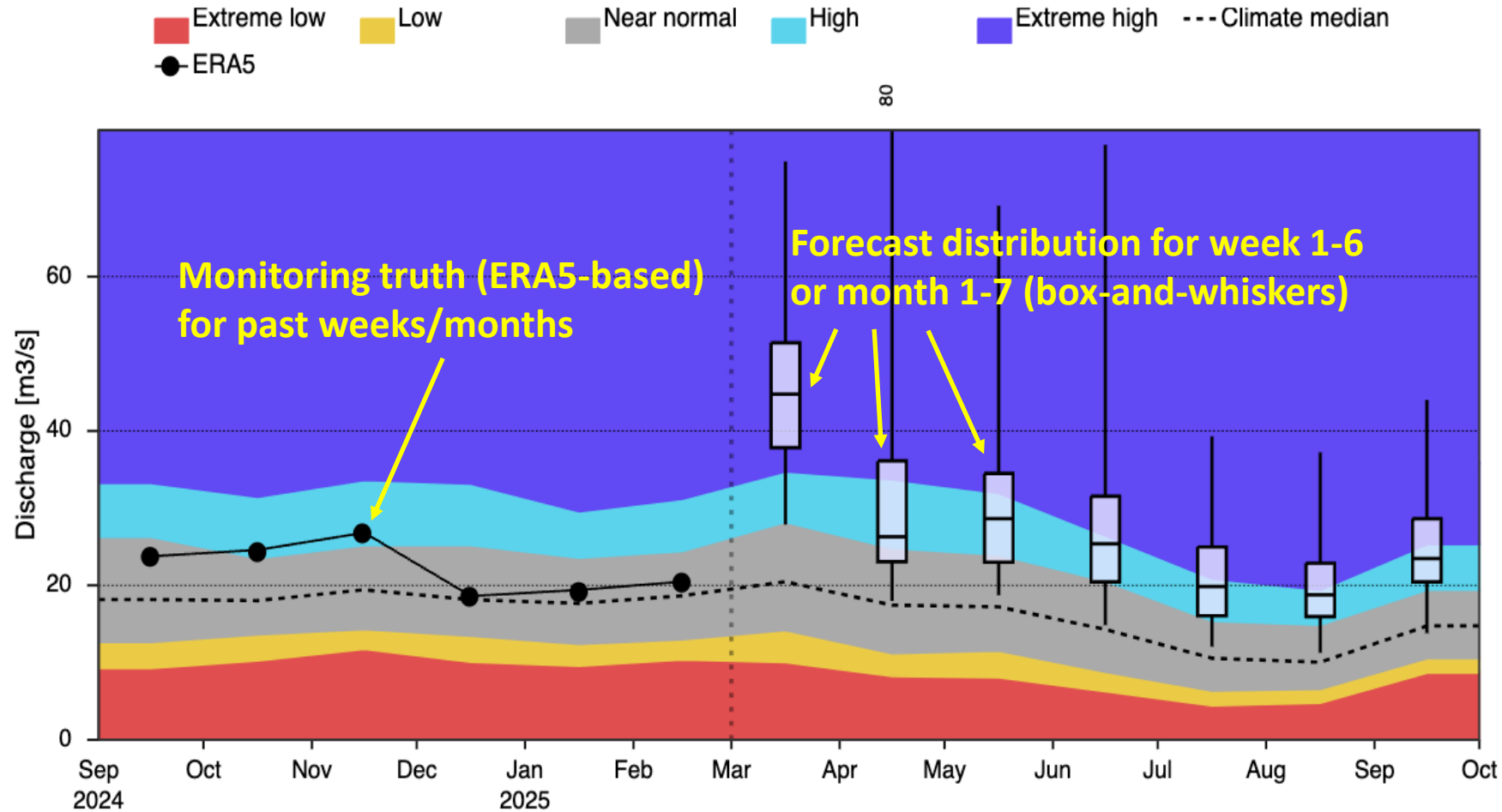
River discharge evolution hydrograph

Seasonal forecast probability (numbers) and expected anomaly category (coloured cells) [2025-03-01]

	March 2025							April 2025							May 2025							June 2025							July 2025							August 2025							September 2025						
	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH
March 2025	0	0	0	0	2	14	64	0	0	0	10	33	26	31	0	0	0	8	22	33	37	0	0	0	6	20	31	43	0	0	0	2	14	39	45	0	0	0	2	12	37	49	0	0	0	4	10	41	45
February 2025	0	0	4	31	39	12	14	0	0	8	29	25	18	20	0	2	4	22	29	29	14	0	0	10	18	37	19	16	0	0	2	22	35	25	16	0	0	4	23	33	24	16							
January 2025	0	0	12	33	27	10	18	0	0	10	21	31	18	20	0	2	6	33	23	16	20	0	0	8	35	14	21	22	0	0	2	25	39	14	20														
December 2024	0	0	4	45	25	10	16	0	0	6	33	31	18	12	0	2	12	25	16	33	12	0	0	12	27	18	31	12																					
November 2024	0	0	2	35	35	22	6	0	0	8	26	31	31	4	0	4	10	27	25	22	12																												
October 2024	0	2	20	33	21	16	8	0	6	16	21	27	14	16																																			
September 2024	0	14	35	33	10	8	0																																										

Probability evolution table

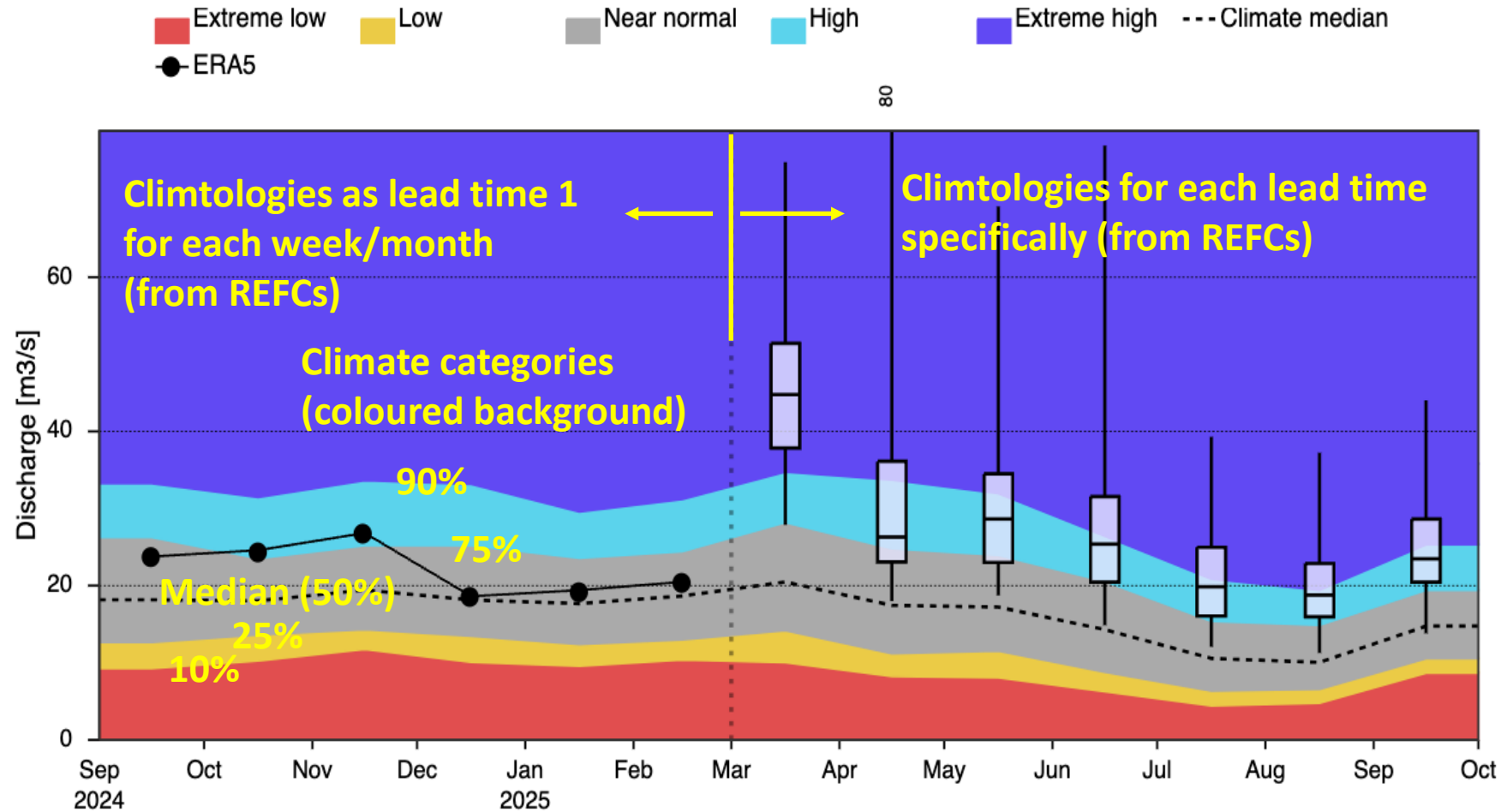
Reporting point products



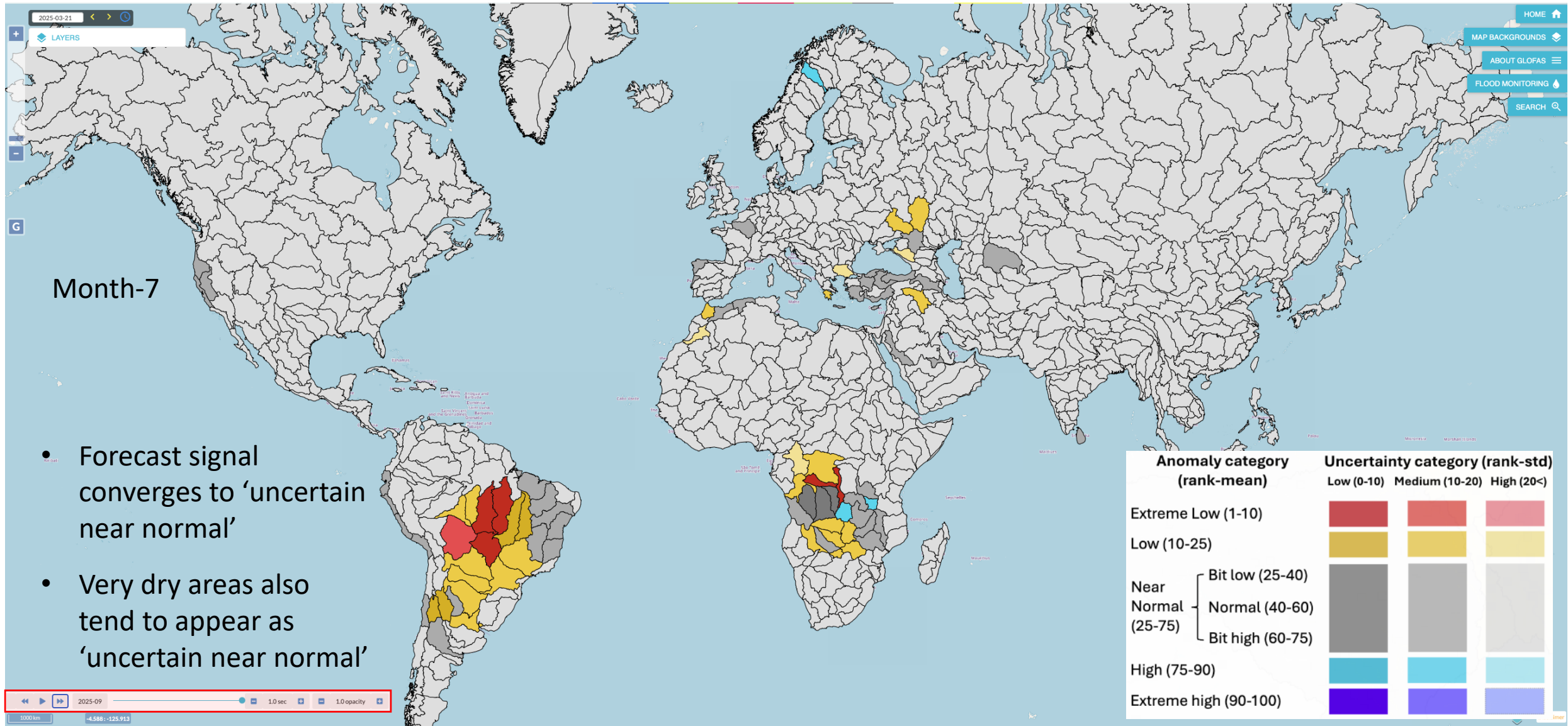
Monitoring truth (black dots) added retrospectively

So, users can go back and check later how the forecast verified

Reporting point products

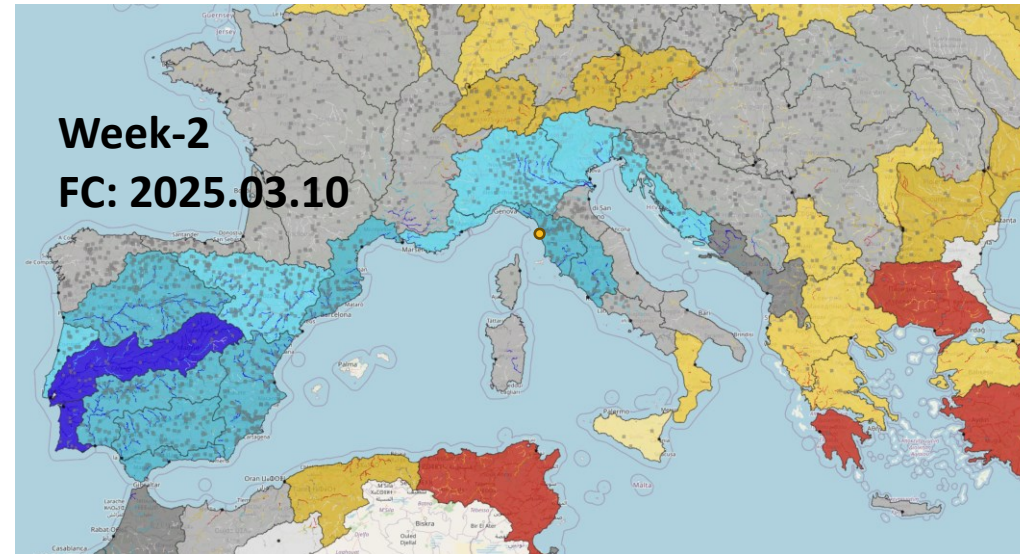
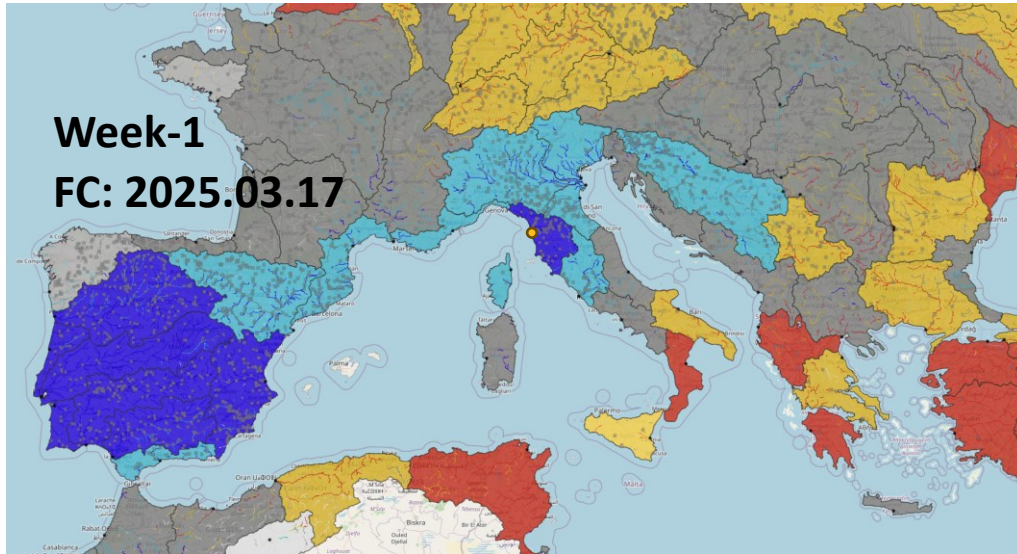


Outlook – Basins example

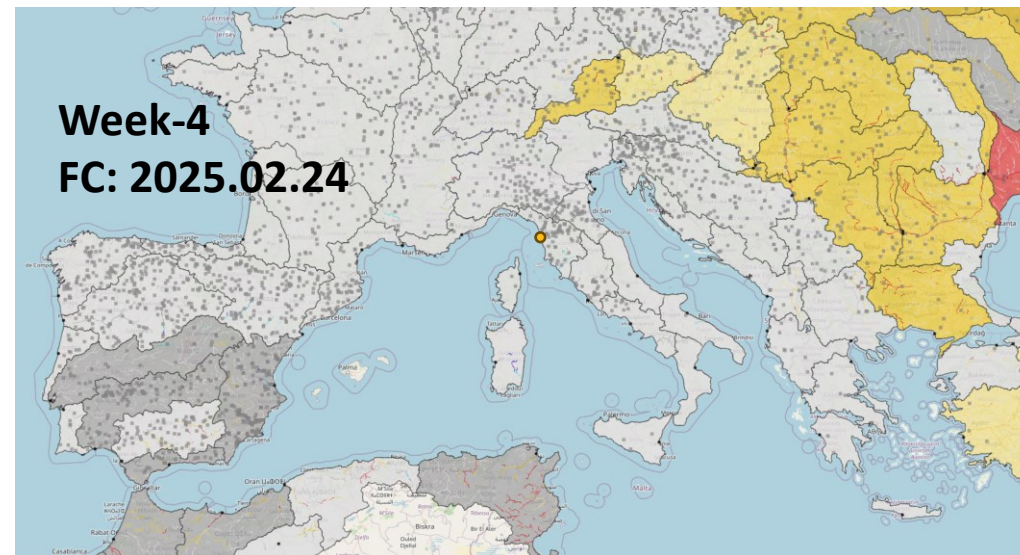
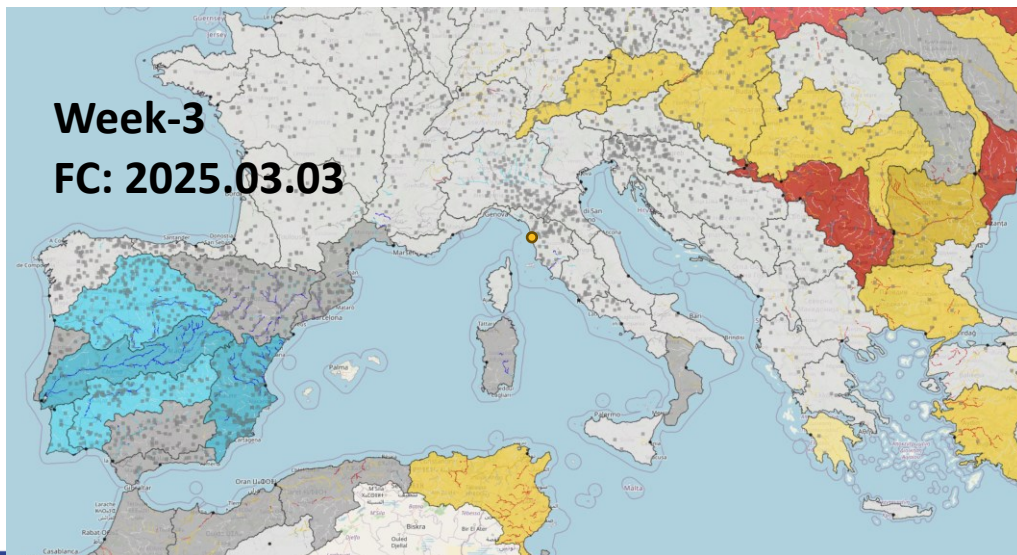


Sub-seasonal forecast example

Valid for the calendar week of 17-23 March 2025



Strong wet
signal out
to week 2-3



Sub-seasonal forecast example

Forecast evolution table for the forecast run of 17 March 2025

Sub-seasonal forecast probability (numbers) and expected anomaly category (coloured cells) [2025-03-17]

Forecast lead times (calendar week or month)

	Mar, Mon 17							Mar, Mon 24							Mar, Mon 31							Apr, Mon 07							Apr, Mon 14							Apr, Mon 21						
	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH	EL	L	BL	N	BH	H	EH							
Mar, Mon 17	0	0	0	0	0	0	100	0	0	0	0	0	0	100	0	0	0	0	0	22	78	0	0	0	2	20	35	43	0	0	2	14	20	31	33	0	2	12	10	12	37	27
Mar, Sun 16	0	0	0	0	0	0	100	0	0	0	0	0	37	63	0	0	0	2	8	29	61	0	0	0	16	24	23	37	0	2	8	12	22	23	33	0	6	8	16	14	33	23
Mar, Sat 15	0	0	0	0	0	0	100	0	0	0	0	0	25	75	0	0	0	2	8	29	61	0	0	2	16	25	22	35	0	2	8	20	16	25	29	0	2	14	14	21	22	27
Mar, Fri 14	0	0	0	0	0	0	100	0	0	0	0	14	23	63	0	0	0	2	8	37	53	0	0	2	20	26	27	25	0	4	10	22	21	25	18	0	4	16	25	16	23	16
Mar, Thu 13	0	0	0	0	0	31	69	0	0	0	8	22	35	35	0	0	2	22	22	23	31	0	0	10	18	23	22	27	0	2	8	20	29	20	21	0	2	14	21	20	23	20
Mar, Wed 12	0	0	0	0	0	14	86	0	0	0	4	20	37	39	0	0	6	14	18	25	37	0	0	10	12	29	31	18	0	8	14	23	16	19	20							
Mar, Tue 11	0	0	0	0	0	35	65	0	0	0	8	35	26	31	0	0	0	16	29	31	24	0	0	2	16	26	31	25	0	4	8	24	12	25	27							
Mar, Mon 10	0	0	0	0	4	29	67	0	0	8	14	20	33	25	0	4	12	25	18	18	23	0	4	21	33	8	16	18	0	8	18	25	18	12	19							
Mar, Sun 09	0	0	0	0	2	33	65	0	0	6	18	23	31	22	0	2	2	27	22	18	29	0	2	20	20	8	25	25	0	14	12	12	21	23	18							
Mar, Sat 08	0	0	0	2	4	23	71	0	0	10	29	20	20	21	0	4	12	18	27	27	12	0	4	10	29	25	16	16	0	8	10	23	18	21	20							
Mar, Fri 07	0	0	0	2	4	43	51	0	0	6	31	26	25	12	0	6	12	45	10	17	10	0	12	12	18	8	29	21	0	2	16	25	20	12	25							
Mar, Thu 06	0	2	2	8	8	33	47	0	6	8	21	23	22	20	0	10	19	18	29	12	12	0	10	10	25	29	22	4														
Mar, Wed 05	0	0	2	12	16	31	39	0	4	12	31	12	20	21	0	16	21	16	21	12	14	0	18	10	31	12	21	8														
Mar, Tue 04	0	0	14	16	12	27	31	0	8	21	25	18	16	12	4	12	19	16	18	19	12	0	18	14	23	21	16	8														
Mar, Mon 03	0	8	14	23	14	29	12	0	23	10	25	14	12	16	2	19	23	8	20	12	16	2	8	25	19	16	12	18														
Mar, Sun 02	0	0	14	35	24	23	4	0	23	25	12	18	14	8	2	16	21	27	14	10	10	2	18	21	21	12	18	8														
Mar, Sat 01	2	12	23	33	10	16	4	2	29	25	22	4	16	2	4	31	21	20	8	10	6	6	25	22	33	6	6	2														
Feb, Fri 28	4	27	20	23	6	12	8	17	33	18	16	2	10	4	6	29	12	31	12	6	4	10	21	19	14	16	16	4														
Feb, Thu 27	8	27	16	17	14	16	2	10	21	19	20	16	8	6	4	25	16	23	6	10	16	4	23	12	23	8	18	12														
Feb, Wed 26	0	16	35	27	8	12	2	8	25	20	27	6	12	2	12	15	21	16	16	16	4																					
Feb, Tue 25	2	19	21	16	12	14	16	10	21	19	14	16	16	4	10	21	14	25	10	14	6																					

Anomaly category highlighted by the Outlook product from 'EL' (Extreme Low) to 'EH' (Extreme High)

Expected category highlighted by the Outlook product

Forecast run dates

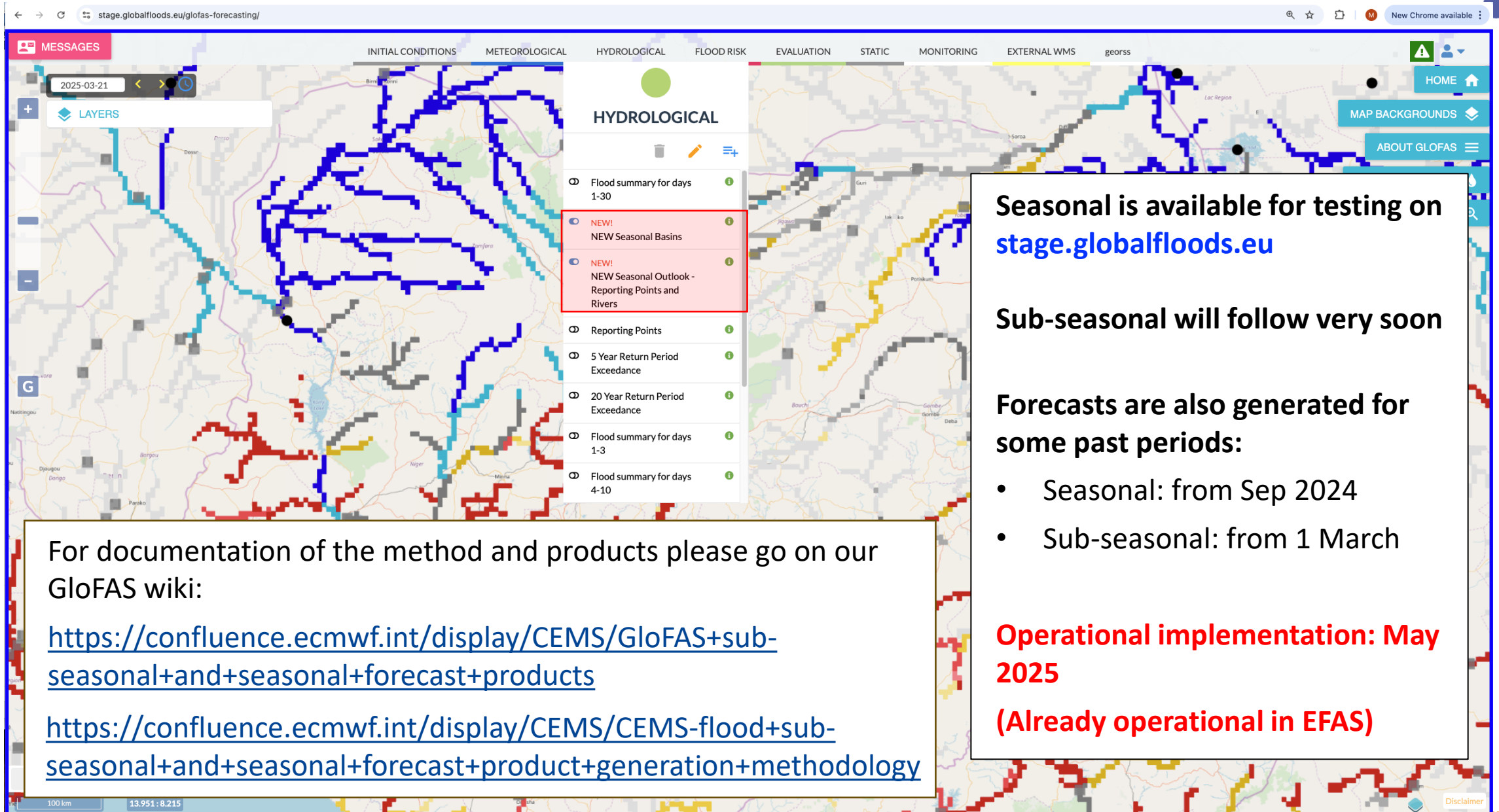
Anomaly categories from 'EL' (Extreme low) to 'EH' (Extreme high)

- Highlighted colour is the same as the corresponding river pixel on the Outlook product

Expected category highlighted by coloured cell + bold number

Then some further rows below this...

How to see the new products?





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Thank you!

Feedback / comments very welcome!



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