Telling your science story:

A guide to captivating talks and compelling posters

Katie Facer-Childs
Senior Hydrologist

16/07/2026

UKCEH

Our planet.
Decoded.

Talk Structure

- Introduction
- Structure
- Oral Presentations
- Poster Presentations
- Design Principles
- Useful tools
- Summary

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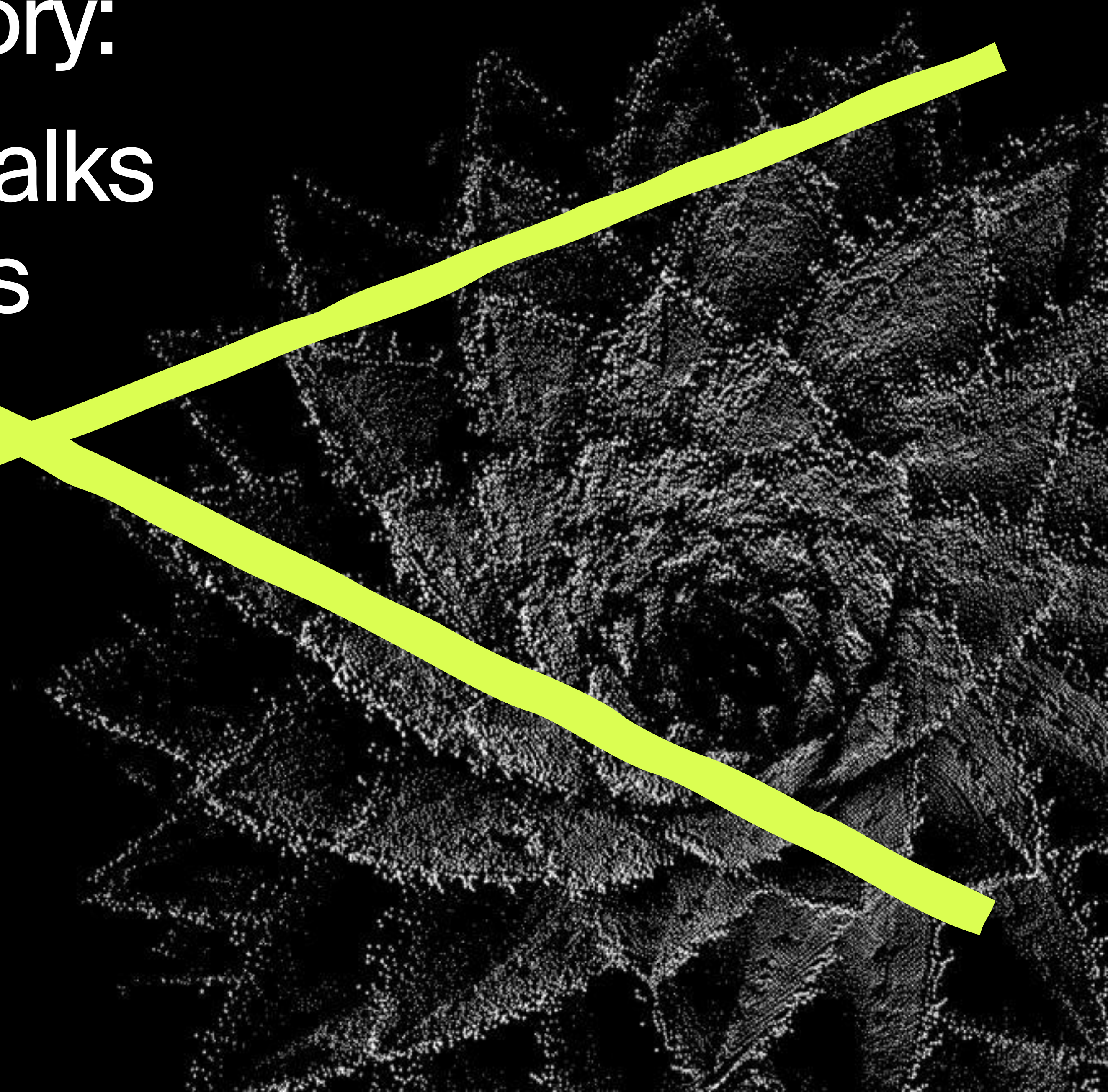

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INCEPTION

How to plant your science in someone's mind

Katie Facer-Childs

Senior Hydrologist

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Our planet.
Decoded.

[Don’t assume your audience’s knowledge]

What is INCEPTION?

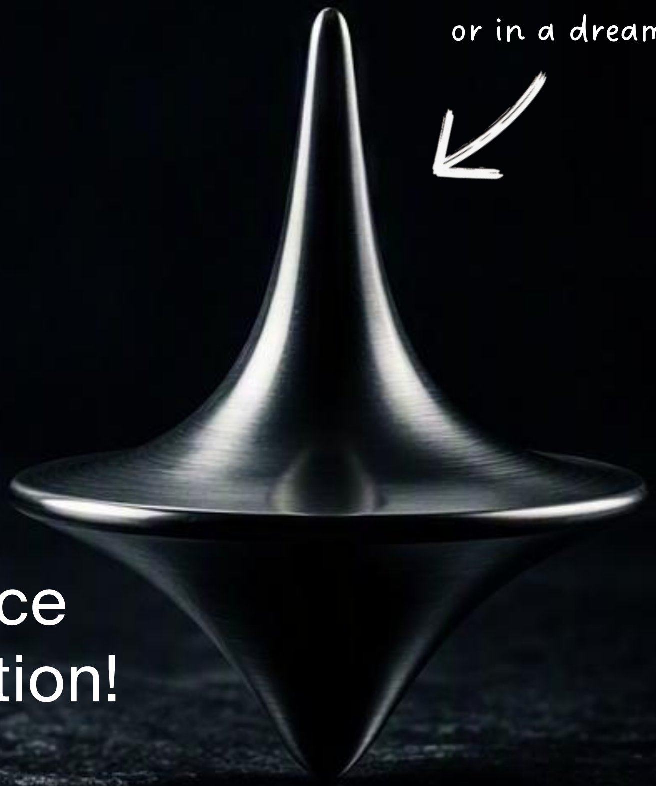
Layered dreams.

Planting ideas.

...

That’s science communication!

This is Cobb’s “Totem” that he uses to check whether he’s in reality, or in a dream



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[Give your audience a road map]

The SPOTLIGHT
Make people remember your work

The STORY BOARD
Find your analogy and build a narrative

The DIRECTOR'S CUT
Less methods, less text, more meaning

The CINEMATOGRAPHY
Graphics, colours and visual design

The SPECIAL EFFECTS
Tools of the trade

The POSTER
Get them through the door

The KICK
End with impact

[The Spotlight]

DATA

STATISTICS

BACKGROUND

METHODS

MODELS

RESULTS

DISCUSSION

LIMITATIONS

ONE IDEA

- **Problem** — Uncertainty is hard to quantify and visualise
- **Vision** — We can improve our forecasts with blending
- **Question** — Can we simulate historic droughts accurately?
- **Method** — This complex method has many advantages over simple ones
- **Finding** — Atmospheric indices can be used to better predict streamflow
- **Action** — Hydroclimate services must be co-designed with users

[Finding your story]

Don't ask how do I **EXPLAIN** my science

Ask what is my science **LIKE**?

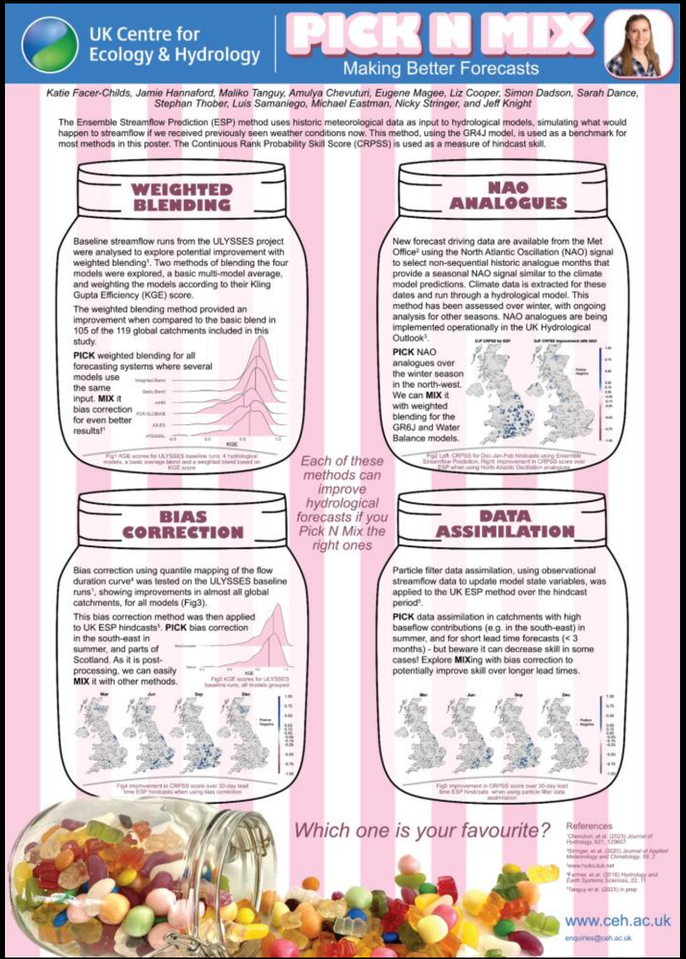
A story doesn't have to be fictional.

It's simply a familiar vehicle for your idea

[Finding your story]

Great ideas don't just happen at your desk

They come when you give your brain TIME and SPACE


UK Centre for Ecology & Hydrology

PICK N MIX
Making Better Forecasts

Katie Facer-Childs, Jamie Hannaford, Maliko Tanguy, Amulya Chevuturi, Eugene Magee, Liz Cooper, Simon Dadson, Sarah Dance, Stephan Thober, Luis Samaniego, Michael Eastman, Nicky Stringer, and Jeff Knight

The Ensemble Streamflow Prediction (ESP) method uses historic meteorological data as input to hydrological models, simulating what would happen to streamflow if we received previously seen weather conditions now. This method, using the GR4J model, is used as a benchmark for most methods in this poster. The Continuous Rank Probability Skill Score (CRPSS) is used as a measure of hindcast skill.

WEIGHTED BLENDING

Baseline streamflow runs from the ULYSSES project were analysed to explore potential improvement with weighted blending[1]. Two methods of blending the four models were explored, a basic multi-model average, and weighting the models according to their Kling Gupta Efficiency (KGE) score.

The weighted blending method provided an improvement when compared to the basic blend in 105 of the 119 global catchments included in this study.

PICK weighted blending for all forecasting systems where several models use the same input. **MIX** it bias correction for even better results![1]

Fig1 KGE scores for ULYSSES baseline runs: 4 hydrological models, a basic average blend and a weighted blend based on KGE score

NAO ANALOGUES

New forecast driving data are available from the Met Office[2] using the North Atlantic Oscillation (NAO) signal to select non-sequential historic analogue months that provide a seasonal NAO signal similar to the climate model predictions. Climate data is extracted for these dates and run through a hydrological model. This method has been assessed over winter, with ongoing analysis for other seasons. NAO analogues are being implemented operationally in the UK Hydrological Outlook[3].

PICK NAO analogues over the winter season in the north-west. We can **MIX** it with weighted blending for the GR6J and Water Balance models.

Fig2 Left: CRPSS for Dec-Jan-Feb hindcasts using Ensemble Streamflow Prediction, Right: improvement in CRPSS score over ESP when using North Atlantic Oscillation analogues

Each of these methods can improve hydrological forecasts if you Pick N Mix the right ones

BIAS CORRECTION

Bias correction using quantile mapping of the flow duration curve[4] was tested on the ULYSSES baseline runs[1], showing improvements in almost all global catchments, for all models (Fig3).

This bias correction method was then applied to UK ESP hindcasts[5]. **PICK** bias correction in the south-east in summer, and parts of Scotland. As it is post-processing, we can easily **MIX** it with other methods.

Fig3 KGE scores for ULYSSES baseline runs, all models grouped

Fig4 improvement in CRPSS score over 30-day lead time ESP hindcasts when using bias correction

DATA ASSIMILATION

Particle filter data assimilation, using observational streamflow data to update model state variables, was applied to the UK ESP method over the hindcast period[5].

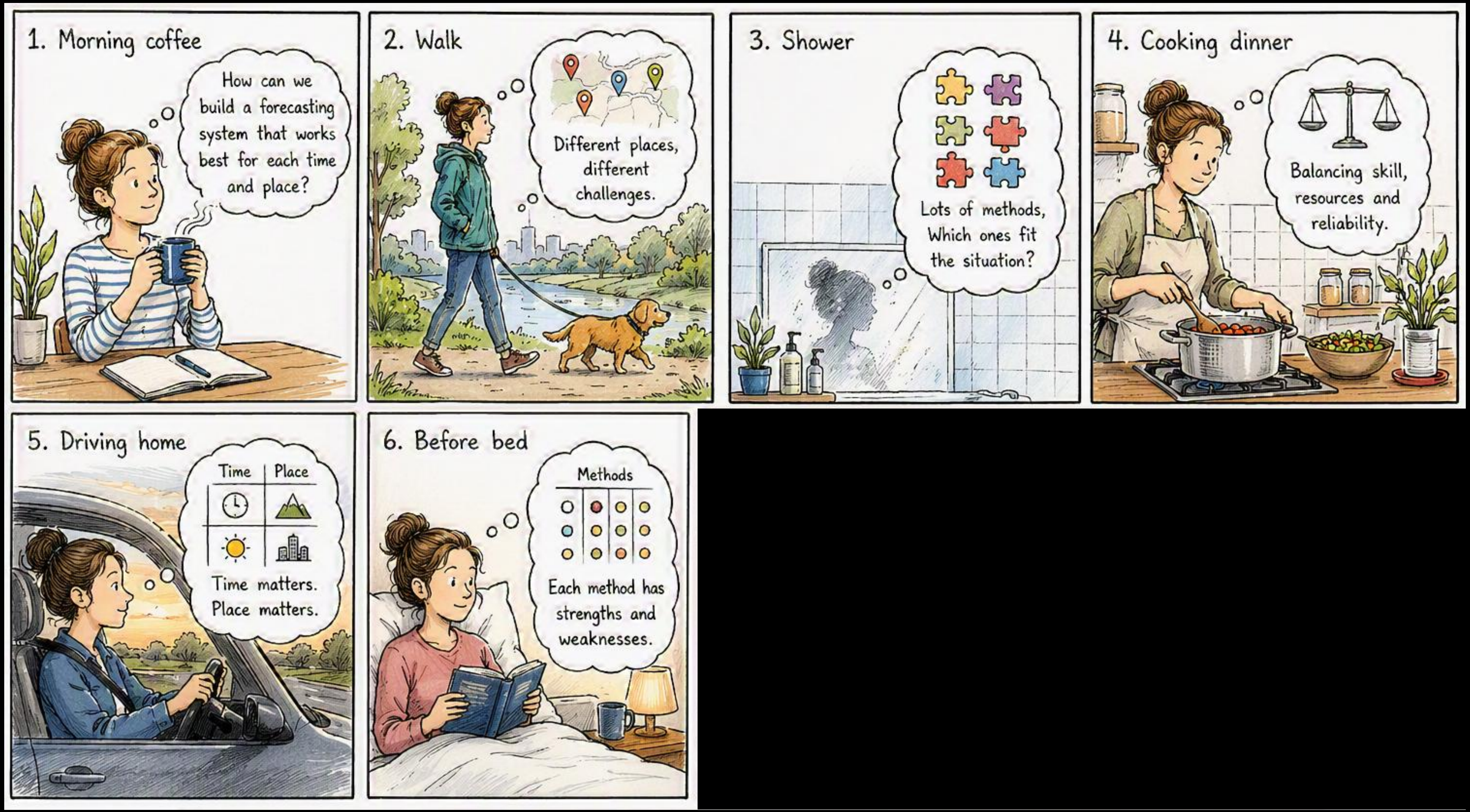
PICK data assimilation in catchments with high baseflow contributions (e.g. in the south-east) in summer, and for short lead time forecasts (< 3 months) - but beware it can decrease skill in some cases! Explore **MIX**ing with bias correction to potentially improve skill over longer lead times.

Fig5 improvement in CRPSS score over 30-day lead time ESP hindcasts when using particle filter data assimilation

Which one is your favourite?

References

www.ceh.ac.uk
enquiries@ceh.ac.uk



[Telling your Story]

This is a report structure, not a story

A typical science talk

Introduction → Methods → Results → Conclusions

Build a story that's easy to follow and hard to forget

[Cut the methods]

We took ERA5 and CMIP6 data

We ran a catchment model

We assessed the outputs with NSE and KGE

Catchment soil moisture storage was simulated using a conceptual water balance framework:

$$S_{t+1} = S_t + P_t - ET_t - Q_t$$

where precipitation P_t, evapotranspiration ET_t, and discharge $Q_t$were estimated at daily timesteps. Actual evapotranspiration was calculated as:

$$ET_t = ET_p \left(\frac{S_t}{S_{max}} \right)^{\beta}$$

Runoff generation was represented by:

$$Q_t = kS_t^{\alpha}$$

Model performance was assessed using the Nash–Sutcliffe Efficiency:

$$NSE = 1 - \frac{\sum_{t=1}^{n} (Q_{obs,t} - Q_{sim,t})^2}{\sum_{t=1}^{n} (Q_{obs,t} - \bar{Q}_{obs})^2}$$

and Kling–Gupta Efficiency:

$$KGE = 1 - \sqrt{(r-1)^2 + (\beta-1)^2 + (\gamma-1)^2}$$

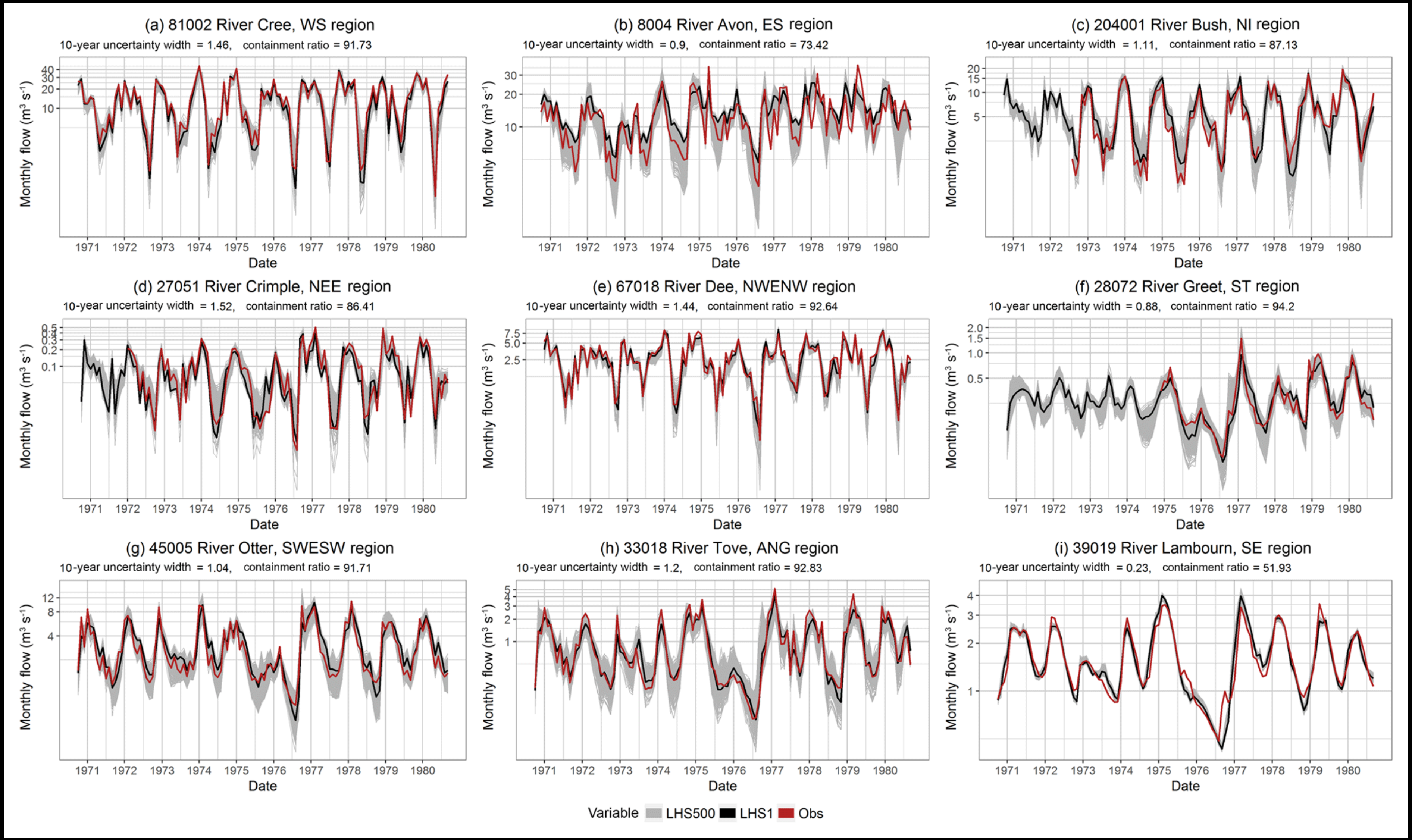
Parameters $(k, \alpha, \beta, S_{max})$were estimated using a multi-objective optimisation procedure based on a genetic algorithm comprising 500 generations and a population size of 100 candidate solutions. Calibration was performed for 1981–2000 and validated for 2001–2020. Uncertainty was quantified using a Monte Carlo ensemble containing 10,000 parameter sets, and ensemble spread was evaluated using:

$$\sigma_e = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (Q_i - \bar{Q})^2}$$

Simulations were forced using bias-corrected meteorological inputs derived from ERA5 and CMIP6 climate projections.

[Cut the results]

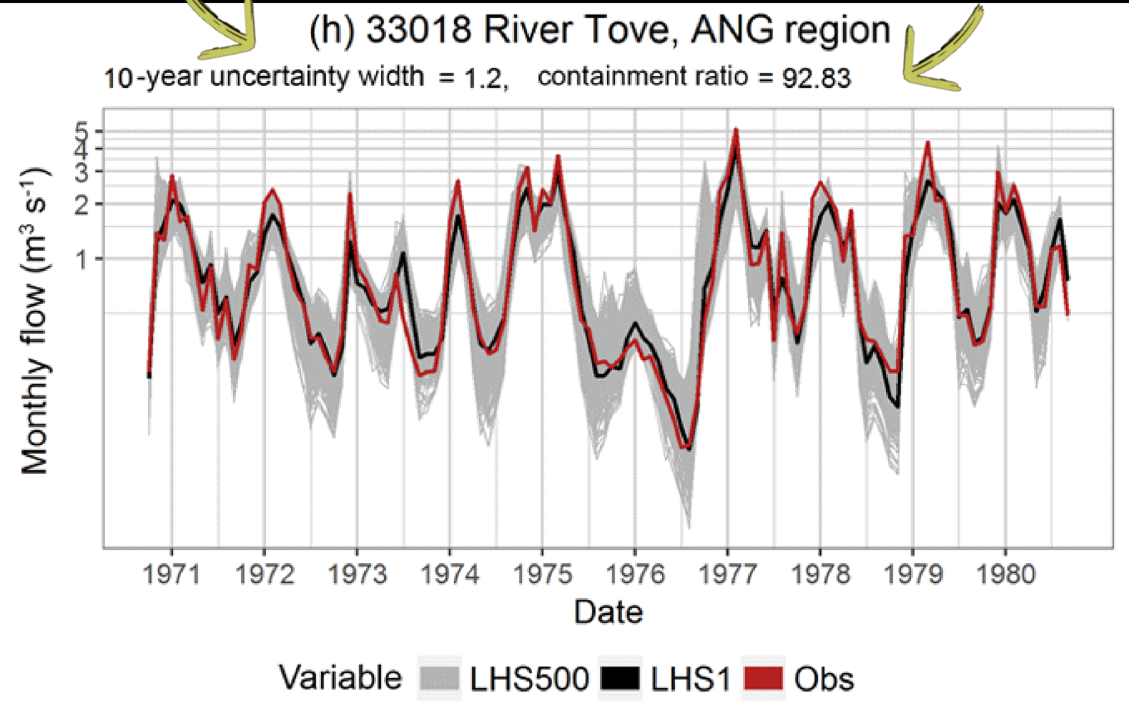
What's the message?

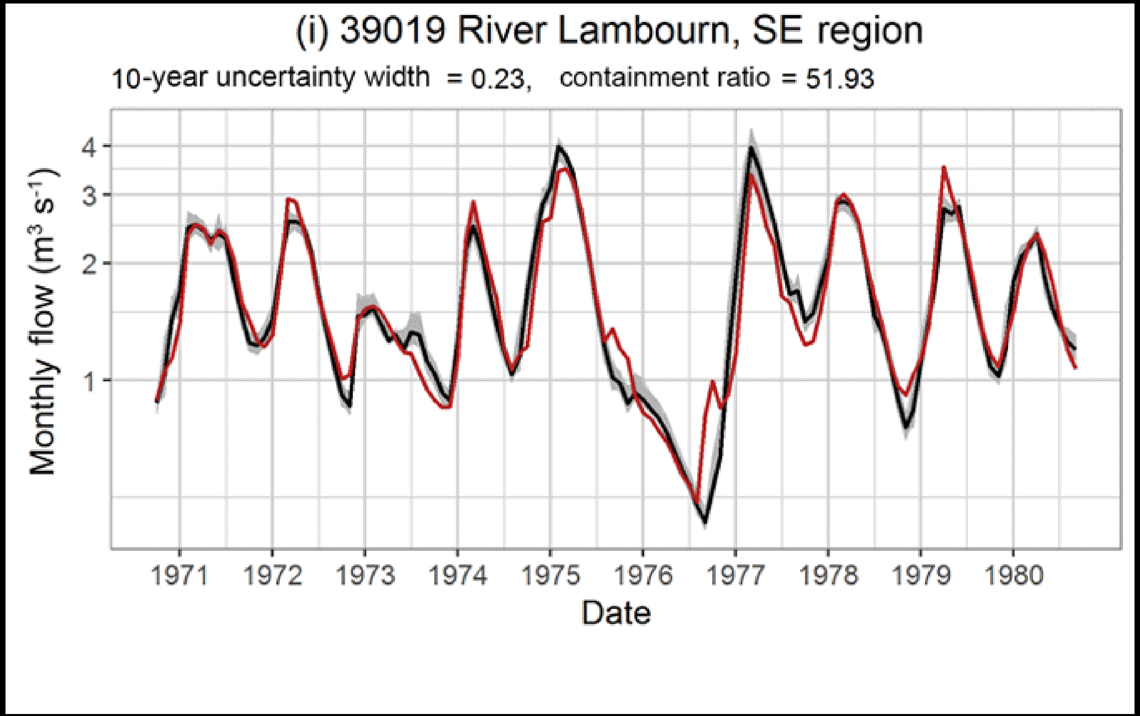


[Cut the results]

Uncertainty width = range of model simulations

Containment ratio = % time obs sit within the range of the model simulations





This is a "flashy" catchment

Models are more certain in slow responding catchments
But are less likely to catch the observations

This is a "slow responding" catchment

[Cut the results]

[Cut the story]

Slide Sorter View

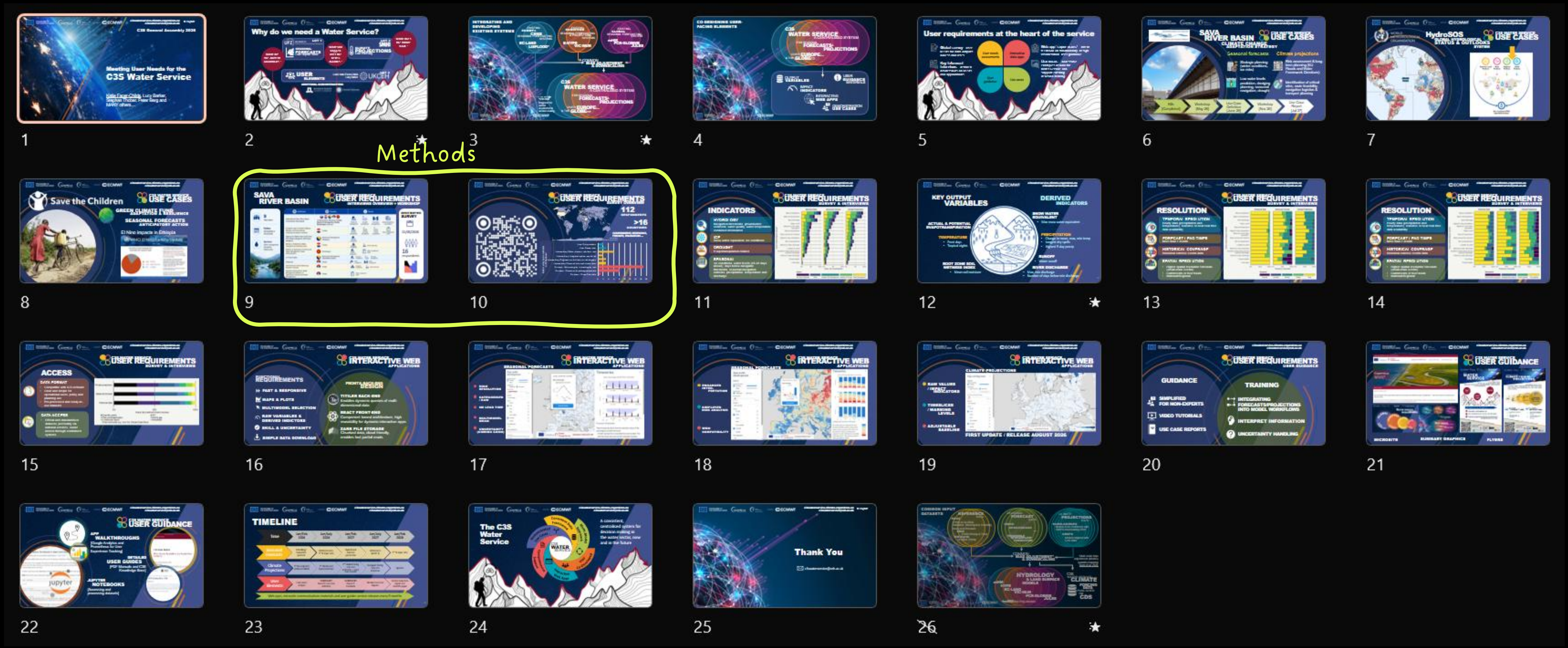
Problem/Need/Goal?

[Cut the story]

Slide Sorter View

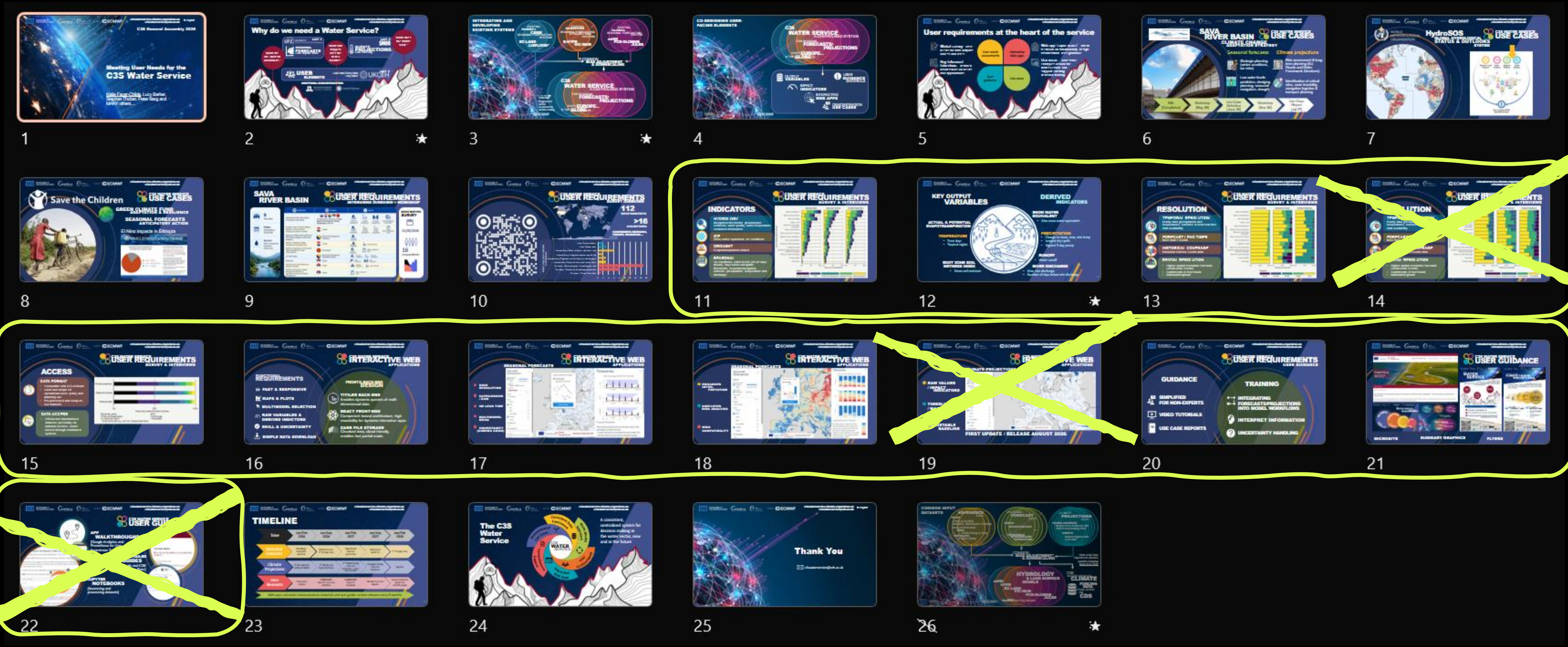
[Cut the story]

Slide Sorter View



[Cut the story]

Slide Sorter View

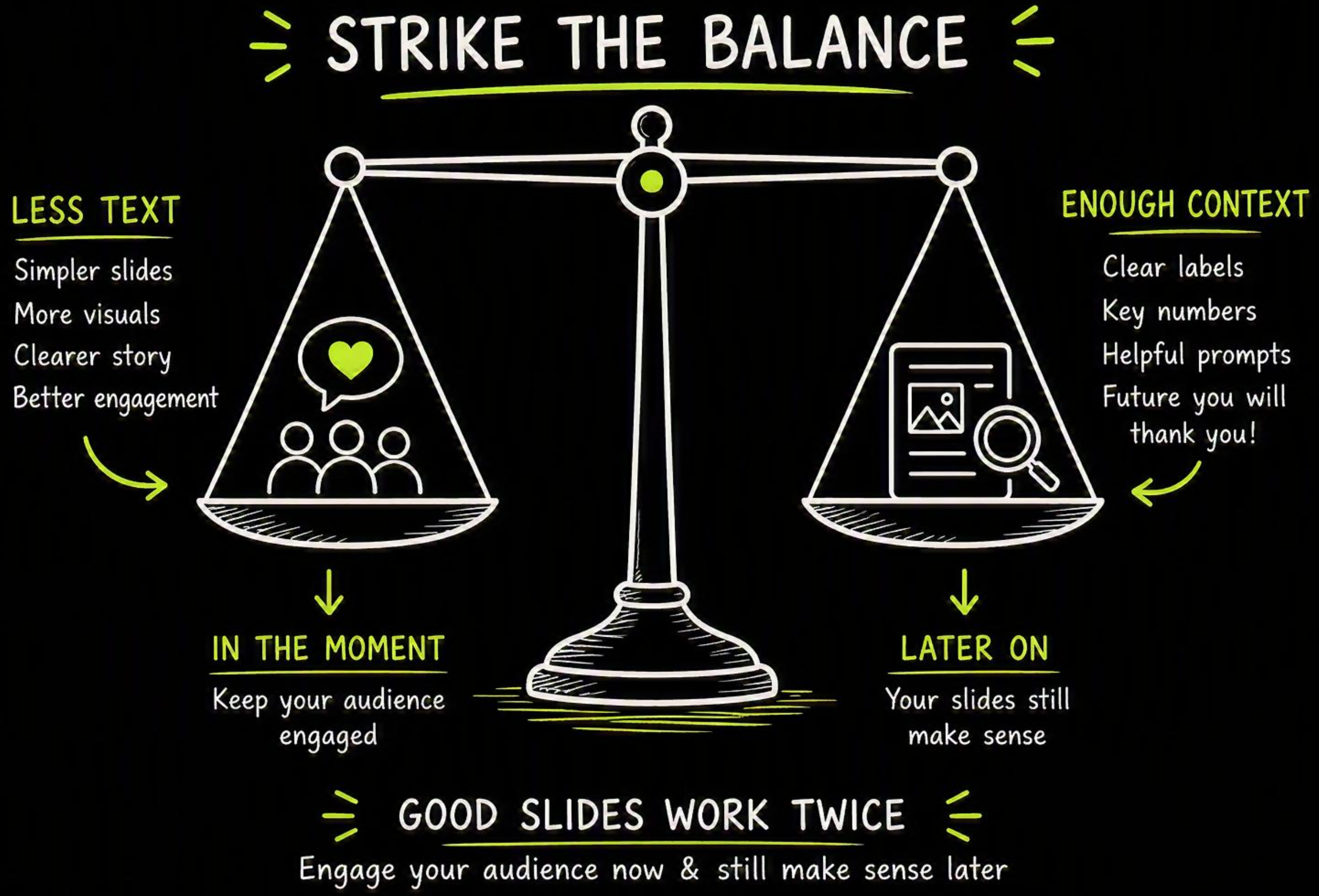


[Cut the story]

Slide Sorter View

Hidden slides for future use / questions

[Cut the text]

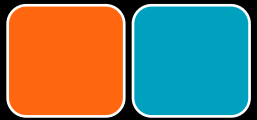

STRIKE THE BALANCE
LESS TEXT
Simpler slides
More visuals
Clearer story
Better engagement
ENOUGH CONTEXT
Clear labels
Key numbers
Helpful prompts
Future you will thank you!
IN THE MOMENT
Keep your audience engaged
LATER ON
Your slides still make sense
GOOD SLIDES WORK TWICE
Engage your audience now & still make sense later

[Visual Identity]

COLOUR SCHEMES

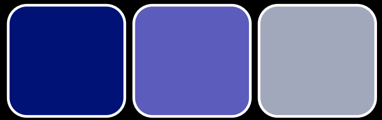
COMPLEMENTARY

EXAMPLE



MONOCHROMATIC

EXAMPLE



ANALOGOUS

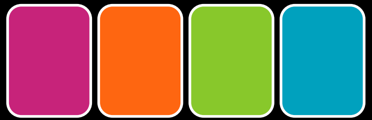
EXAMPLE

TRIADIC

EXAMPLE

TETRADIC

EXAMPLE



TIPS

- Limit your palette to 2-4 main colours
- Use one, dominant colour, one secondary and an accent
- Consider contrast for readability
- Keep it simple and consistent

[Visual Identity]

Fonts

CHOOSE ONE
and use it throughout

CHOOSE TWO
and add a little...
... playfulness

TIPS

- One font family can go a long way
- Keep it simple and consistent
- A maximum of two fonts
- If you're using script or decorative fonts, make sure they're readable

[Graphics]

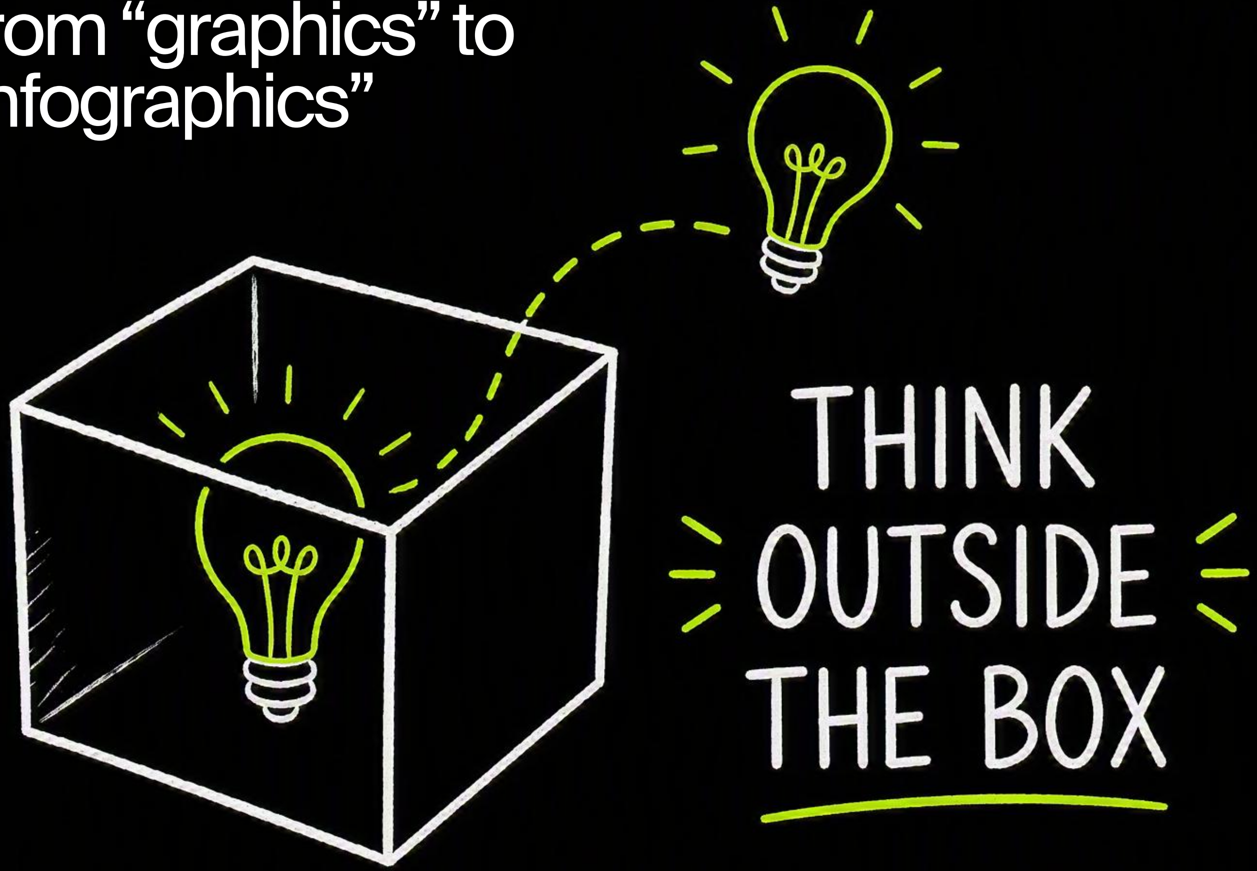
Use graphics to tell your story, not to decorate your slide.

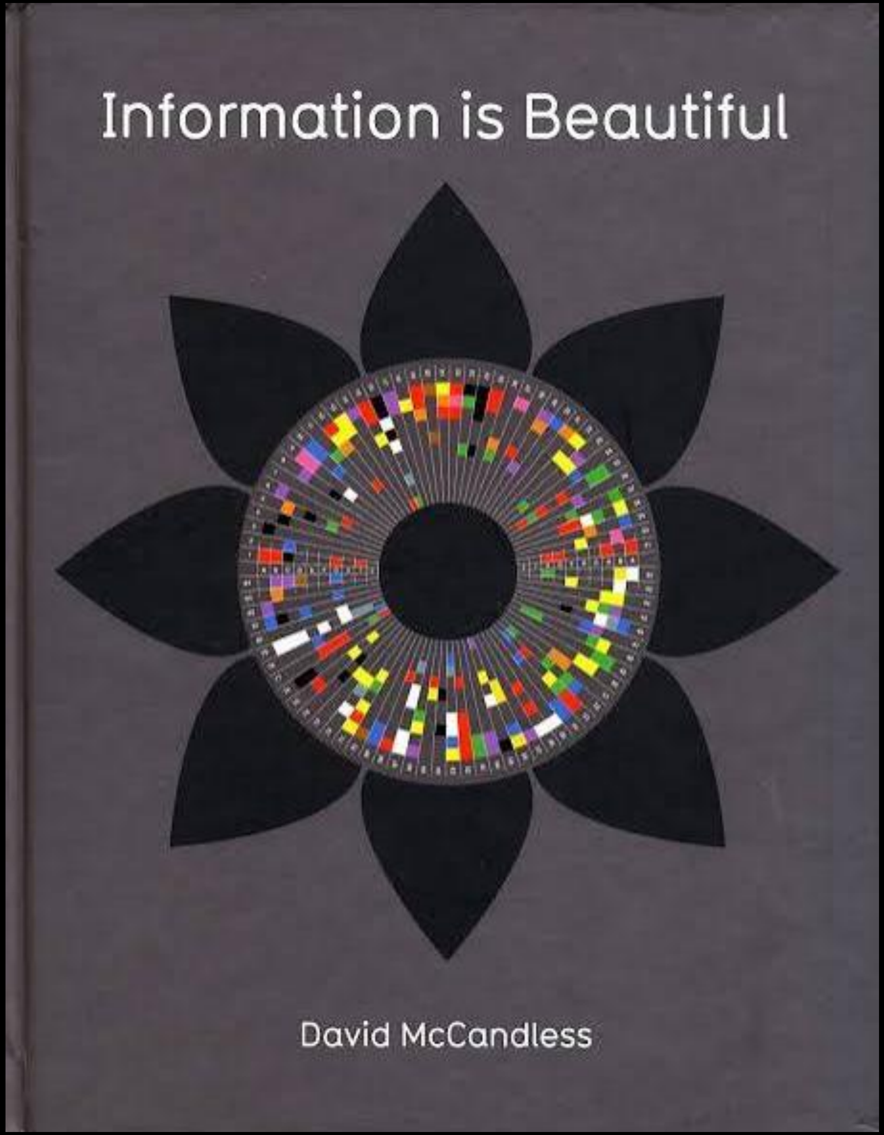
This graphic is pretty pointless...

This slide is pretty pointless...

[Graphics]

From "graphics" to "infographics"

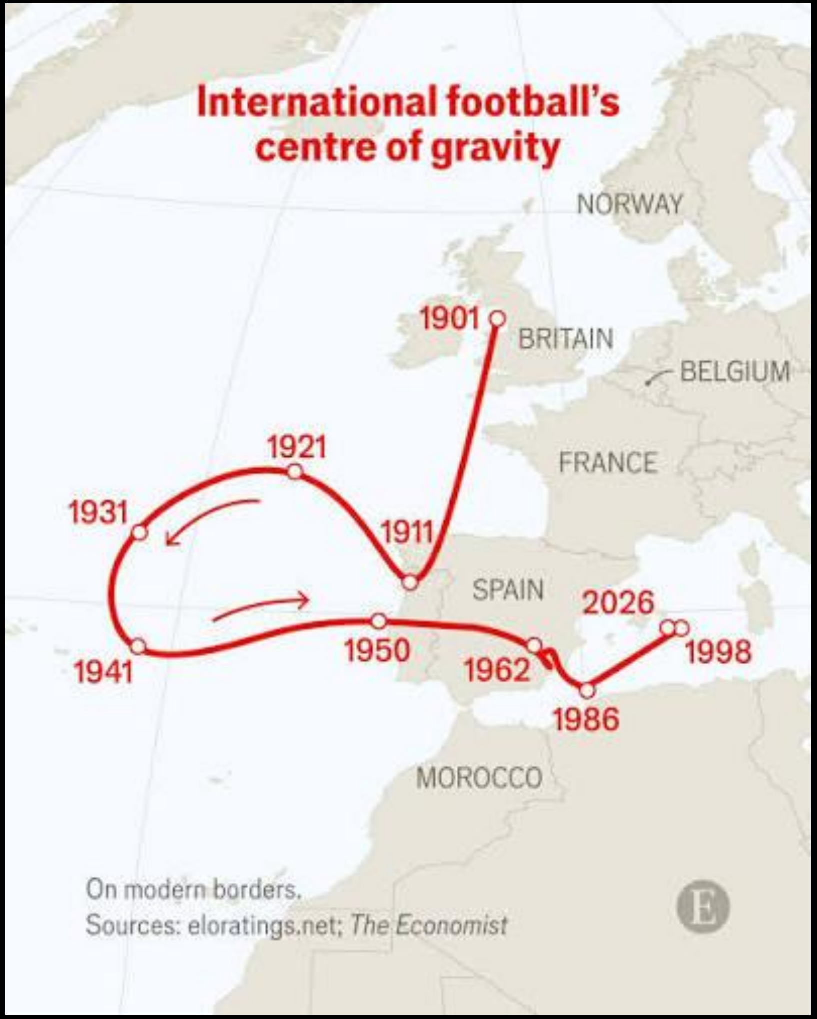




https://informationisbeautiful.net/

[Graphics]

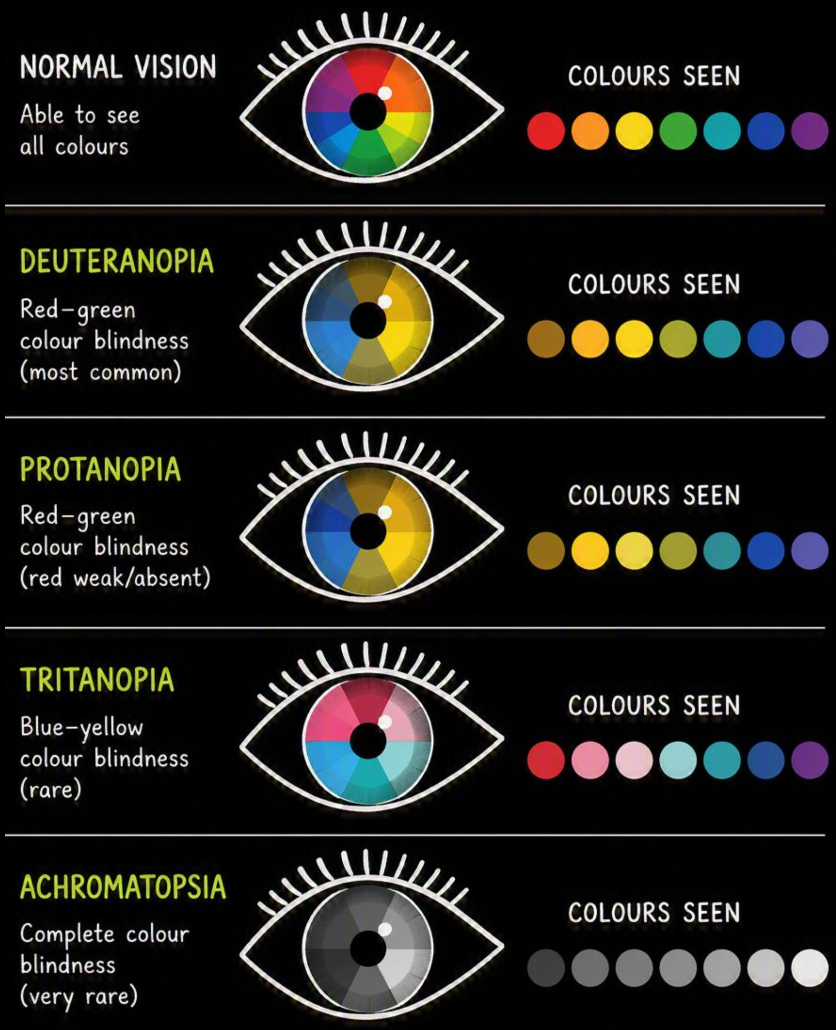
Where is the home of football?



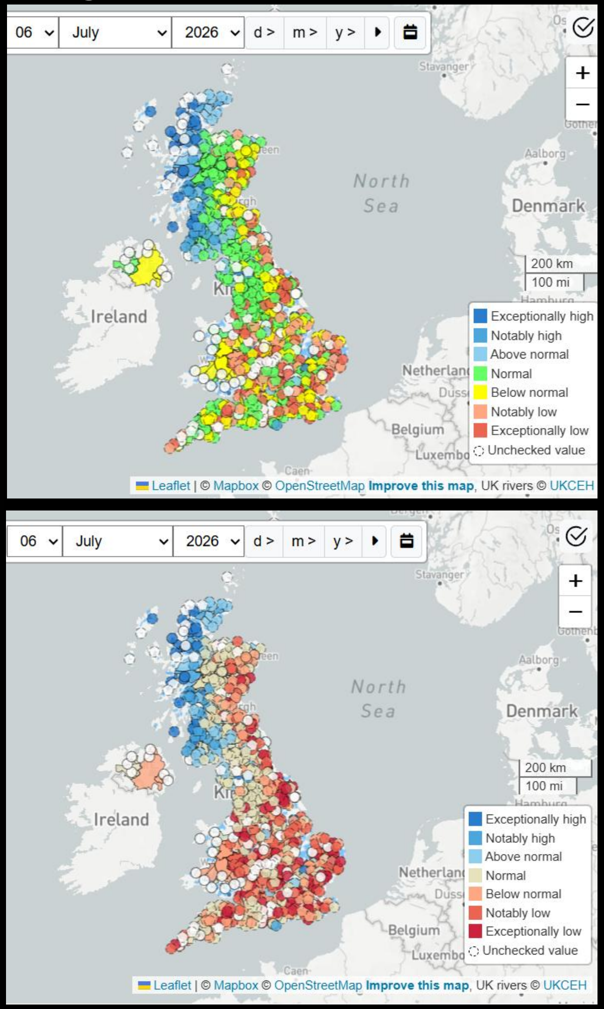
The Economist

Harris Saleem – Visual Capitalist

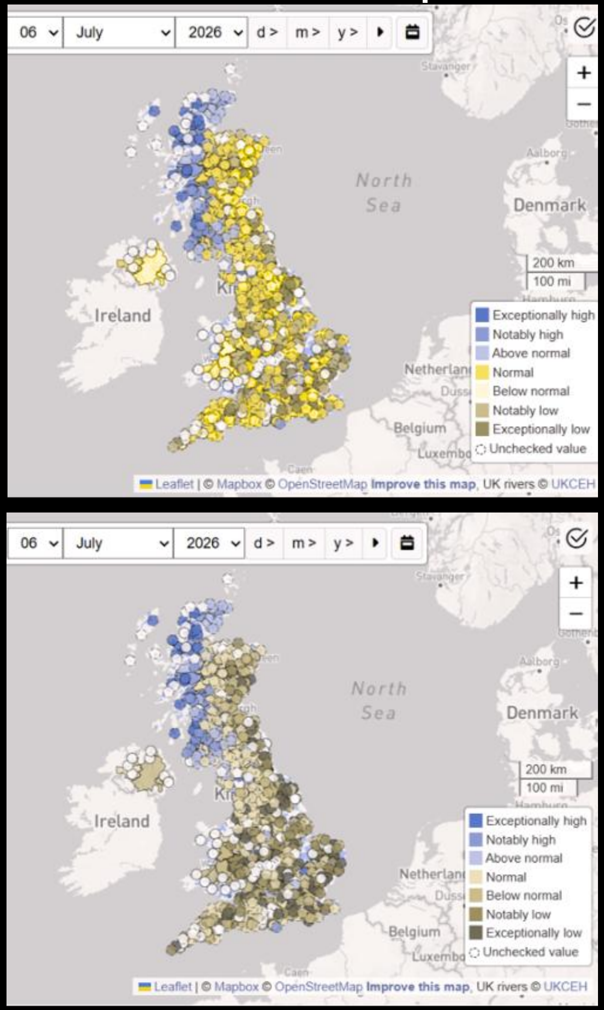
[Colour Blindness]



Original



Red-Blind / Protanopia



TIPS

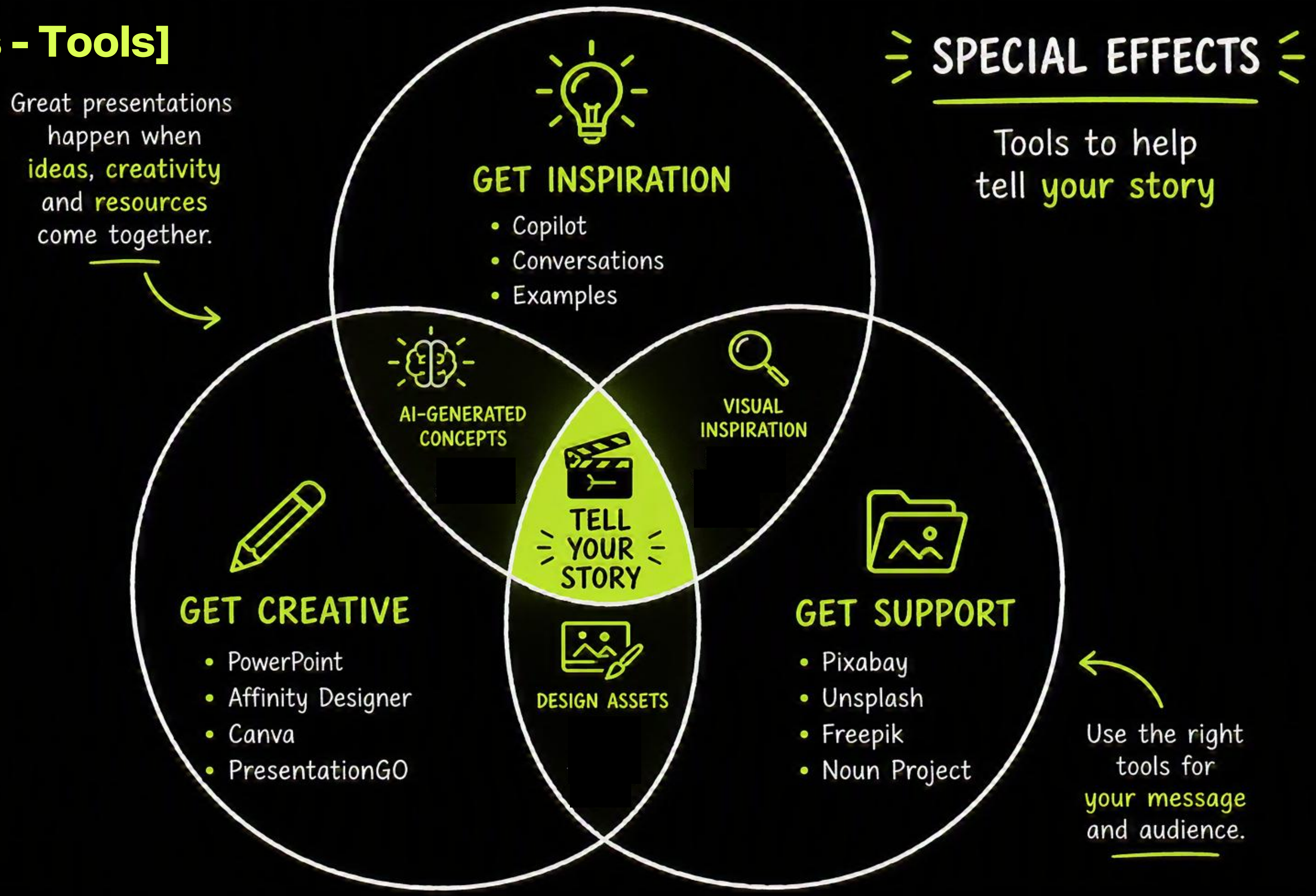
Use strong contrast

Add labels or patterns

Test your visuals

PILESTONE
COLOR BLIND EXPERTS

[Special Effects - Tools]



[Special Effects – PowerPoint Tips]

Picture Format

- Selection Pane
- Align
- Set Transparent Colour
- Crop to Shape

View

- Slide Master

Insert

- Icons
- SmartArt

Animations/Transitions

- Animation Pane
- Morph

[Posters]

The SPOTLIGHT

Make people remember your work

The STORY BOARD

Find your analogy and build a narrative

The DIRECTOR'S CUT

Less methods, less text, more meaning

The CINEMATOGRAPHY

Graphics, colours and visual design

The SPECIAL EFFECTS

Tools of the trade

The KICK

End with impact

[Some poster examples]

This is Copilot's suggestions on what one could look like…

What do you think?

[Some poster examples]

A good story

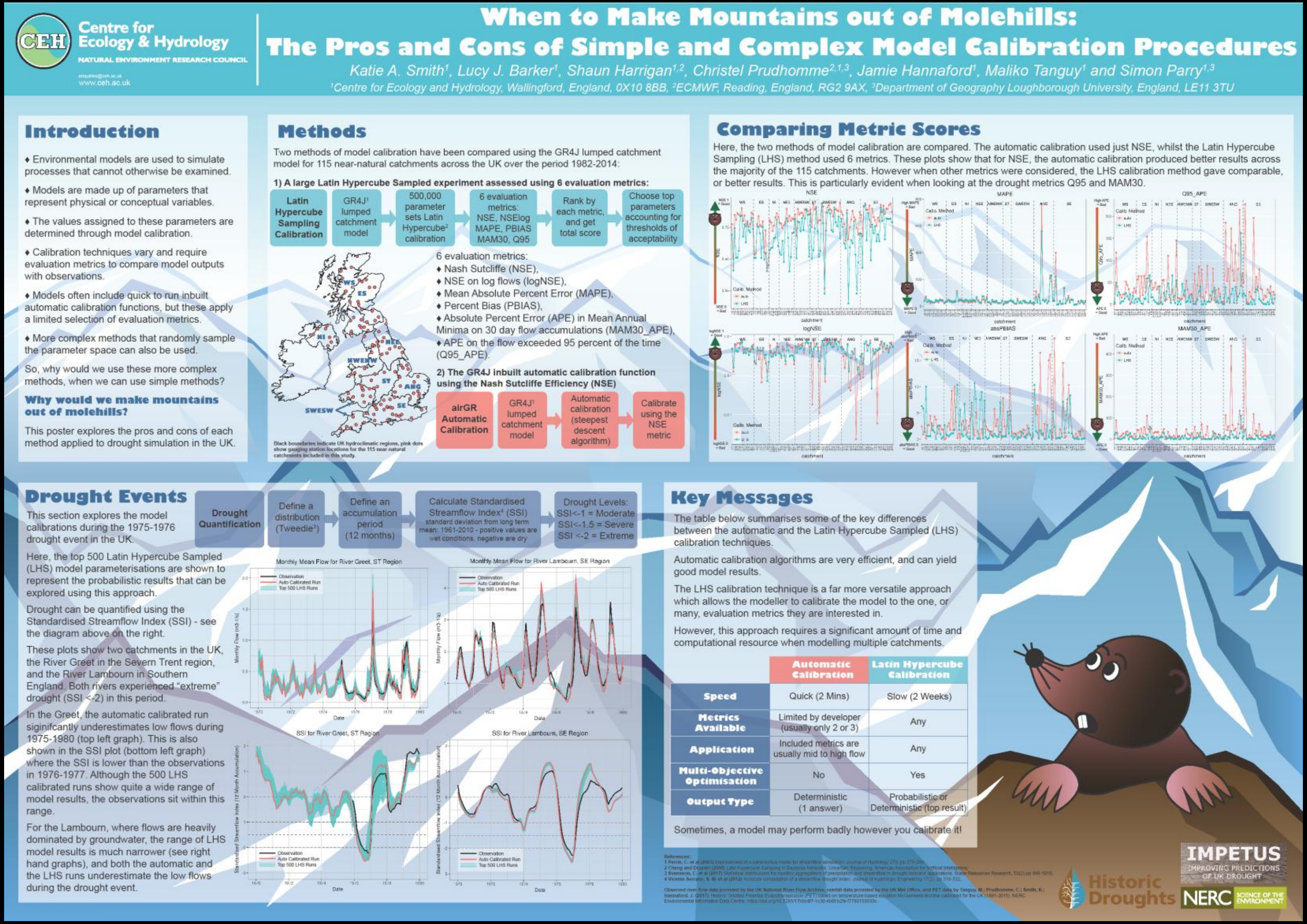
“Making mountains out of molehills” – making it more complicated than it needs to be

Two Fonts

Three colours

An engaging image

Too much text!



[Some poster examples]

A professional design

One Font

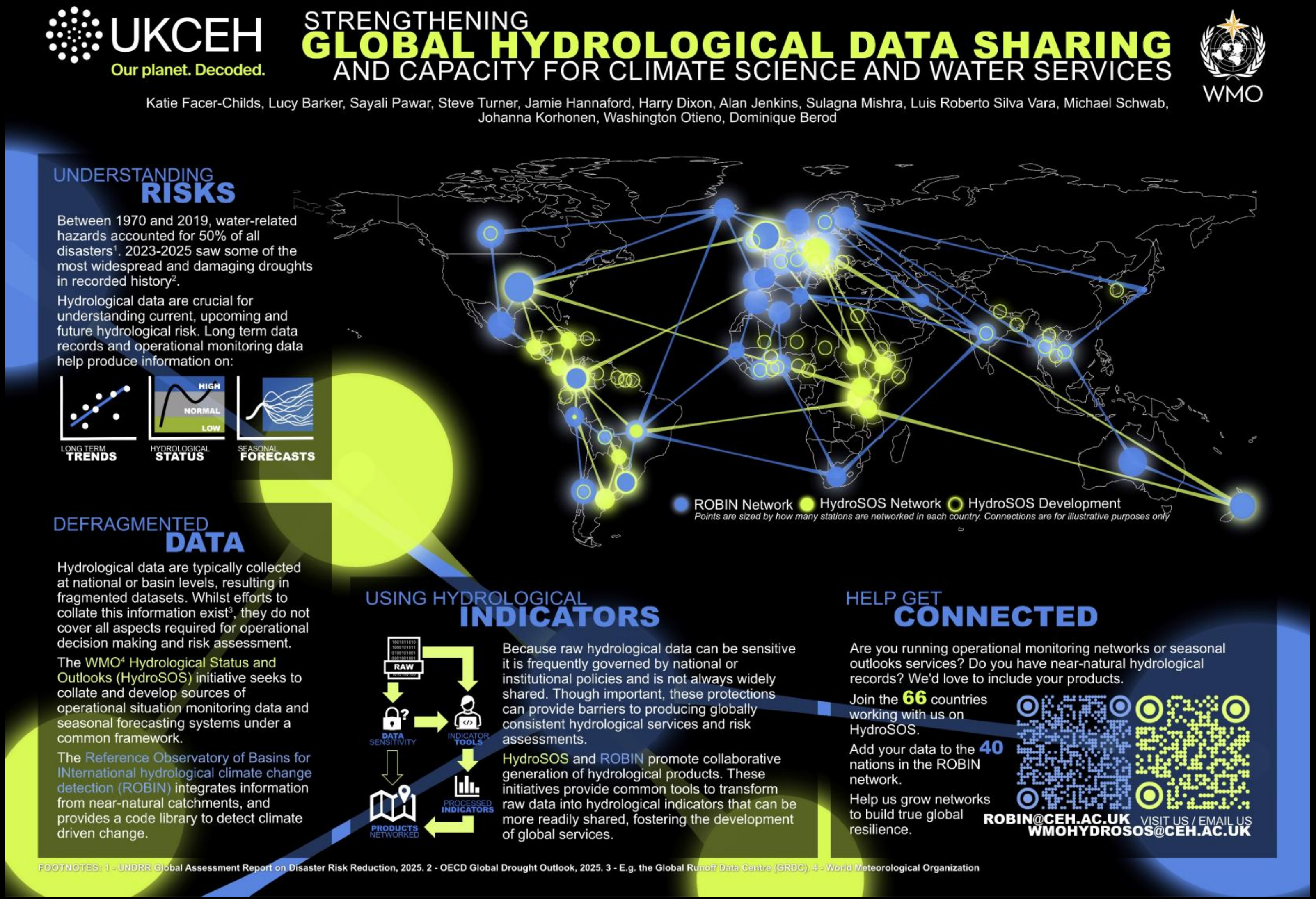
Two colours

An engaging image

Diagrams

Highlighted text

Spotlight?



[Some poster examples]

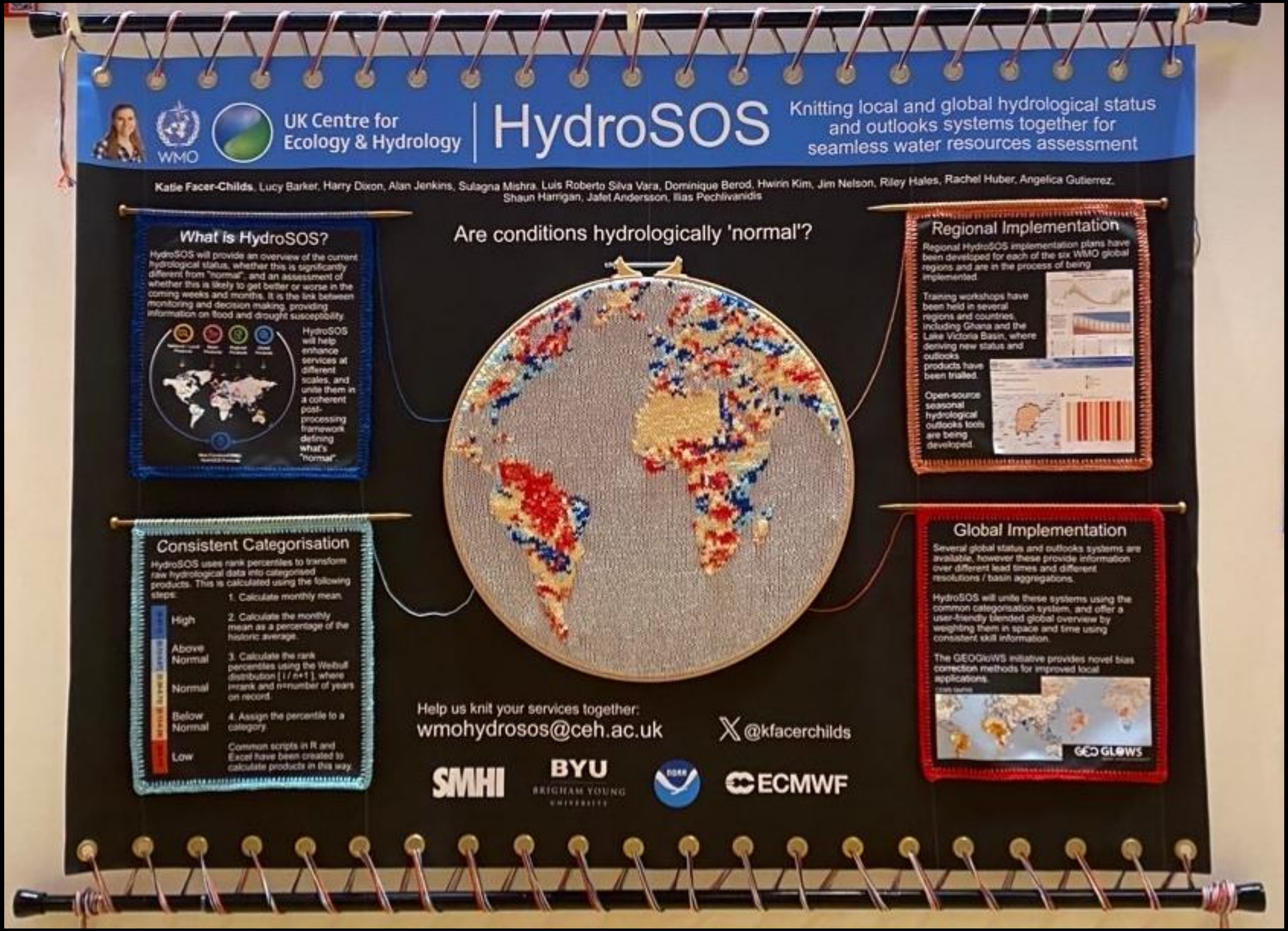
Knitting local and global systems together for seamless water resources assessment.

Inspired by fiber-artists

Don't be afraid to think beyond 2D!

Get interactive

Give yourself time



[What's the spotlight?]

Thank you.

For more information please contact:

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