Environment Agency/Bureau of Meteorology: Working in partnership to deliver system and service improvements

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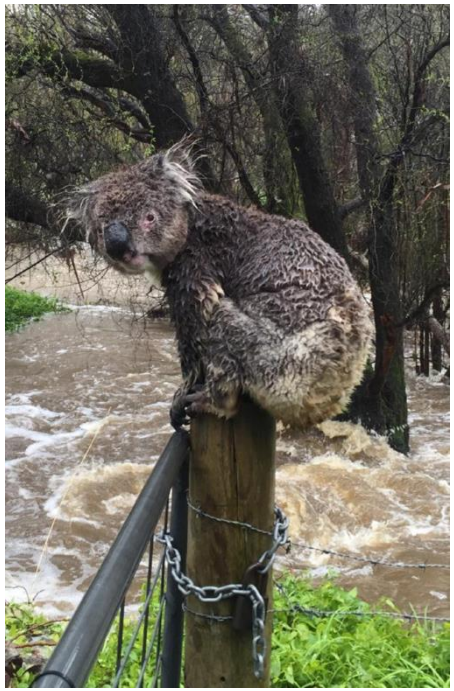
Introduction

- **A shared vision**
- **A collaborative approach**
- **FEWS underpins both organisations**
- **What will be different in the next year**



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Two national *flood* organisations

Agency – risk analysis, hydrometry, forecasts, warnings, advice & information, responding, builder and operator of assets

- Bureau - climate, meteorology, all natural hazards, forecasting, warning to responders, advice & information

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Saving lives and livelihoods: a shared goal

- User focussed
- Forecast led service providing impact information and describing the confidence
- Delivering a national service
- Increased digital presence
- Ambition to be world class in flood forecasting and flood warning

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Now:

Weather Forecast

Hydro Forecast

Warning/impact

Hydrometeorological Guidance

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Issued by the Flood Forecasting Centre on 01/12/15 at 06:55 GMT (06:55 local time)
Unique Reference No. 1618 Version 1 Original

Our 5 day assessment of Heavy Rainfall Alerts (HRAs) / Tidal Alerts is below.

Rainfall Scenario Map: From 2100 Sat 19 Nov to 1800 Sun 20 Nov

Met Office

Area A:

Hydromet Best Estimate (L): 15 mm (in 12 hrs) widespread, 25 mm (in 12 hrs) locally, ma... south coast and south facing upslopes

Reasonable Worst Case (L): 20 mm (in 12 hrs) widespread, 40 mm (in 12 hrs) locally, ma... south coast and south facing upslopes

Area B:

Hydromet Best Estimate (L): 5 mm (in 12 hrs) widespread, 10 mm (in 12 hrs) isolated

Reasonable Worst Case (L): 20 mm (in 12 hrs) widespread, 30 mm (in 12 hrs) locally, ma... south facing upslopes

Issue time: 0700 17/11/16

1 Dec 2015 06:55

Forecast Meteorological Data
EA North West Region

FLOODFORECASTINGCENTRE

Issued by the Flood Forecasting Centre on 01/12/15 at 06:49 GMT (06:49 local time)
Unique Reference No. 3069 Version 1 Morning Issue

Precipitation Forecast

CUML	Ave (mm)	
	Max (mm)	
CUMH	Ave (mm)	
	Max (mm)	
NLH	Ave (mm)	
	Max (mm)	
LANL	Ave (mm)	
	Max (mm)	
PEN	Ave (mm)	
	Max (mm)	
MLPL	Ave (mm)	
	Max (mm)	
CHPL	Ave (mm)	
	Max (mm)	

CUML	
NLH	
PEN	
CHPL	

1 Dec 2015 06:49

Heavy Rainfall Alert
EA North West Region

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Issued by the Flood Forecasting Centre on 30/11/15 at 17:30 GMT (17:30 local time)
Unique Ale

ORIGINA

Start of me

End of meb

Summary

10 mm
15 mm
30 mm (
40 mm (

Notes:
- Confidk... Heavy R...
- Issue of... the ban...
- All Alert...

UKCMF Tidal Alert Forecast

Issued by the Flood Forecasting Centre on behalf of UKCMF

Data covers the interval 2014-10-07 14:00 to 2014-10-08 06:00 UTC
Using model data from 2014-10-07 06:00 UTC

Issued on Tuesday, 07 October 2014 at 11:52 UTC by Daniel Lamb

Margin (Diff from previous tfc) m	Margin (Diff from alert level) m	Division	Port	Alert level OD(N) m	Date & Time (Astro) UTC	Date & Time (Model) UTC	Height OD(N) (Astro) m	Surge (Model) m	Forecaster Adjustment m	Height OD(N) (Forecast) m	Model Wind degrees/ m/s	Confidence	Comments
0.00	-0.14	EA 7	Newlyn	3.02	07.10.2014 15:37	07.10.2014 15:35	2.79	0.05	0.05	2.88	240/5	H	High confidence in total water level. Small positive adjustment made to account for recent model performance on similar high tides.
0.00	-0.28	EA 7	Boumemouth	1.30	07.10.2014 19:52	07.10.2014 19:49	0.99	0.02	0.00	1.02	219/6	M	No adjustment made with medium confidence in total water level based on recent observations not being available at this port.
-0.01	-0.20	EA 8G	Hinkley Point	6.80	07.10.2014 17:50	07.10.2014 17:50	6.43	0.17	0.00	6.60	189/4	M	Medium confidence in total water level. No forecaster adjustment made due to recent model performance on equivalent tides.
-0.01	0.35	EA 8G	Avonmouth	7.20	07.10.2014 18:19	07.10.2014 18:20	7.35	0.20	0.00	7.55	219/8	M	Medium confidence in total water level. No forecaster adjustment made due to recent model performance on equivalent tides.
0.03	0.10	EA 8N	Newport	7.00	07.10.2014 18:13	07.10.2014 18:14	6.92	0.23	-0.05	7.10	236/7	M	Medium confidence in total water level with a negative forecaster adjustment made based on recent model performance at this port.
-0.06	-0.14	EA 9	Fishguard	3.01	07.10.2014 18:16	07.10.2014 18:18	2.72	0.15	0.00	2.87	207/5	M/H	Medium/high confidence in total water level with no forecaster adjustment made. This is because of recent model performance and narrow spread in surge ensembles.
-0.12	-0.07	EA 9	Barmouth	3.23	07.10.2014 19:15	07.10.2014 19:15	2.95	0.21	0.00	3.16	210/8	M/H	Medium/high confidence in total water level with no forecaster adjustment made. This is because of recent model performance and narrow spread in surge ensembles.
-0.07	-0.29	EA 9	Holyhead	3.45	07.10.2014 21:18	07.10.2014 21:15	2.98	0.18	0.00	3.16	220/7	M/H	Medium/high confidence in total water level with no forecaster adjustment made. This is because of recent model performance and narrow spread in surge ensembles.
-0.01	-0.20	EA 9	Llandudno	4.69	07.10.2014 21:40	07.10.2014 21:38	4.30	0.19	0.00	4.49	177/4	M/H	Medium/high confidence in total water level with no forecaster adjustment made. This is because of recent model performance and narrow spread in surge ensembles.
-0.04	-0.29	GEPA 7	Foula	2.70	07.10.2014 20:18		2.26	0.15	0.00	2.41	062/13	M/H	No adjustment made based on model performance at recent high tides at nearby ports. Medium/high confidence in total water level.
-0.02	-0.22	GEPA 7	Lerwick	1.55	07.10.2014 22:00	07.10.2014 21:58	1.14	0.19	0.00	1.33	059/12	H	No adjustment made based on model performance at recent high tides at this port. High confidence in total water level.
-0.02	-0.25	EA 10	Workington	5.03	07.10.2014 22:30	07.10.2014 22:29	4.60	0.23	-0.05	4.78	230/5	M/H	Small negative adjustment to account for recent model over forecast at this site on previous high tides. Medium to high confidence in total water levels.
0.01	-0.23	EA 6	Portsmouth	2.47	07.10.2014 22:20	07.10.2014 22:17	2.19	0.06	0.00	2.26	212/5	M/H	No adjustment made with good recent model performance at this site at previous equivalent high tide. Medium to high confidence in total water levels.

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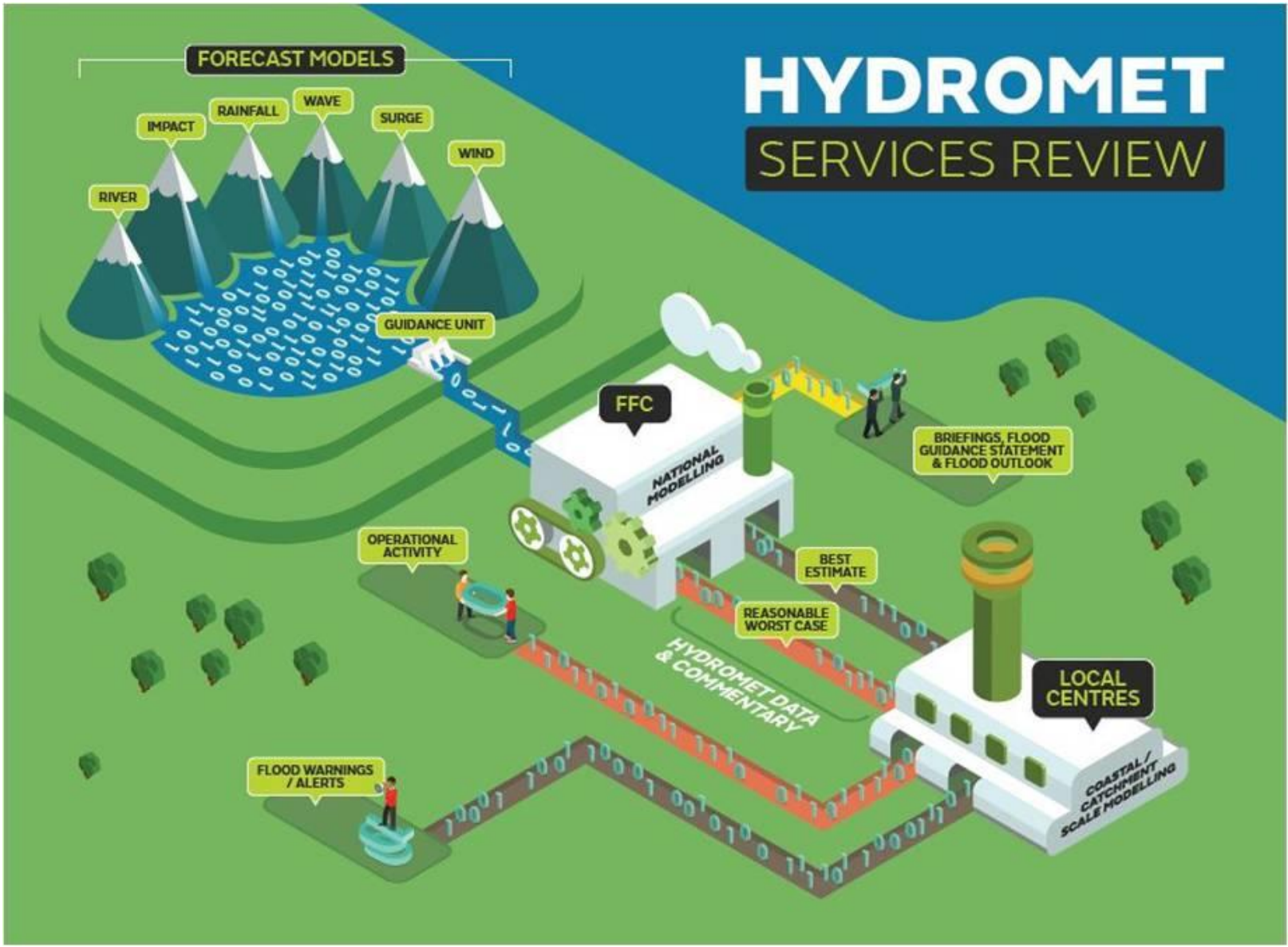
Future:



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System and services

BoM - Where we are now vs. future ambition

Now

- One National Forecasting System
- Primarily text based products
- Developing product generation capability
- Limited impact based services

Future

- Totally seamless national operations
- Forecasts better linked to impacts
- Products in a range of formats
- Agile product generation capability

System and services

EA - Where we are now vs. future ambition

Now

- **Eight** legacy instances regional forecasting systems
- **Aging** infrastructure
- **Out of date** software
- **Not able to easily make necessary changes** / improvements
- System is **holding us back** to make our service more interoperable and efficient

Future

- **One** interoperable, efficient forecasting system/service for England
- **Scalable** infrastructure to meet today's & future demands
- Being able **respond faster** to user requirements and make service improvements

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Memorandum of Understanding Journey from 2011 to 2018

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Strategic Plan

Service development

- operational standards, service process, research and development, learning and operational response

Customer and partner engagement

- warning and informing services, infrastructure operators, communication channels and embedding effective actions

Technology and innovation

- flood monitoring, forecasting (FEWS) and warning systems development, maintenance and performance

Developing our people

- Skills, competency, accreditation

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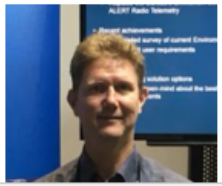
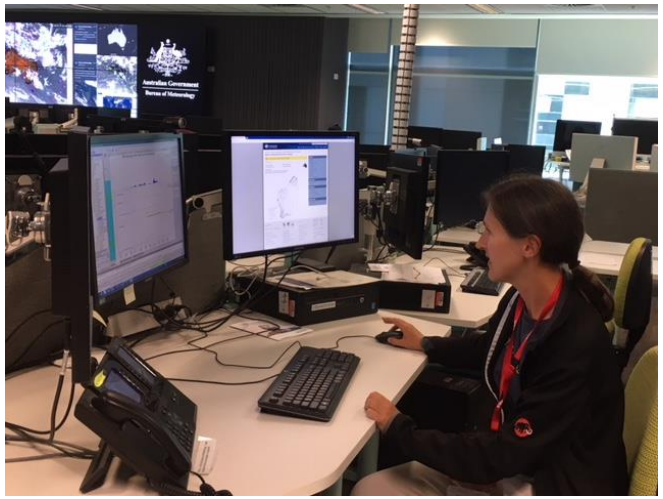
Topic¤	Outcome¤	Success·Measures·¤	Commentary¤	RAG·status¤
Flood· Forecasting· **and· System·Development**¶ Ian·Clayton¶  ¶ Chris·Leahy¶  ¤	Reduce·risk·to·FFFS· implementation·in·EA¶ To·shape·future·system· enhancements·to·FFFS·and·HyFS· and·the·products·they·deliver¶ Increased·resilience·in·service· delivery·through·an·interoperable· design¶ Engagement·and·communication· to·deliver·change·in·behaviours· and·ways·of·working·with· implementation·and·embedding· of·new·systems¤	• → HyFS·lessons·identified·shared· and·implemented·appropriately· by·FFFS¶ • → Risk·to·implementation·of·FFFS·is· reduced¶ • → Collaboration·on·system·and· service·enhancements·identified¶ ¤	**Relationship:**·between·teams·well· established.··Regular·calls¶ **Next:**·¶ • → Planning·BoM·Config·specialist·to·join· FFFS·team·for·a·'sprint'¶ • → Discussions·on·verification·methods·and· standards¶ • → Sharing·on·catchment·delineation¶ ¶	¤
Flood· Warning· and· Informing¶ Leads:¶ Frazer·Rhodes¶  ¶ Alex·Cornish¶ 	Shaping·the·Bureau·Web·Refresh· for·flood·warning·products¶ Shared·learning·on·methods·to· visualise·flood·warnings¶ Shared·learnings·on·the·use·of· social·media¶ More·effective·partnership· working·and·operational· outcomes¤	• → Flood·Digital·Strategy·and· subsequent·business·base·shared· and·key·learnings·help·shape·the· Bureau's·Refresh·project·for· flood·warning·products·and· exploiting·social·media.¶ • → Environment·Agency·'Flood· Forecast·Online'·online·beta· service·benefits·from·Bureau's· experience.·¶ • → Web·Refresh·reflects·learnings· from·EA¶ • → Collaboration·on·digital·solutions· identified·and·collective· research/user·needs·are·pooled¤	**Relationship**·established.·There·has·been· some·change·in·personnel·at·the·Bureau· following·the·recent·restructure.¶ • → Both·teams·have·widened·the·project· scope·from·a·flood·focus·to·take·wider· hazards·into·consideration.·¶ • → Alex·Cornish·visited·EA·offices·and· spent·time·with·the·digital·team·and· discussed·Google·Alerts¶ **Next:**·Team's·to·re-engage·and·share·new· goals.·¶ Sharing·experiences·of·adopting·Common· Alerting·Protocol·¶	¤

Collaboration and tangible outcomes

Site visits

- Look for opportunity for site visits and face to face meetings
- EA – two visits to BoM
- BoM – multiple visits to EA
- BoM in EA next week
- BoM configuration expert to come to EA for 5 days
- Outcome – build relationships and augment technical development/learning



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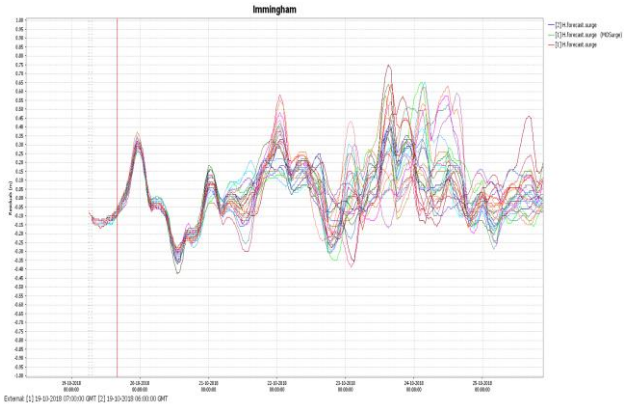
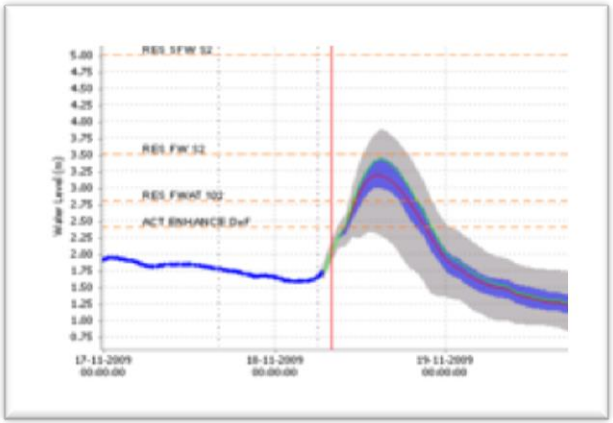
Collaboration and tangible outcomes

Ensembles/Probabilistic Forecasting

- Key area of future functionality and service improvement for both organisations
- Sharing strategies and learning
- BoM sharing trial catchment findings with EA
- Outcome – develop functionality and service collaboratively using FEWS





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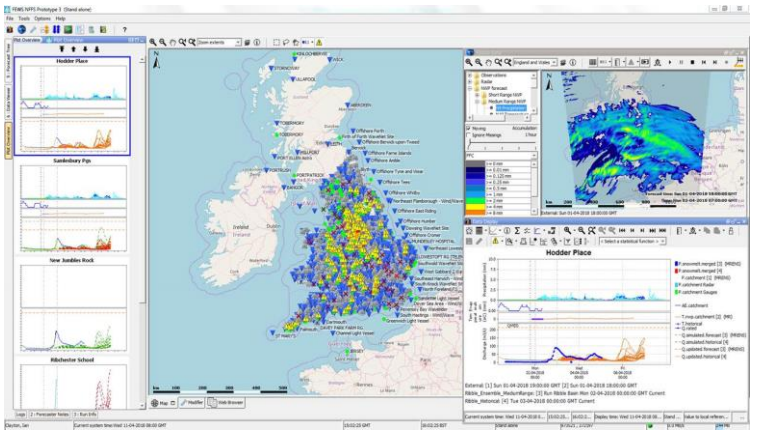
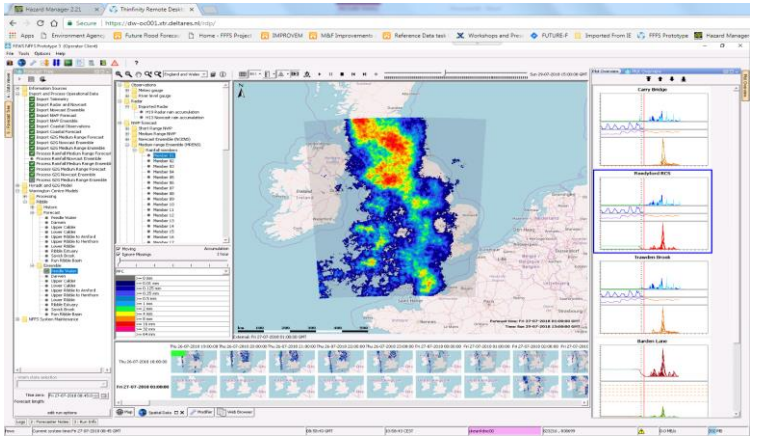
Collaboration and tangible outcomes

EA Future Flood Forecasting System (FFFS) Day 1

- BoM are utilising functionality that EA require for FFFS
- WaterCoach – training and exercising
- Modifiers
- Open Archive
- Event verification tool
- Outcome – informed EA procurement of FFFS
- BoM – EA informing Impact forecasting





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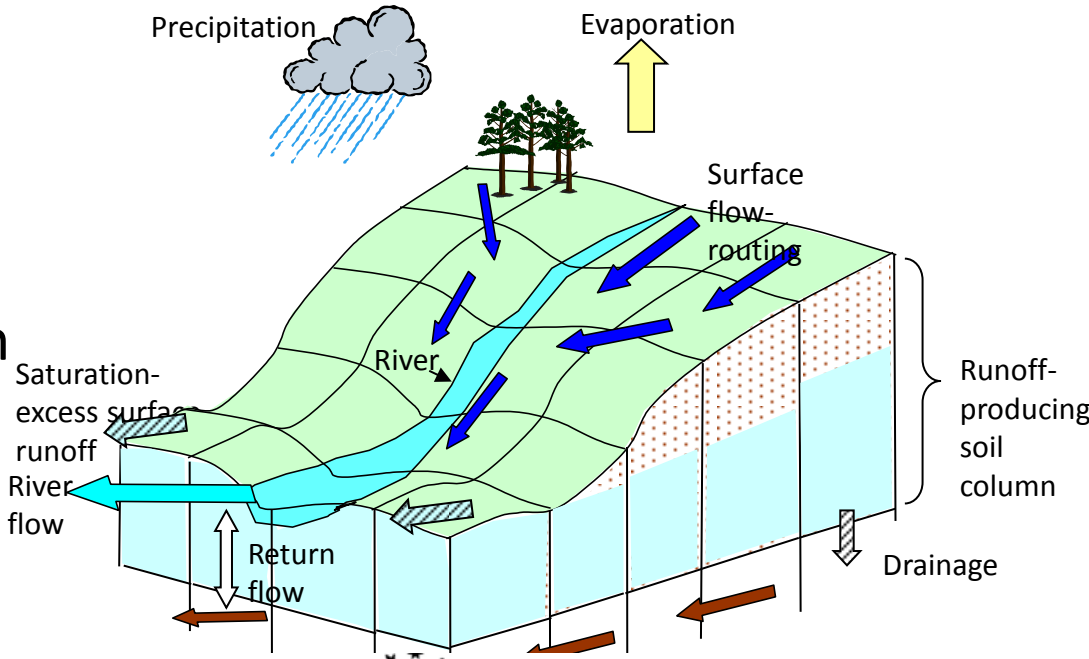
Collaboration and tangible outcomes

Performance Standards and Modelling

- Sharing of each others current model performance standards
- Assessment of model performance against the standards in FEWS
- Calibration and model development practices
- Sharing of experiences in continuous and gridded models in FEWS

	Lead time (hrs)						
	1	2	4	8	12	24	36
Model Calibration (Perfect Rainfall)							
Threshold 1 (m) - 1	2	2	2	2	2	2	2
Threshold 2 (m) - 1.5	1	1	1	1	1	1	1
Threshold 3 (m) - 1.75	2	2	2	2	2	2	2
Peak	2	2	2	2	2	2	2
Real time model performance (forecast rainfall)							
Threshold 1 (m) - 1	2	3	3	3	3	4	4
Threshold 2 (m) - 1.5	2	4	3	3	2	2	5
Threshold 3 (m) - 1.75	3	3	5	3	3	4	5
Peak	2	3	4	4	4	4	5



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Collaboration and tangible outcomes

Only in year 2 of 5 year MoU

- We're on a journey
- FFFS will be nearing go-live into service in a years time
- BoM will be further into a maturing system
- Further sharing will happen
- Watch this space for further updates

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Thank you and questions

www.environment-agency.gov.uk

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