

## Deltares

# Delft-FEWS New features of 2025.01

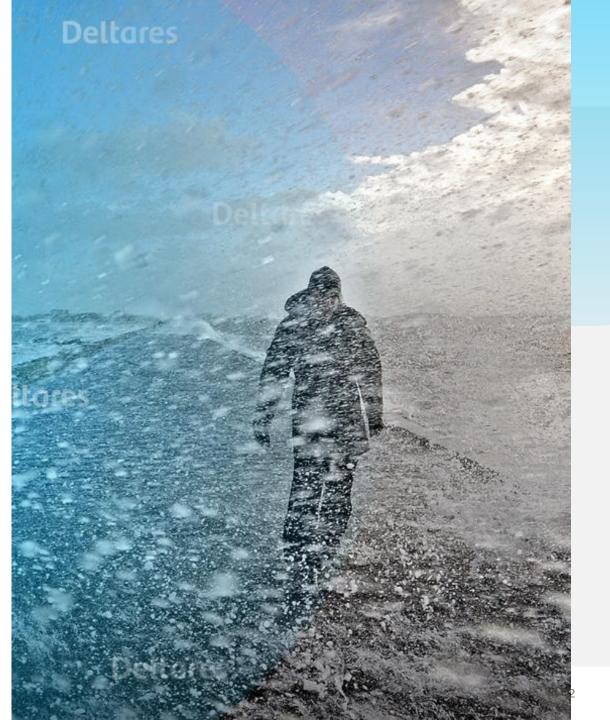
Delft-FEWS Anwendertreffen

**Marcel Ververs** 

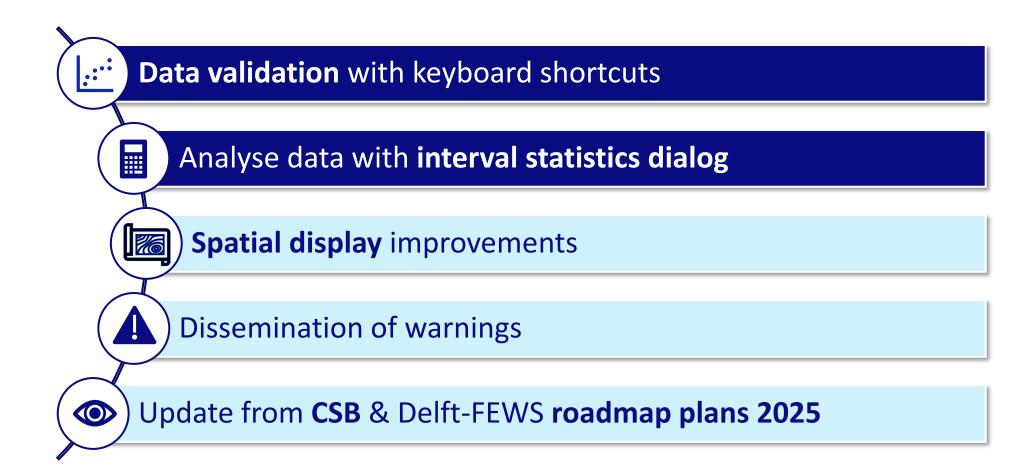
July 2025

## Introduction...

- Welcome
- What's new in 2024.02 and 2025.01
- Roadmap plans 2025
- As usual: Links for more info



## Highlights of the 2024.02 and 2025.01



## Data validation in Delft-FEWS

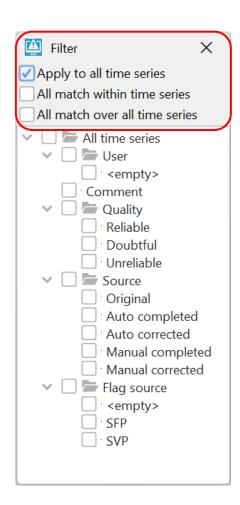
Use of quality flags

- Primary validation
- Secondary validation
- Manual edits/validation

Improved keyboard shortcuts for navigation Improved indicators

Automatically clear the flag source column when the value of flag is changed

Filtering records based on: user, comment, quality, source and flagSource



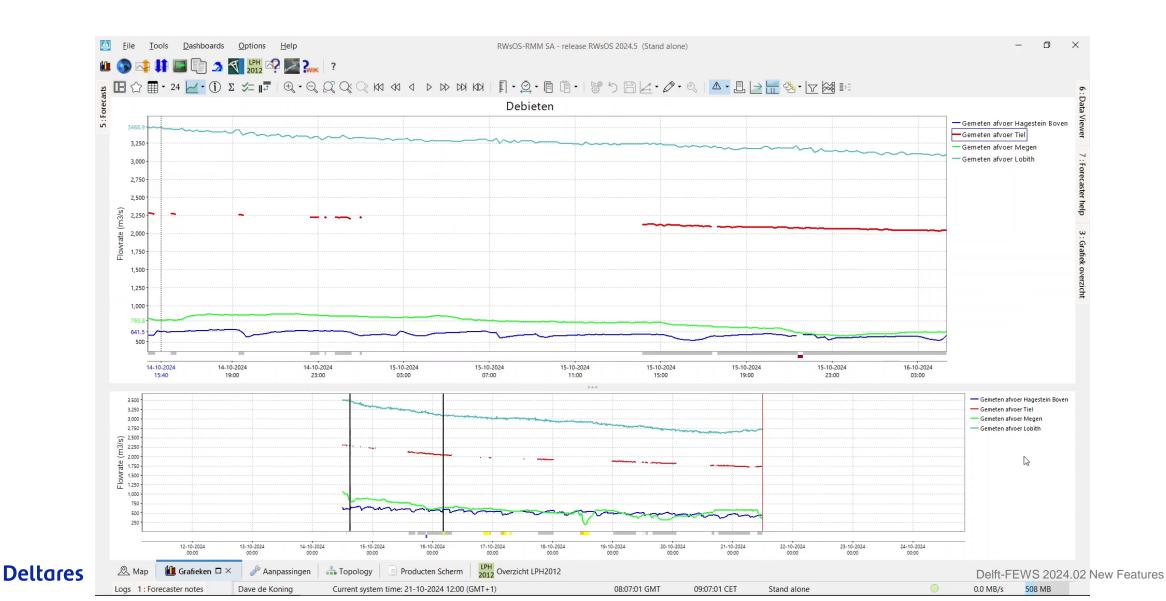
## Data validation – show data flags in long term scroller



ires 5

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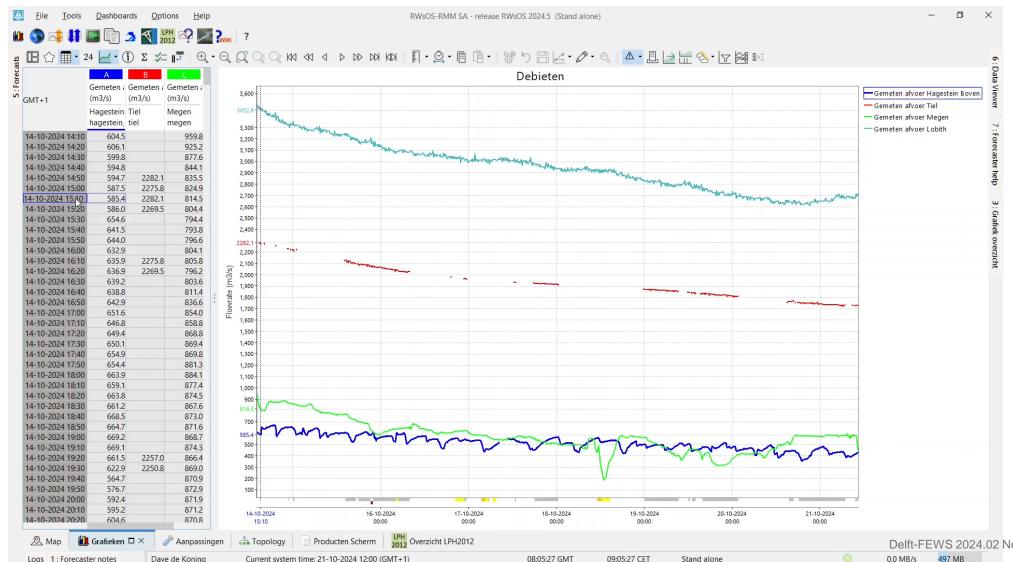
## Data validation – missing value crosses



6

## Data validation – jump to next flagged block

Deltares



Delft-FEWS 2024.02 New Features 7

## Interval Statistics Dialog – number of values

Start	23-07-2014	12:45:00		\$	] Interv	al	maa		$\sim$			_
Eind	23-09-2024	12:45:00		0	] Groot	theid	~ .		e validatie icht min (SN	I)		
Huidige datum	03-07-2024	12:45:00						│ % ha │ # ha ✓ % za	cht min (SN ard min (HN rd min (HN) acht max (S) cht max (S)	) () ()		
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					Verbe	erg waarde re	gels	Min 0		0	Buiten	]
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id naam 1 1	id 1	Parameter 1		Grootheid 4		_	E	Min 0 xporteer	Max Toepass mei	0 🗘		
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id naam 1 1	id 1 . H.G.15 . H.G.15	1 Waterho	instantie 1 WerkFilt WerkFilt	4 % zacht	jan 3 1 7	feb 3 3 1 1 40 3	E	Min 0 xporteer apr	Max Toepass mei	0 ≎ en jun	jul 3	aug

## Interval Statistics Dialog – secondary validation

	Start 23-07-201	4 12:45:00		$\Diamond$	Interval		maand	$\sim$			
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					Waarschuwi	ngsniveau					
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					Verberg waa	arde regels	Min	0 🗘	Max 0	🗘 Buite	en 🗌
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1 1	1	1	1	2		1	1	1	1	1	1
OW1041 A12				% series vergeli		0	0	0	0	0	0
OW1041 A12	STU H.G.15	Waterho	WerkFilt	# series vergelij	king (SC)	0	0	0	0	0	0

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## Interval Statistics Dialog – Flag Source Columns

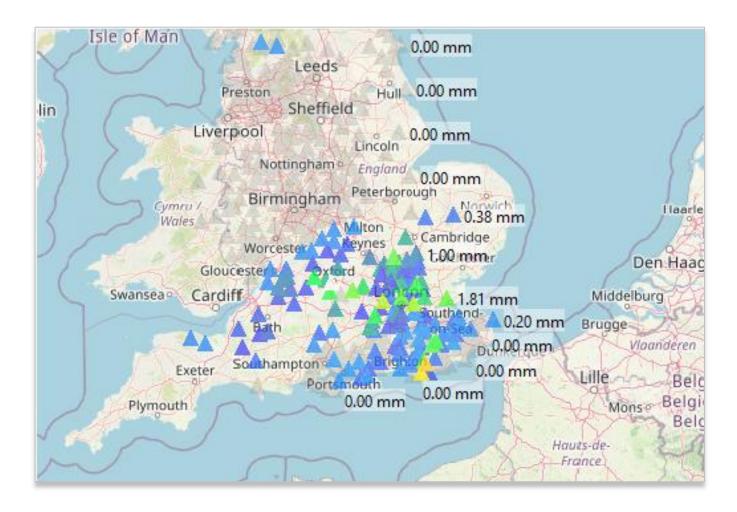
Start	23-07-2014	12:45:00		0	Interval	maand		~		
Eind	23-09-2024	12:45:00		♦ 🗖	Grootheid		Flag source PRI	columns		
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id naam 1 1 OW1041 A12 STU	id 1 . H.G.15	1 Waterho	instantie 1 WerkFilt	4 % series verge	Grootheid elijking (SC) PRIMAIR	Expo jan 3	orteer feb 3 0	Max Toepassen mrt 3 0	0 🗇 Bu apr 3 0	mei 3 0
id naam 1 1 0W1041 A12 STU. 0W1041 A12 STU.	id 1 . H.G.15 . H.G.15	1 Waterho Waterho	instantie 1 WerkFilt WerkFilt	4 % series verge # series verge	Grootheid elijking (SC) PRIMAIR elijking (SC) PRIMAIR	Expo jan 3 0	feb 3 0 0	Max Toepassen mrt 3 0 0	0 🗇 Bu apr 3 0 0	mei 3 0 0
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## Spatial display – allow custom symbols

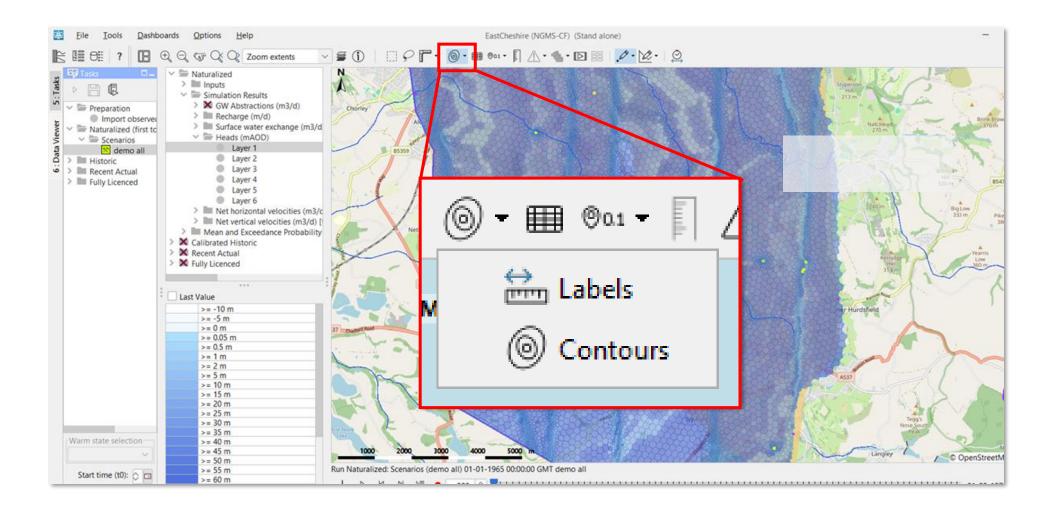
Use custom symbol (svg) Every layer own symbol Automatic resizing Colour changes according to legend

dataLayer>

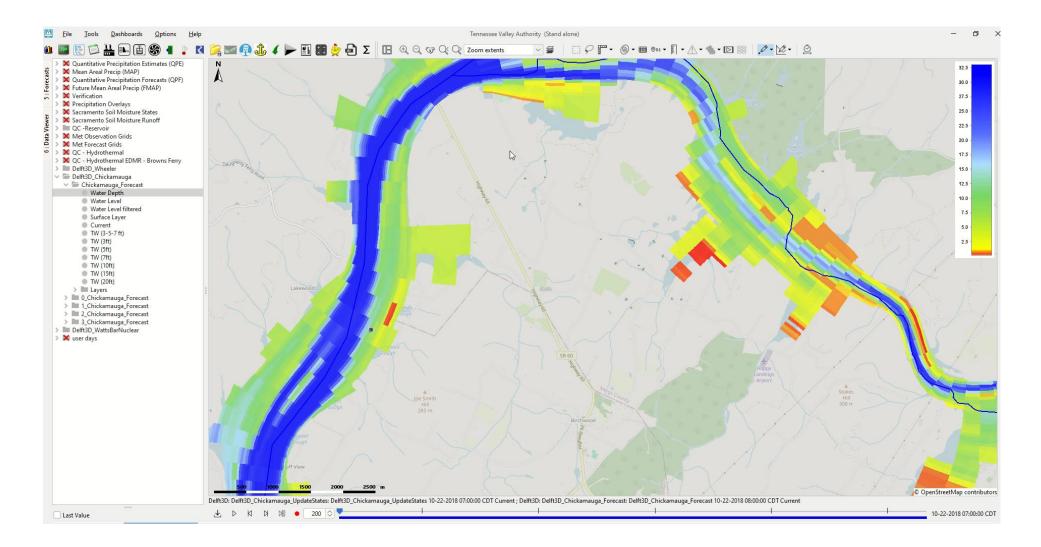
<symbolSvg>triangle.svg</symbolSvg> <timeSeriesSet> <moduleInstanceId>DummyImport</moduleInstanceId> <valueType>scalar</valueType> <parameterId>H.m</parameterId> <locationId>SX.E7842</locationId> <timeSeriesType>external historical</timeSeriesType> <timeStep unit="hour"/> <readWriteMode>read complete forecast</readWriteMode> </timeSeriesSet> </dataLayer>



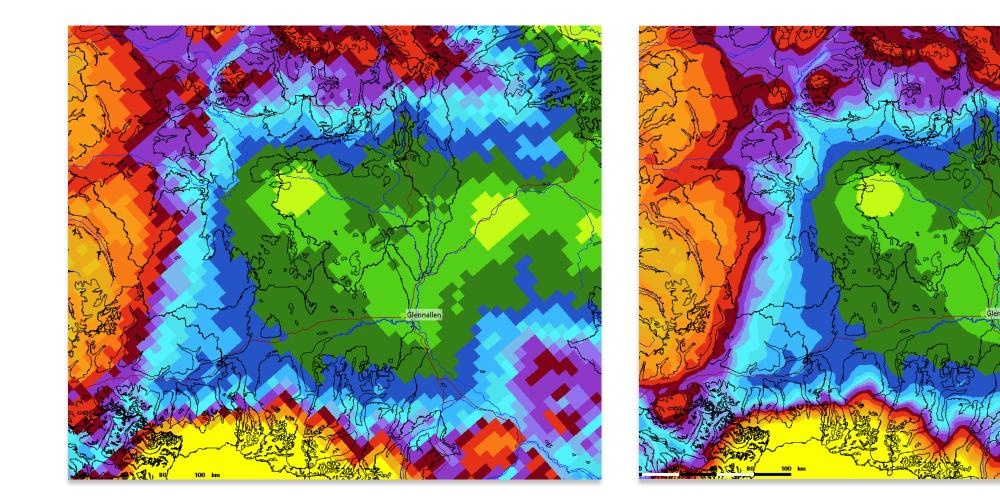
## Spatial display & on-the-fly grid interpolation



# Spatial display – Smoothening irregular grids



## Spatial display – Smoothening rotated grids



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## **Interactive Report Editor**

Value Properties Entry Display

 Technical name, based on the way it stores data

Interactive Report Editor (this use case)

- Peak water level prediction overview to which extra information can be added manually
- All information at the screen can then be exported to a report

Every element is freely configurable and contents will be stored as value properties in Delft-FEWS

6	H	Initial	Ð	€	



MFDO Headline New report

Weather Summary: Looks nice

Status

Fluvial Summary: But a bit we

Day 1: Wed 3( ) Day 2: Thu 31· ) Day 3: Fri 01-1 ) Day 5: Sun 03· )

Forecast values in the Days 1-5 columns are raw model output, so not to be taken literally. MFDOs will only make modifications to the MFDO Adjusted Peak column.

MEDO Name Forecaste

Catchment	Location Name	Already peaked (y/n)	Time of max in last 24 hrs	Max value last 24	Unit	Day 1 OP (max)	Day 2 OP (max)	Day 3-5 BE (max)	MFDO adjusted peak value			MFDO adjusted peak timing	Value of next FAL/FW threshold	Time of next FAL/FW threshold	Value of next Operation Activity	Tir ne na Op Ar
Tweed Woo	Sprouston	no 🗸	Wed 04:30	1.244	m				6.0	Mon	$\sim$	Early AM	<ul> <li>1</li> </ul>			
Tweed Woo	Coldgate Mill	no 🗸	Tue 19:00	1.036	m				9.0	Tue	$\sim$	AM N	•]			
Tweed Woo	Wooler	~	Tue 19:30	0.985	m					Wed	$\sim$	PM N				
Tweed Woo	Pawston	~	Wed 00:45	1.339	m				7.0	Thu	$\sim$	Late PM	<u>.</u>			
Tweed Woo	Heaton Mill	yes 🗸	Wed 12:15	1.414	m						$\sim$	\\	<ul> <li></li></ul>			
Tweed Woo	Belford	~	Tue 22:15	0.605	m						$\sim$	(	<u>.</u>			
Tweed Woo	Waren Ford	×	Wed 04:30	0.467	m				7.0	Fri	$\sim$	Early AM	- I			
Tweed Woo	Norham	~	Wed 12:00	2.373	m						$\sim$	\\				
Coquet	Shillmoor	~	Tue 20:15	0.61	m						$\sim$		<u>.</u>			
Coquet	Alwinton Bridge	×	Tue 20:45	1.013	m						$\sim$		• ]			
Coquet	Rothbury	~	Wed 03:00	1.291	m						$\sim$		<ul> <li></li></ul>			
Coquet	Felton UG Coquet	×			m						$\sim$		- I			
Coquet	Morwick	×	Wed 07:30	1.768	m						$\sim$		•]			
Wansbeck, P	Stamfordham	×	Wed 11:00	1.777	m						$\sim$		•]			
Wansbeck, P	Ponteland	×	Wed 05:45	0.884	m						$\sim$		- I			
Wansbeck, P	Hart Burn	×	Wed 03:30	0.545	m						$\sim$		•]			
Wansbeck, P	Mitford Dam		Wed 05:15	1.394	m						$\sim$		-			
Wansbeck, P	Nunnykirk	×	Wed 10:45	1.0	m						$\sim$					
Wansbeck, P	Mitford	~	Wed 02:45	1.729	m						$\sim$		· ]			
Wansbeck, P	Morpeth	~	Wed 01:45	25.118	m						$\sim$	\ \	-			

## **Interactive Report Editor**

lime and I																				
	Date Wed 12-03-2 🗘	M	DO	Area East Mid	dlands				MFDO	O Name	Erik									
Headline	There is something	going	g to	happen						L										
Summary:																				
	Lots of water every	where	1																	
Catchmer	Location Name	Alrea peak (y/n)	ced	Time of max in last 24 hrs	Max value last	Unit	Day 1 OP (max)	Day 2 OP (max)	Day 3-5 BE	Day 3-5 RWC	MFDO adjusted peak value			MFDO adjusted peak timing	Time of peak (OP forecast days 1-2)	Value of next FAL/FW threshold	Time of next FAL/FW threshold	Value of next Operational Activity	Time of next Operational Activity	MFDO Confidence
Derwent	Ladybower Reservoir	yes	$\sim$	Tue 13:30	-0.94	m	-0.24	0.42	0.56	0.11	0.5	Fri	$\sim$	Early AM V	Thu 23:30 13-03	0.40	Thu 21:4			High 🗸
	Yorkshire Bridge		$\vee$	Wed 07:00	0.33	m	0.34	2.08	2.46	0.96			$\sim$	~	Thu 23:30 13-03			0.51	Thu 13:0	~
	Castleton Peakshole		$\vee$	Tue 19:30	0.08	m							$\vee$	~						~
Derwent	Bradwell Brook		$\sim$	Wed 00:30	0.15	m							$\sim$	~						~
Derwent	Mytham Bridge		$\sim$	Tue 22:30	0.85	m	2.54	4.14	4.41	2.00			$\sim$	~	Thu 22:45 13-03	3.03	Thu 14:3			~
Derwent	Chatsworth		$\sim$	Wed 04:15	1.10	m	3.61	4.98	5.18	2.65			$\sim$	~	Fri 00:00 14-03	3.34	Wed 22:4	4.76	Thu 20:3	~
Derwent	Perryfoot Farm		$\sim$	Wed 11:30	0.22	m							$\sim$	~						~
Derwent	Buxton Burlington Road		$\sim$	Tue 20:30	0.52	m							$\sim$	~						~
Derwent	Buxton Lightwood Ro		$\sim$	Tue 15:15	0.22	m			_				$\sim$	~						$\sim$
Derwent	Buxton		$\sim$	Wed 10:00	0.14	m	1.17	1.63	1.60	0.78			$\sim$	~	Thu 21:00 13-03	1.17	Wed 19:1			$\sim$
Derwent	Ashford		$\sim$	Tue 19:00	0.38	m	1.07	1.82	1.72	0.89			$\sim$	~	Fri 00:00 14-03	0.76	Wed 20:1	1.26	Thu 16:4	$\sim$
Derwent	Matlock		$\sim$	Tue 18:00	0.66	m	2.97	4.97	5.24	2.70			$\sim$	~	Fri 00:00 14-03	2.55	Wed 22:1	2.02	Wed 20:4	~
Derwent	Wingfield Park		$\sim$	Wed 10:00	0.36	m	2.93	3.34	3.44	3.04			$\sim$	~	Fri 00:00 14-03	2.09	Wed 18:0	2		$\sim$
	Belper Whitemoor Lane		$\sim$	Wed 12:45	0.10	m							$\sim$	~						~
Derwent	Duffield		$\sim$	Tue 15:00	0.24	m	2.06	2.57	3.84	2.21			$\sim$	~	Thu 20:15 13-03	0.91	Wed 16:4			~
Derwent	Smithy Houses		$\sim$	Tue 20:45	0.34	m							$\sim$	~						$\sim$
Derwent	Derby Bridge Street Br		$\sim$	Wed 01:30	0.88	m	2.01	2.92	3.43	2.08			$\sim$	~	Fri 00:00 14-03	1.37	Wed 18:1			~
Derwent	Derby St Marys US		V	Wed 09:15	0.64	m	1.99	5.14	4.88	2.60			$\sim$	~	Fri 00:00 14-03	1.88	Wed 23:1	2.01	Thu 00:1	$\sim$
Derwent	Church Wilne		$\sim$	Tue 15:15	0.69	m	2.34	2.83	2.73	2.49			$\sim$	~	Fri 00:00 14-03	1.64	Wed 18:1	1.77	Wed 19:0	$\sim$
Soar	Sharnford		$\sim$	Wed 12:45	0.32	m	0.49	0.49	2.45	2.07			$\sim$	~	Thu 01:00 13-03					~
Soar	Whetstone		$\vee$	Wed 05:45	0.09	m	0.29	0.31	3.24	2.11			$\sim$	~	Fri 00:00 14-03					~

# Report exported from display

	Time and I	Date Wed 12-03-2 🗘	MFDO	Area East Mid	dlands				MFDO	O Name	Erik			
	Headline	There is something	going to	happen										
	Summary:	Lots of water every	where											
MFDO Forecast Report	Catchmer	Location Name	Already peaked (y/n)	Time of max in last 24 hrs	Max value last	Unit	Day 1 OP (max)	Day 2 OP (max)	Day 3-5 BE	Day 3-5 RWC	MFDO adjusted peak value			MFDO adjusted peak timing
MFDO Area: East Midlands	Derwent	Ladybower Reservoir	yes 🗸	Tue 13:30	-0.94	m	-0.24	0.42	0.56	0.11	0.5	Fri	$\sim$	Early AM 🗸
MFDO Name: Erik	Derwent	Yorkshire Bridge	~	Wed 07:00	0.33	m	0.34	2.08	2.46	0.96			$\sim$	$\sim$
Report Time: 14/03/2025 10:56	Derwent	Castleton Peakshole	$\sim$	Tue 19:30	0.08	m							$\sim$	$\sim$
MFDO Headline: There is something going to happer	Derwent	Bradwell Brook	$\sim$	Wed 00:30	0.15	m							$\sim$	$\sim$
Summary: Lots of water everywhere		Mytham Bridge		Tue 22:30	0.85	m	2.54	4.14	4.41	2.00			$\sim$	$\sim$
,	Derwent	Chatsworth	$\sim$	Wed 04:15	1.10	m	3.61	4.98	5.18	2.65			$\sim$	$\sim$

#### Forecast Location Water Level

Catchment	Location Name	Aiready	Max in I hr:		Unit	Day 1 OP	Day 2 OP	Day 3-5 BE	Day 3-5 RWC	MFDO A	Adjusted
Gatchinent	Location Name	Peaked	Time	value		(max)	(max)	(max)	(max)	Peak Value	Peak Time
Derwent	Ladybower Reservoir Level	yes	Tue 13:30	-0.94	m	-0.24	0.42	0.56	0.11	0.50	Fri Early AM
Derwent	Yorkshire Bridge		Wed 07:00	0.33	m	0.34	2.08	2.46	0.96		
Derwent	Castleton Peakshole Water		Tue 19:30	0.08	m						
Derwent	Bradwell Brook		Wed 00:30	0.15	m						
Derwent	Mytham Bridge		Tue 22:30	0.85	m	2.54	4.14	4.41	2.00		
Derwent	Chatsworth		Wed 04:15	1.10	m	3.61	4.98	5.18	2.65		

## Other use cases

## Multiple tables in display

### Different input types:

### Dates / Boolean checkboxes

		N3660	8 Number	1	Name Hunte	r River			Phase	Nev	v	Severity	low	minor				
Reissue (	Comment																	
Title		Initial	Below mino	r Flood Warr	ning for the Hur	ter River												
Sub-title	;																	
Headline	е																	
Overview	v																	
Other Wa	amings																	
Next Issu	-	T 1	1-03-2025 02		ACT During	time (ha)	Dei aute	Nerre	I V Include		<b>c</b> $\Box$							
ivext issu	le lime	Tue 1	1-03-2025 02		AET Expiry	Fime (hr)	Priorit	y Norma		e SEW	5 🗆							
Ordei A		ase	Туре		atchment Title		Severi							(	atchment Ov	erview		
	<u>_</u>		Quantitat \					$\sim$										
	✓ New		Quantitat				Below mino	r V										
17	<u> </u>		Quantitat I Generalis I					~										
10		~	Generalis 1	vewcastie Ai	ea			Ť										
Order	Location	Phase	Туре		Location		Catchn	nent	Forecast Severity		lude serva	Obse tior Level		iauge Gauge Datum Zero	e Observed Severity	Observed Tendency	Observed Time	
210.29	H061	New	forecast	Kingdon P	onds at Scone		Upper Hunt	er	Below minor		<ul> <li>Image: A second s</li></ul>	0.29	L	GH		0.0	Tue 21-01-2025 0	
210.37	H561		forecast	Hunter Riv	er at Aberdeen		Upper Hunt	er				2.18	L	GH		0.0	Tue 21-01-2025 1	
210.38	H561		forecast	Hunter Riv	er at Muswellbr	ook	Upper Hunt	er				1.05	L	GH		0.0	Tue 21-01-2025 1	
210.39	H561		forecast		er at Denman		Upper Hunt					2.08		GH		0.0	Tue 21-01-2025 1	
210.42	H561		forecast	Wollombi	Brook at Wollo	mbi	Wollombi B	rook				86.57		GH 85.7		0.0	Tue 21-01-2025 1	
210.44	H061		forecast		Brook at Bulga		Wollombi B					0.67		GH		0.0	Tue 21-01-2025 0	
210.59	H561		forecast		er at Singleton		Lower Hunte					2.67		GH		-1.0	Tue 21-01-2025 1	
210.65	H061		forecast		er at Maitland E		Lower Hunte			_		0.68		HD 0		-1.0	Tue 21-01-2025 1	
210.72	H561		forecast	Hunter Riv	er at Ravmond	Terrace	Lower Hunte	er				0.34		HD 0		0.0	Tue 21-01-2025 1	
Location	Kin	gdon P	onds at Scon	e	Minor 3.2	Mode	erate 3.5	Majo	or 3.7	Targ	et Lea	d Time						
Phase	Ne	w	<ul> <li>Forecast</li> </ul>	Severity Be	elow minor V	Prediction	n Type Qua	ntitative		D	atum	LGH	Gauge	Zero	Gauge Typ	e Automat	tic	
Status Te	out																	
Status Te	ext												Inc	lude Current	t Level 🗌	Include (	Observed Peak	
Forecast	Text The	Kingdo	on Ponds at S	Scone may e	xceed 2.90 m W	/ednesday e	evening, belo	w the min	or flood level.									
Clear	Include	Lovel		Date	Severity	Time Typ	e Level Ty	/pe Rar		•	13	ikelihood			Forecast Text		Add additio	
	-				-													iai cominer
Clear		2.9		1/2025 22:27	Below mi		Value	~	exceed	~	ma				90 m Wednes	day evenin		
Clear				<u>1/2025 11:27</u> 2/2025 11:27		1.01.010	Flood	~	exceed	~				ot Valid				
						Part `	Flood		exceed		ma			ot Valid				

- Different export formats ٠
  - Xml, can be used to upload predictions into another system
  - Simply use a different template:

### <forecast-period >

<element>\$sequence\$</element>

- <text type="warning\_situation">
  - \$fw\_headline\$
  - \$fw\_summary\$
  - \$fw\_otherwarning\$

#### </text>

<element type="severity">%SEVERITY%</element> </forecast-period>

# Update from FEWS Community Strategy Board

### **Topics:**

Input for FEWS Vision 2030

Developments and bugfixes for Web-OC

- Supported backend versions
- Backporting strategy

FEWS Community in Latin America AI and ML in operational forecasting and warning FEWS Community Talks

• Talk 11 October 2, 2025

Community Talk



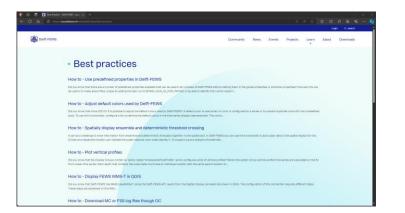
## References

### Portal (delft-fews.com)

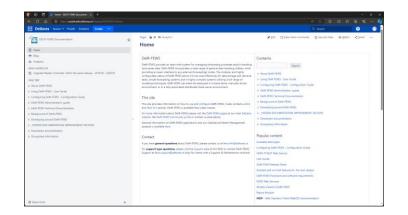
- How to's (Best practice)
- New features (Webinars)

Release notes page (fewsdocs.deltares.nl)

Wiki (publicwiki.deltares.nl)



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< C Q B https://	fewsdocs.deltares.nll[ins/fews	s-release-rich	n/	( <b>*</b> %	ខ្លែកមេខ 🥠
DELFT-FEWS RELEASE NOTES	Release Notes 2024	4.02		Last updated	2024-10-28 04:03:091+0000
E Rolease Notes 2024.02	Show 20 + en	tries		5	earch:
🖬 Roleans Notes 2024.01	Component 1	Кау П	Release Note (Documentation Link)	Description	Screenshot 11
Reference Notes 2023.02	App - Admin Interface	FEW5- 31202	Downloading a zip in the admin interface does not	In the Admin Interface downloading files into a zip does not change the timestamps of the files, which it previously did. This is similar to what Windows Explorer does when zipping and unzipping files.	
Release Notes 2023.01			change the timestamps of the zipped files		
<ul> <li>Release Notes 2022.02</li> <li>Release Notes 2022.01</li> </ul>	App - Admin Interface	FEW5- 26561	None	None	1980 - 1980 - <mark>1</mark> 9
•	App - Admin Interface	FEWS- 31628	None	Name	
	App - Archive	FEW5- 31698	Thredds is upgraded to version 5.5	Threedds is upgraded to version 5.5	
	App - Archive	FEWS- 31285	archive amatgamate is made more robust	When the time series definition of a time series exported to a daily abserved data file is charged by adding or removing a qualifier they cannot be merged into a single monthly file. Previously the amalgament evold be stipped. New the amalgament orders to me modelly file.	
	App - Archive	FEW5- 31662	Additional security checks are added to the pi webservice	Some endpoints were subserable to directory traversal. This is fixed now.	
	App - Archive	FEWS- 31601	None	None	
	App - Archiva	FEW5- 29593	It is now possible to use attributes for products in the data management tool.	It is now possible to use attributes for products in the data management tool	





## Deltares

## PMT Water Operations Delft-FEWS Suite

Roadmap 2025 Overview

**Delft-FEWS Product Management** 

July 2025

## Roadmap 2025 – Timeline & Topics selection process

### Input (Oct '24 – Jan '25)

- Internal ideas & initiatives
- International Delft-FEWS User Days

### **Digestion (Jan '25 – Feb '25)**

- Selection & aligning with on-going Deltares initiatives
- Vision/strategy processes & planning Deltares strategic period: 2026-2029
- International and software strategy

## 4 clusters (Spring 2025)

- Software themes
- Artificial intelligence
- Python integration
- Miscellaneous



### https://delft-fews.com/roadmaps

### Software themes

₽\$<sup>4</sup> Software aspects

**General improvements** 

Security

Test automation

Code quality

Cloud & Dev/Ops

**Delft-FEWS** Web Operator Client **Open Archive FEWS** webservices

### **Artificial Intelligence (AI)**

### **Every day Al**

Github CoPilot and IntelliJ CoPilot for developers

### **Scientific Al**



Flood mapping using AI data & model fusion

Integrating Al generated

weather forecast data (ECWMF)

Agentic workflow (FEWS Bot)

### **Python integration**

### Wrapper

Wrapper for FEWS webservices

**Forecast Verification** 



Forecast verification package enhancing existing methods & functionality (from BoM and RWS)

### **Engagements**

Explore Azure Data Lakes Rainfall downscaling/bias correction module BMI compliancy (extended) **Delft-FEWS** community

### **Miscellaneous**

### Easier configuration

FEWS-Conform: set-up of configuration conventions, templates, documentation, checks etc.

## **Software Themes**



#### Software aspects

For the sub theme software aspects we will be addressing **cybersecurity**, **test automation**, **code quality and clean up**, and **cloud dev/ops activities**. All aimed to keep the software future proof, high quality and secure. Our activities involve regular maintenance, as well as investigating better ways to test, check and maintain our software.



#### **General improvements**

To keep Delft-FEWS fast, robust and easy to use, we need to keep the code up to date with the **latest development standards** as well as **developing improvements that allow users to keep enjoying the benefits**, while at the same time making life of developers easier. We do this for example by adding functionality to upload a localDataStore into a client server system, include support for HTML components and reports and improving the data management tool for the Open Archive. General Improvements Software aspects

## **Software Themes**



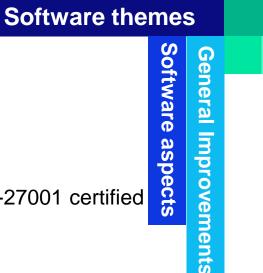
### Software aspects

- Cybersecurity: OIDC complete, 3<sup>rd</sup> party libraries updates and Deltares ISO-27001 certified
- Test automation: improve stress testing and automated GUI testing
- Code quality and clean up: new tooling for static and dynamic code scans
- Cloud dev/ops activities: maintain Azure, improve AWS knowledge, infra as code, FSS scaling



### **General improvements**

- Delft-FEWS: improving scenario comparisons, easier backend replication, more system metrics for easy troubleshooting
- Delft-FEWS Web OC (incl. webservices): modular approach, support for external visualisation tools & automated testing
- Open Archive: pilot for DB plugin for scalar data, improve robustness and performance and simplify installation



# **Artificial Intelligence (AI)**



### **Everyday Al**

To increase the efficiency (and fun) of our daily work, we are investigating ways to incorporate everyday AI such as CoPilot when developing Delft-FEWS. We will work together and share experiences with the other software departments and initiatives within Deltares to benefit most from these experiments with AI.



### **Scientific Al**

Performance and accuracy are two of the most important features of flood early warning systems. With the recent increase in use cases of AI, we want to investigate how this can be of use to further improve the performance and accuracy of our Delft-FEWS applications. For example, by making Delft-FEWS bots, and working on AI generated weather forecasts and fusion of AI and models to generate flood maps.

Deltares' Strategic Agenda 2026-2029 states: "Our AI/ML strategy for the coming strategic period focuses on developing advanced AI/ML techniques to deepen experimental, numerical and datadriven understanding of water and subsoil ("Scientific AI") and on increasing efficiency in daily operational processes ("Everyday AI").

#### **Artificial Intelligence**

Scientific Al Every Day Al

# **Artificial Intelligence (AI)**



### **Everyday Al**

• Integrate AI tools in day-to-day development processes



- Pilots & knowledge sharing within the development team and between development teams
- Code reviews, pull requests, identifying code smells, refactoring and creating unit tests more easily using AI tools



### **Scientific AI**

- Large Language Models for Delft-FEWS (FEWS bots)
- Fusion of AI tooling, Earth Observation (EO) and models for flood mapping
- Exploring application of (ECMWF) AI generated weather data products in an operational context

# **Python Integration**



### Python integration – Delft-FEWS Webservices wrapper

The importance of embracing and integrating Python as a development tool for researchers is clear. To enable internal colleagues and external end users of our software to directly interact with Delft-FEWS using Python, the standard connection facilities will be provided. In this way, Python users can directly focus on their Python algorithms and arrays without having to spend time on figuring out connection and data I/O with Delft-FEWS.



#### Python integration – Forecast Verification

Determining quality and performance of forecasts is becoming more important. In order to assess forecast quality, many tools are available. Building on previous projects, forecast verification knowledge will be collected and improved in a dedicated Python package which will be available for all end users to learn from and apply in their contextual situation.

# **Python Integration**



### Python integration – Delft-FEWS Webservices wrapper

- Robust, performant and standard way for timeseries I/O from Delft-FEWS
- Support for Python-ready array format (Xarrays, Pandas)
- Deltares maintained separate Python package (optional component)



### **Python integration – Forecast Verification**

- Detach in 'wrapper' code (see above)  $\rightarrow$  focus on 'forecast verification' code
- Enhance the forecast verification part with threshold exceedance info (e.g. skill/hit rate/false alarm rate)
- Enabling continuous verification
- Comparing skill(s) of different models running via the General Adapter of Delft-FEWS.

#### Deltares

#### **Miscellaneous**

## **Miscellaneous**



### Engagements

From the Delft-FEWS perspective we would like to engage with and to other domains. Focus will be on the data storage and data processing (Azure data lakes), on model integration using the BMI interface and on meteorology by developing our own rainfall downscaling and bias correction module. We engage with our user community as well under this roadmap theme.

### **Easier Configuration**

The FEWS-Conform initiative summarizes the Easier Configuration sub theme. It is a new approach to flatten the configuration learning curve, while at the same time providing consistent documentation, configuration examples and training materials following these conventions. Starting internally, we will soon expand externally by involving our end users and consultants using Delft-FEWS.

## Miscellaneous

### Engagements

- Azure Data Lakes exploration
- Extending the BMI Interface (module adapters supporting different modelling software languages)
- Rainfall Downscaling and Bias Correction Module
- Delft-FEWS Community



• FEWS-Conform initiative: Configuration convention, consistent materials (documentation, courses)



## Contact

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