

Summary of questionnaire results: procedures for preparing operational seasonal forecasts

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Acknowledgements: Raizan Rahmat, Adrian Trotman, Arun Kumar ,

Many thanks for completing
the questionnaire!

WMO Workshop on Operational Climate Prediction, 9-11
November 2015, Pune, India

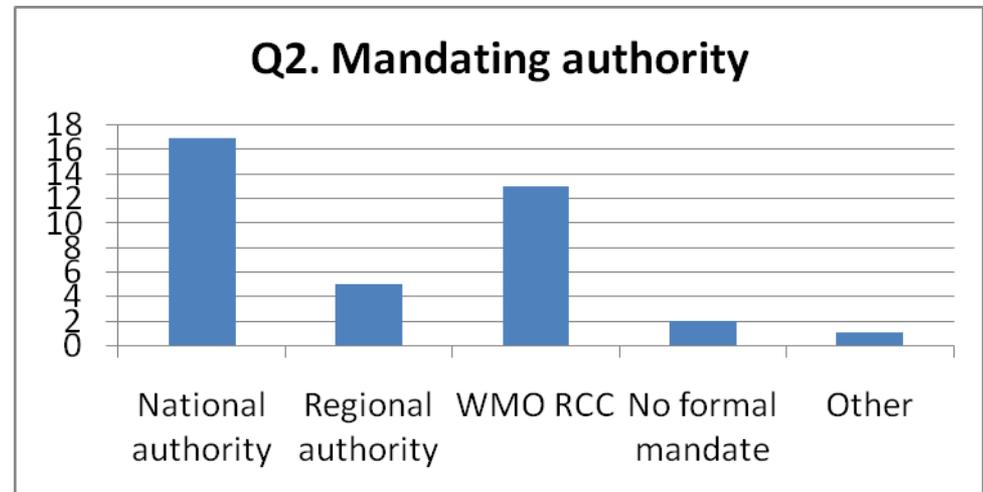
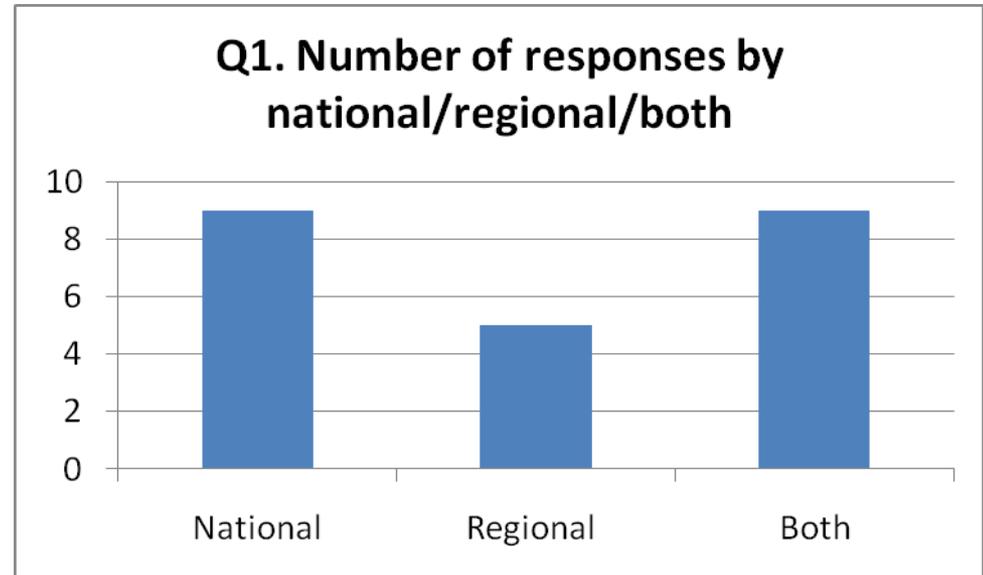


Purpose of questionnaire

- Many centres, national, regional, global are generating operational seasonal forecasts – many different approaches
- Seasonal forecasts: high sensitivity, consequential
- As a community of practice we have no formal document laying out recommended best practices/procedures – need to address this
- Questionnaire is a start to map out the range of practices in use
- Prime discussion in Breakout Groups to develop a framework guidance document

Total of 23 responses

- Many respondents answering for both regional and national operations
- 2 centres – no formal mandate

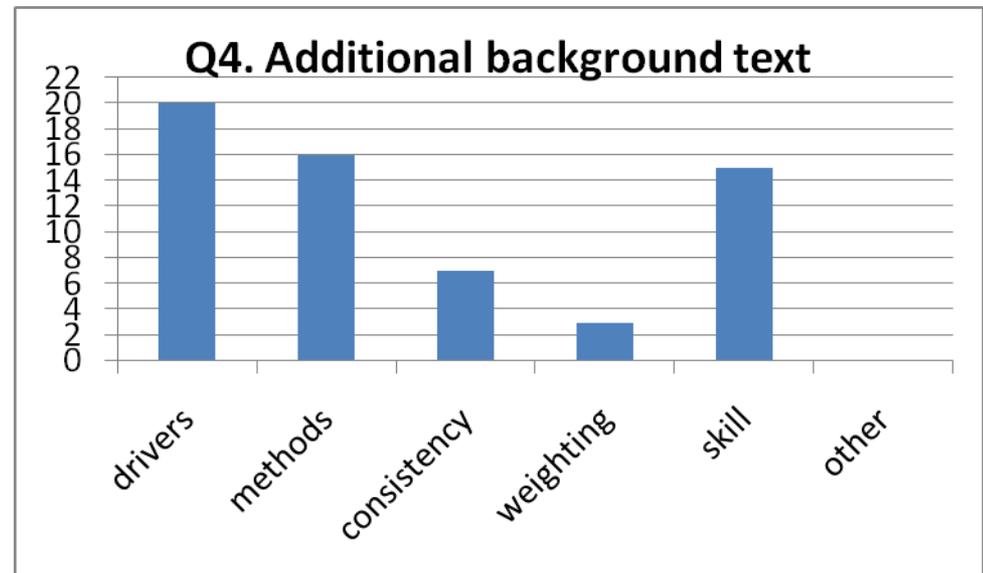
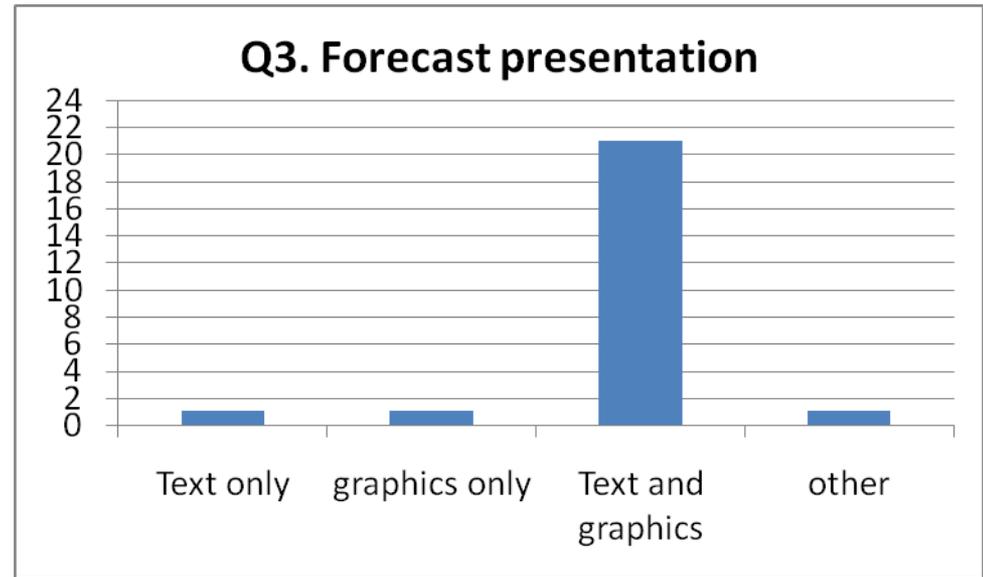




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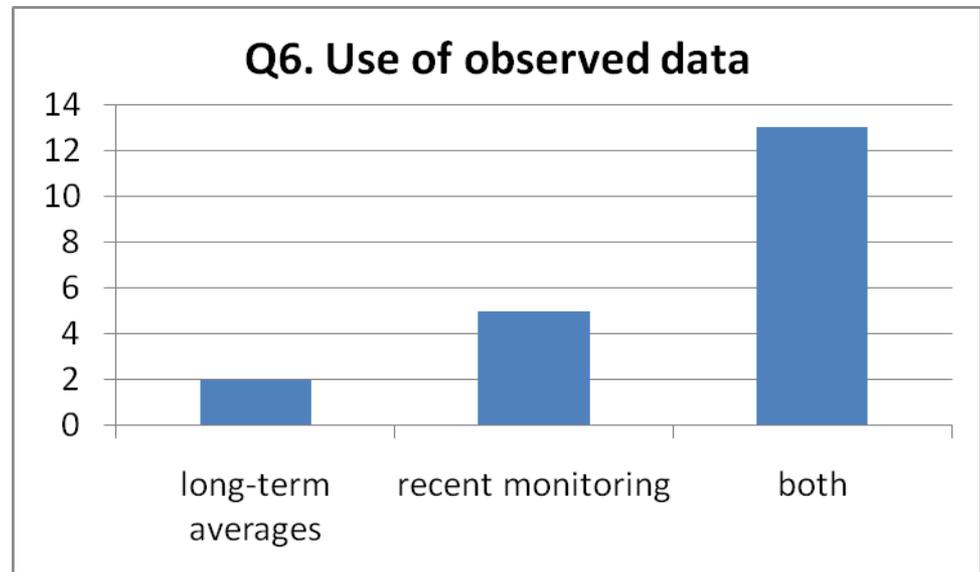
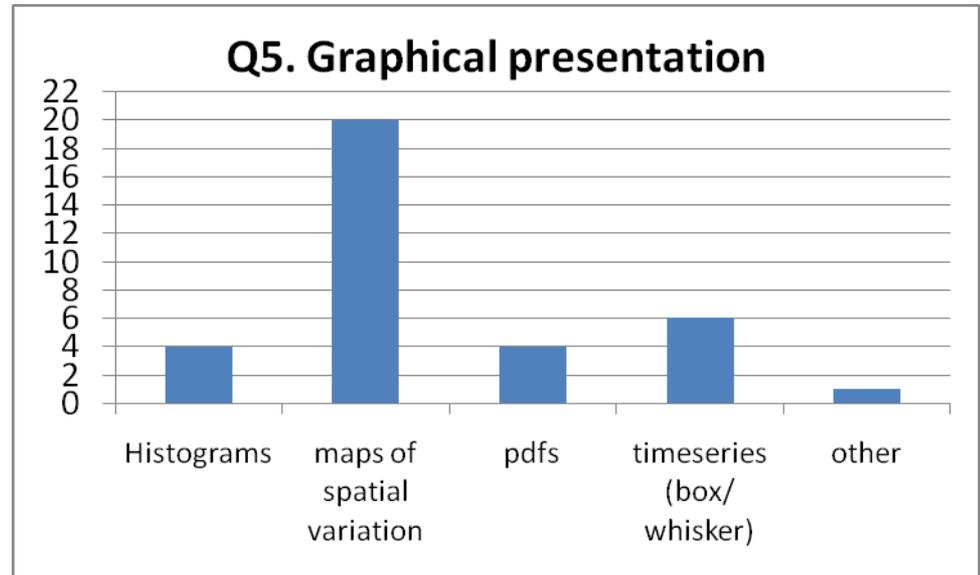
Forecast presentation

- Vast majority text and graphics
- Graphics only – one centre with fully automated forecast data production
- Most common additional text is on drivers, methods and skill



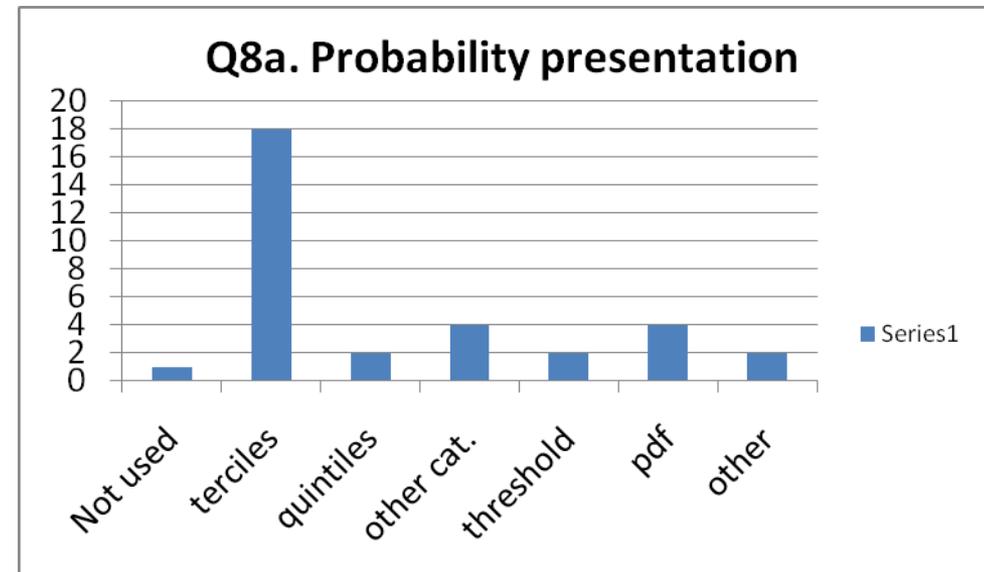
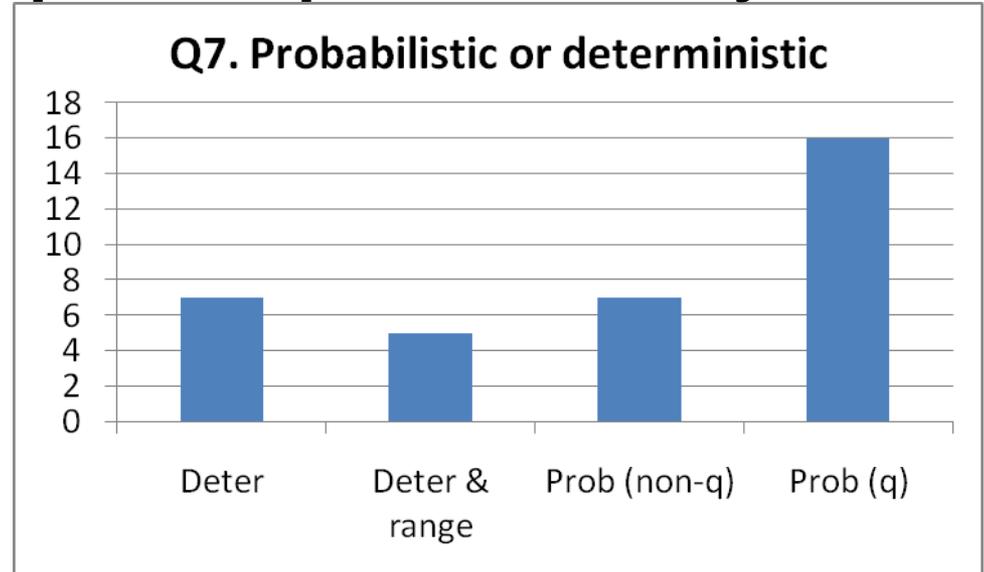
Graphical presentation and use of observed data

- Maps showing spatial variations in the forecast most common
- Size (area) of country a factor
- Observed data: most use both long-term averages and recent monitoring



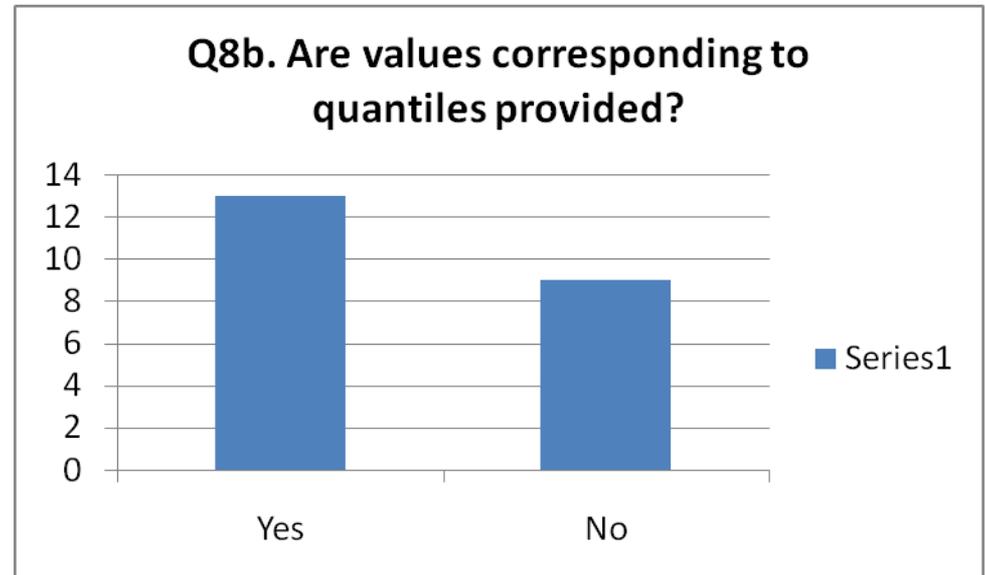
Probabilistic/deterministic content / type of probability

- Quantitative probability format most common
- Nearly all providing probabilities for tercile categories



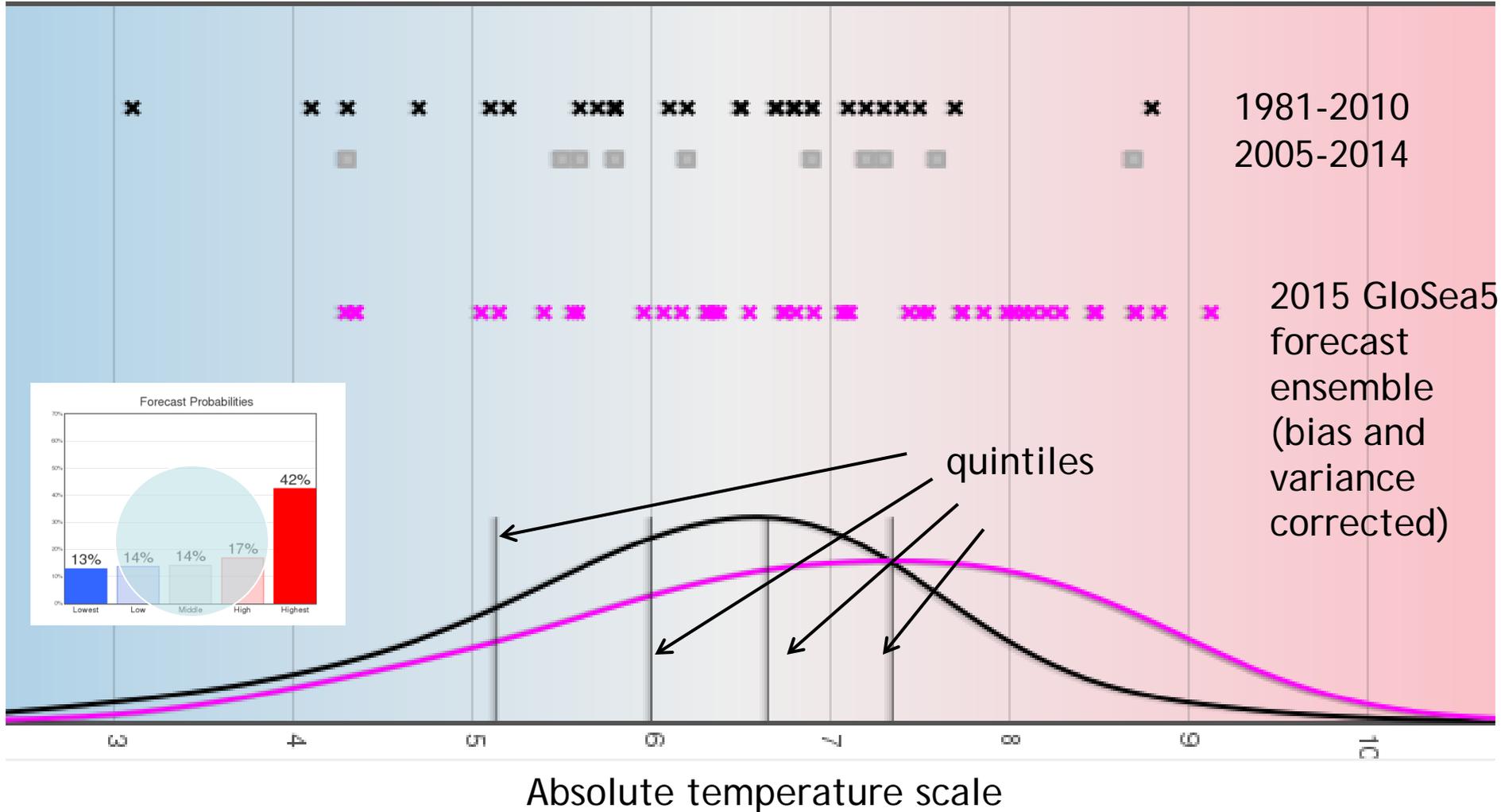
Are values corresponding to quantile boundaries provided

- High proportion do not provide



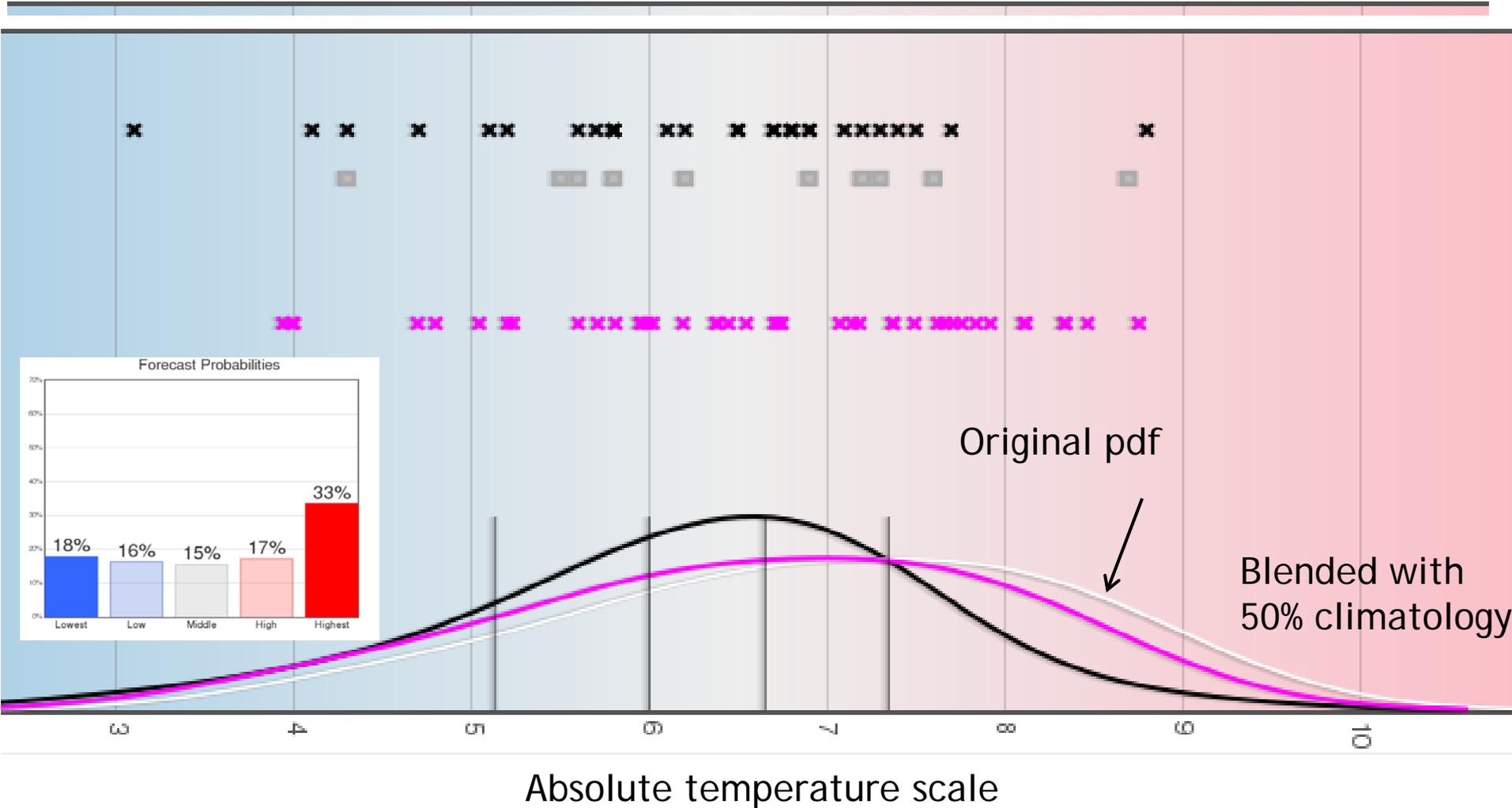


Met Office example: UK temperature forecast for November



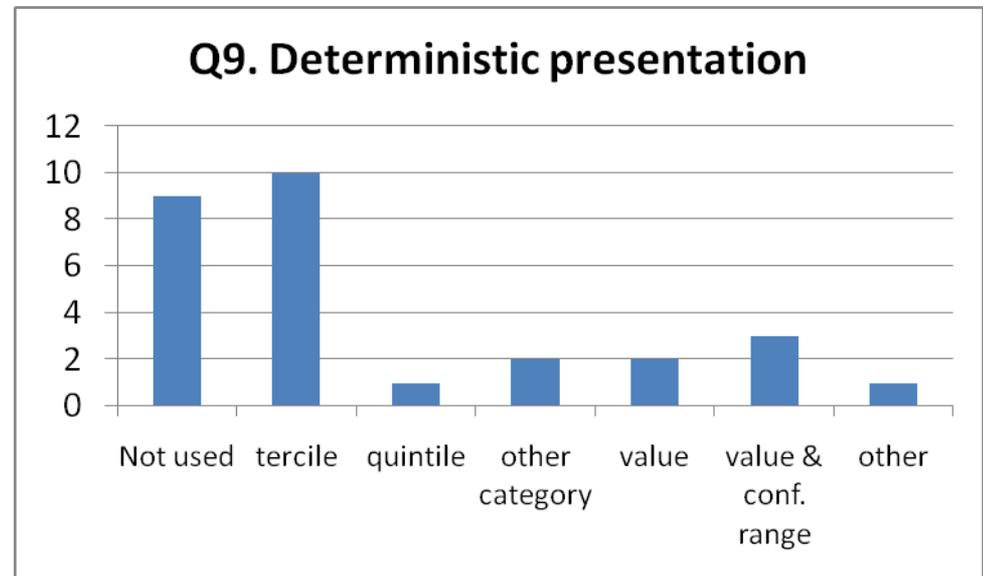


Met Office example: UK temperature forecast for November



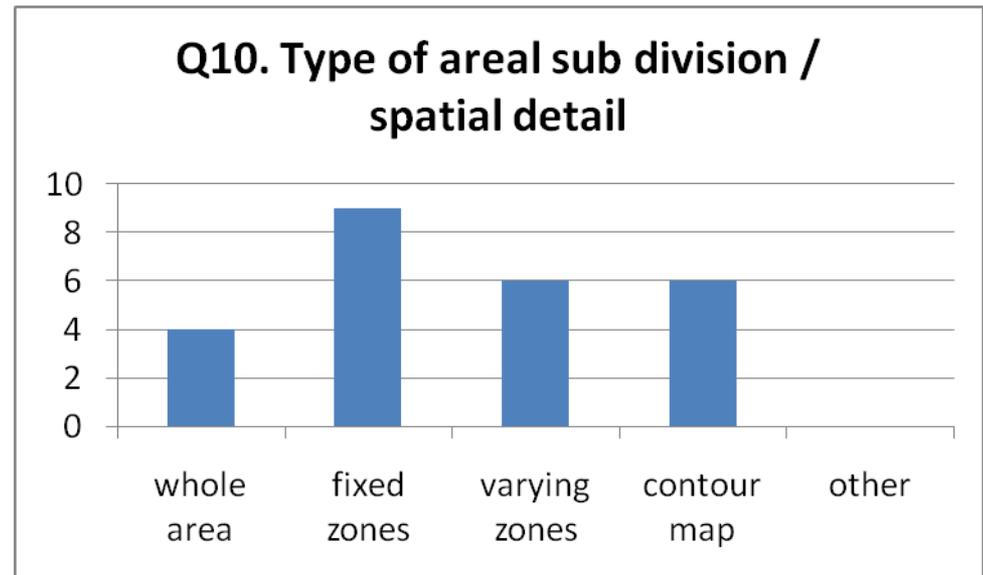
Format of deterministic forecast

- 9 of 23 do not provide a deterministic option
- Of those that do, tercile category is most common



Area subdivision / spatial detail

- Range of subdivision in use
- Fixed zones most common
- Country size is a factor



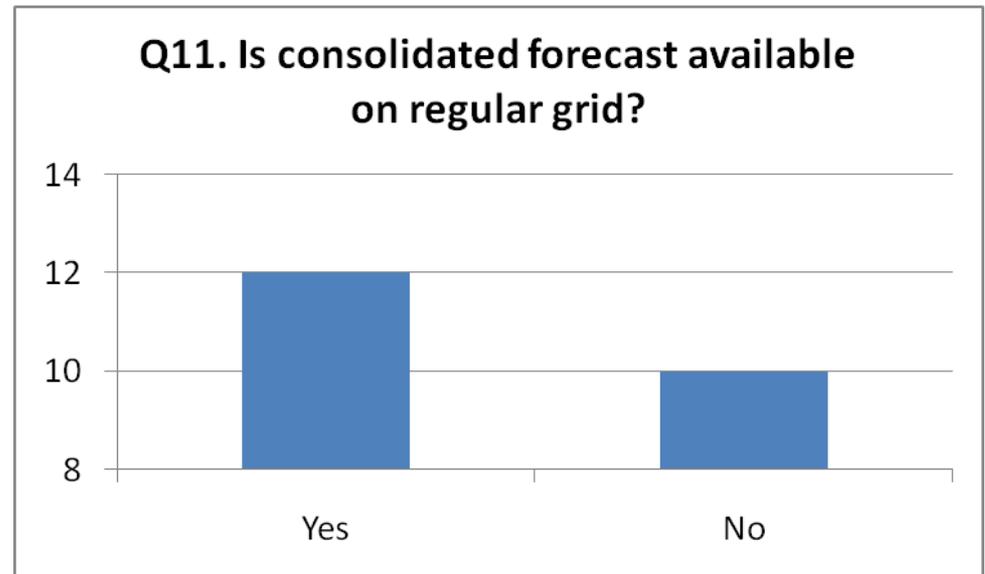
How much spatial precision can we realistically offer with seasonal range?
Needs skill tests?

Is consolidated forecast available on regular grid?

- Roughly equal Y/N spread

Can be useful for flexibility of use

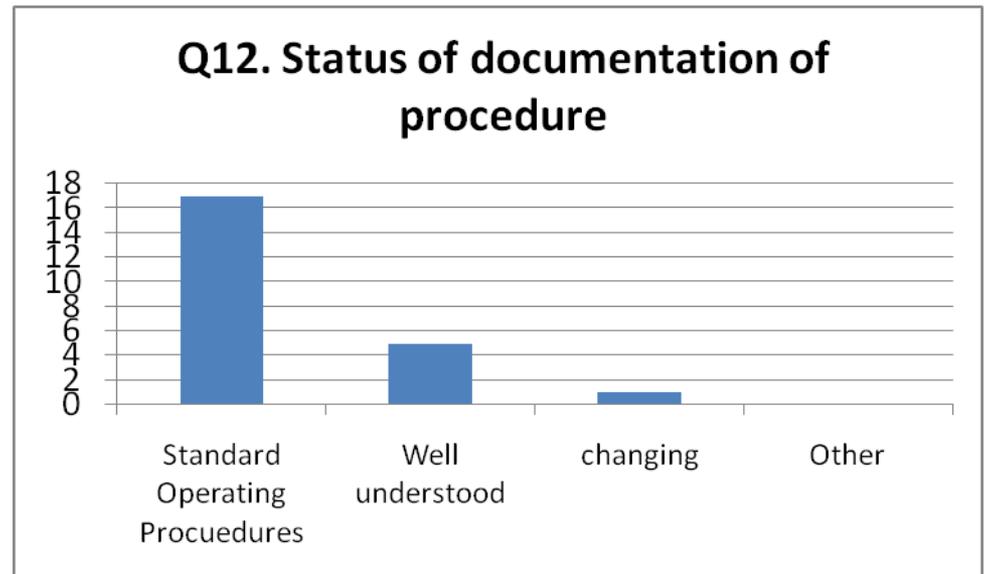
Again issues of spatial precision



Status/stability of procedure used

- Majority of centres are working to written procedures

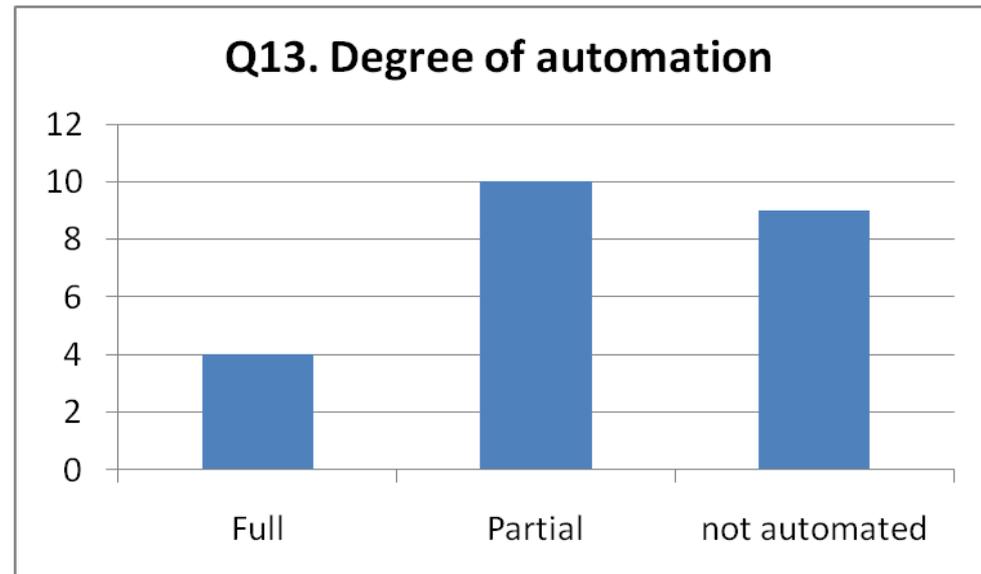
Useful to show systematic approach is used



Degree of automation in generating forecast data (e.g. probabilities)

- Most procedures are partially or no automated
- 4 centres using unchanged output from dynamical model

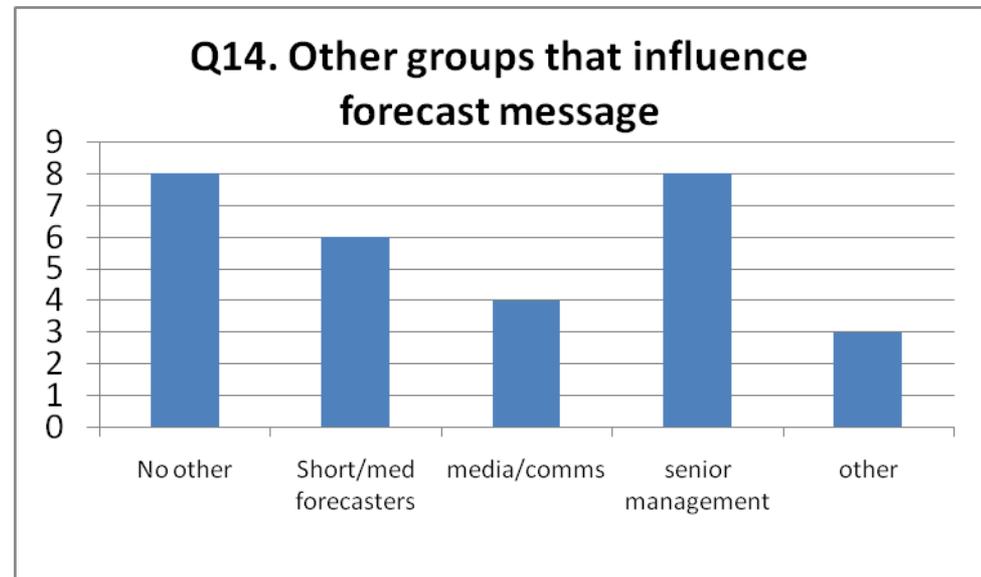
Reflects the many inputs to forecasts in most cases



Other groups in organisation that can influence forecast message

- Senior management seem influential in forecast message

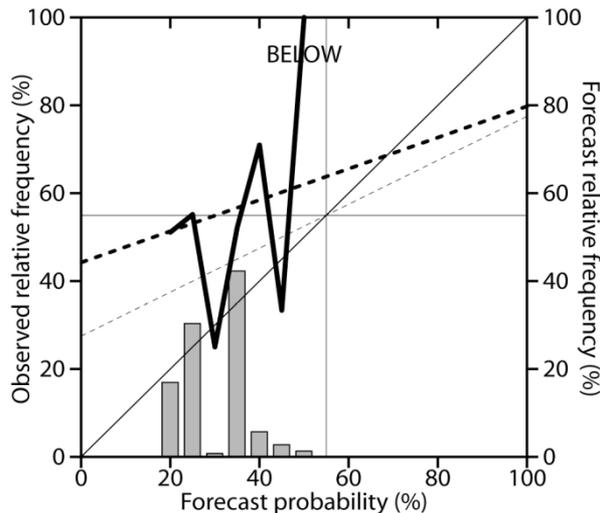
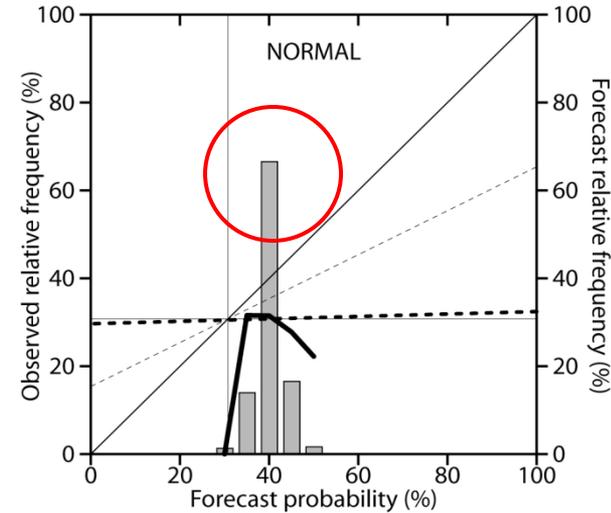
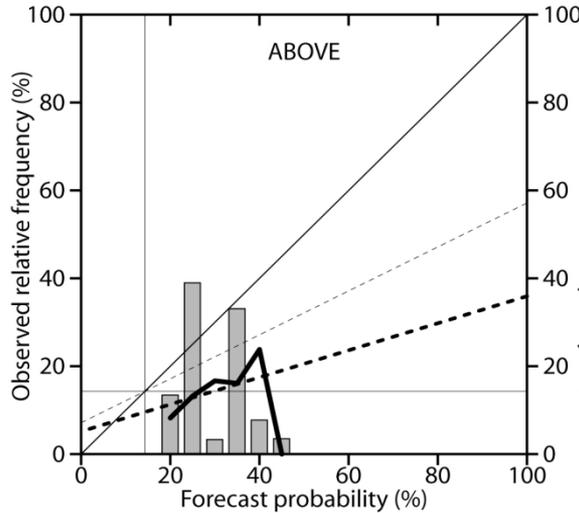
Beware forecast hedging!





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Evidence of “hedging” to normal category – 10 years of RCOFs



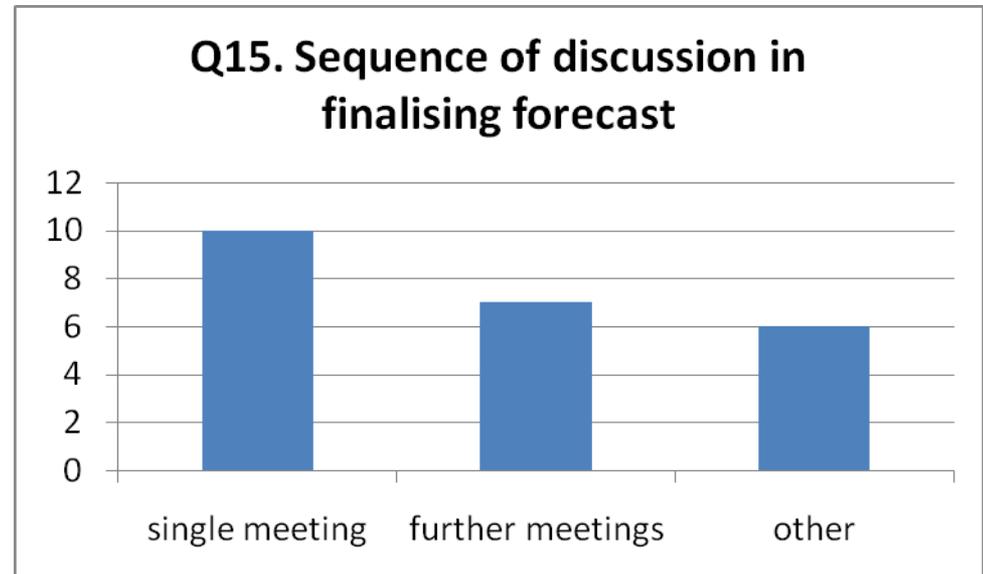
Mason and Chidzambwa 2009

Check: keep simple record of the average probability with which each category is predicted?

Sequence of discussion(s) used to finalise forecast (deterministic value/probs)

- Range of approaches
- Single meeting marginally preferred

More than one meeting carries risk that all considerations raised at science meeting get “watered down” further down the line



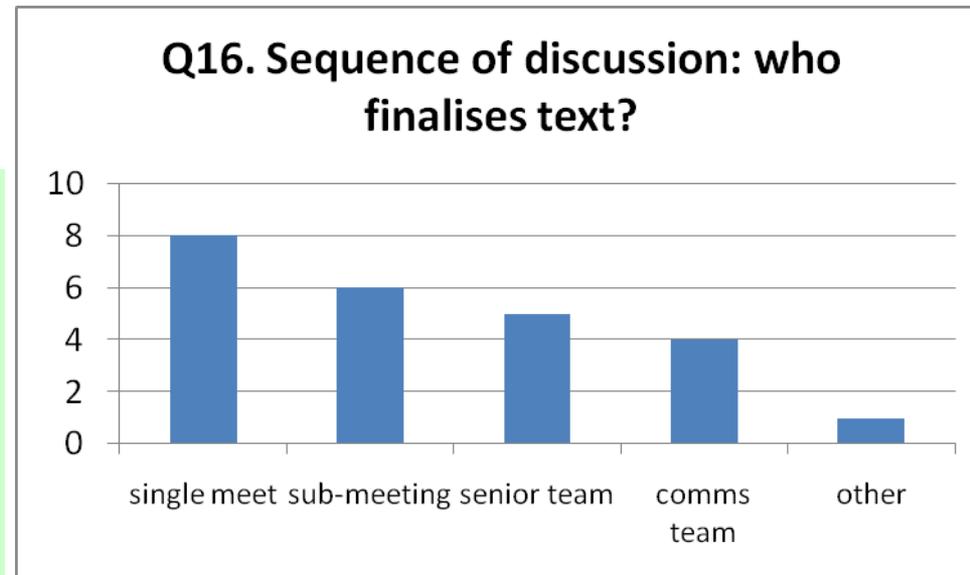
Sequence of discussion(s) used to finalise forecast (text)

- Range of approaches
- Single meeting marginally preferred

Text often difficult to do in a large meeting?

Agree what factors need mentioning then...

Sub team working with agreed forecast values can take time to craft words

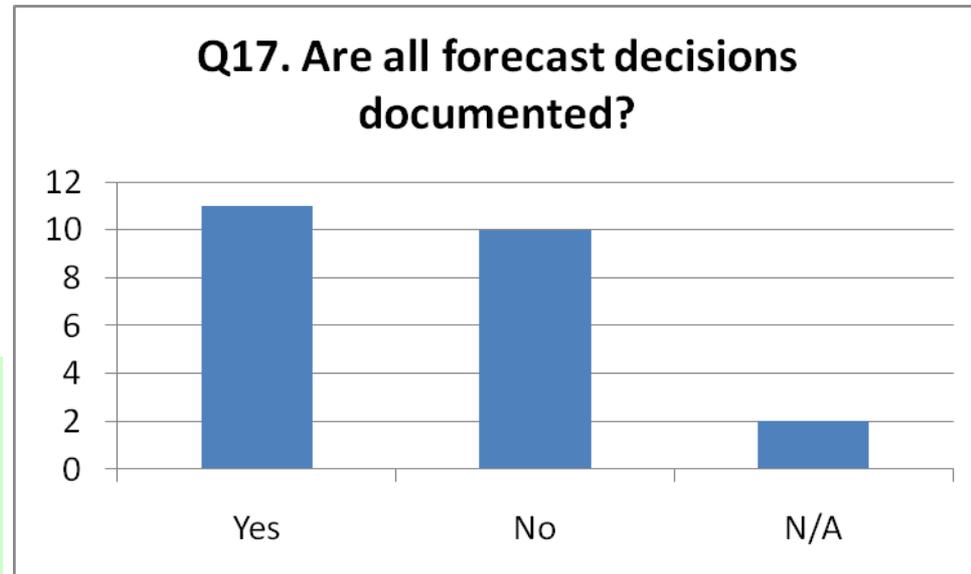


Is the reasoning behind all forecast decisions documented?

- About 50/50
- Not applicable to automated forecasts – but then potential issue of consistency with text?

Documenting reasoning can:

- moderate dominant individuals in process
- provide evidence of reasoned systematic approach when forecast “goes wrong”

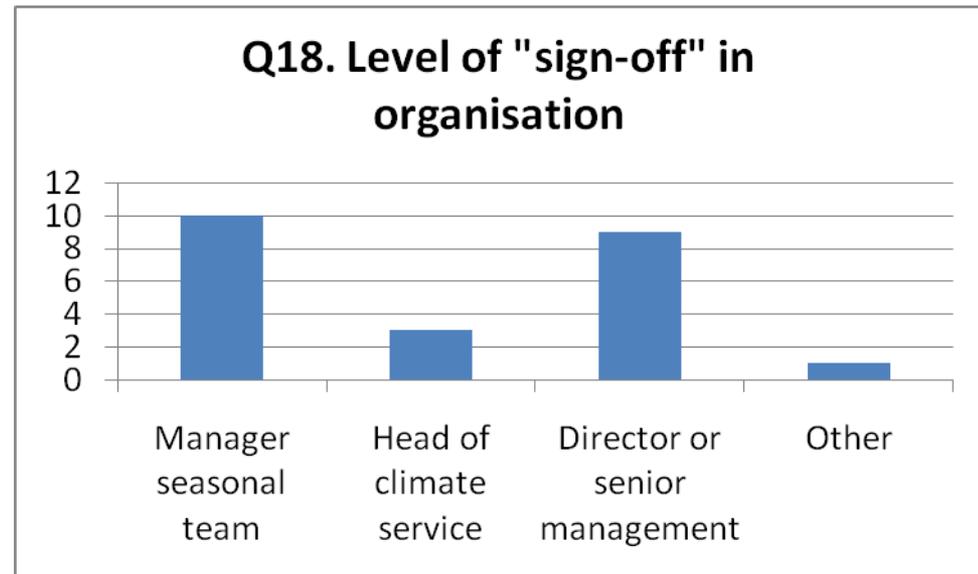


At what level in the organisation is the forecast approved/"signed off"

- Bimodal! Between manager of seasonal team and director

Good to keep senior management aware?

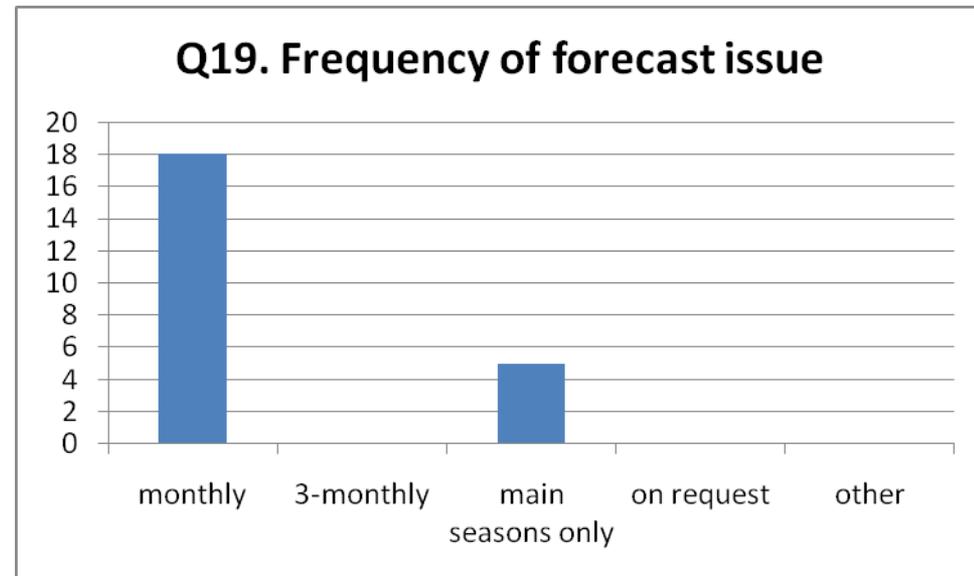
As long as no (unreasonable) interference in forecast!?





How frequently is forecast issued?

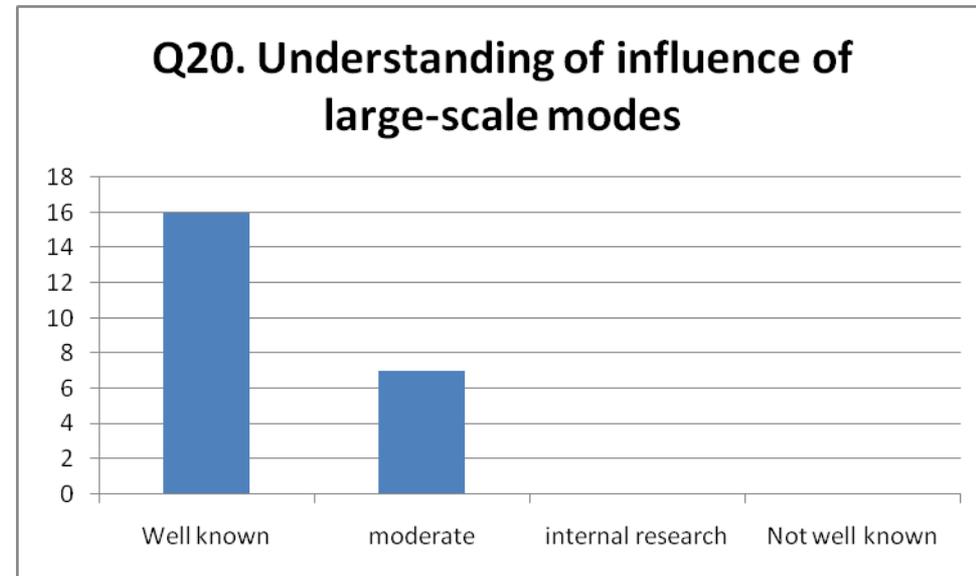
- Majority update monthly
- ...but depends of seasonality of region



Understanding of influence of large scale modes on country/region

- Influences mainly well understood

Some research areas for WCRP?





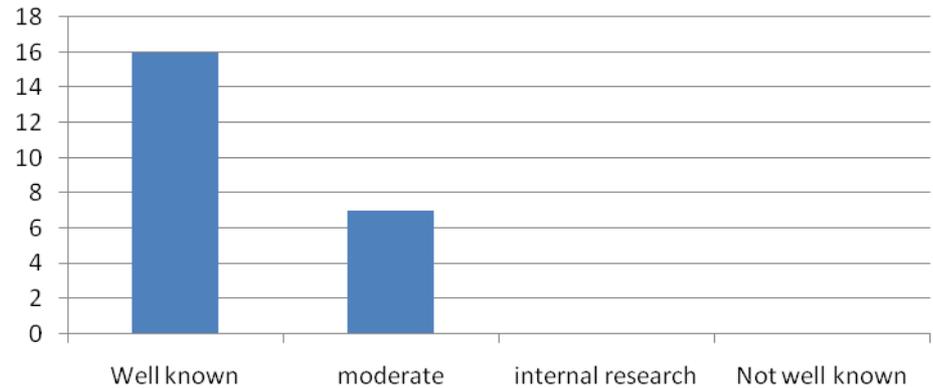
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Understanding of influence of large scale modes on country/region

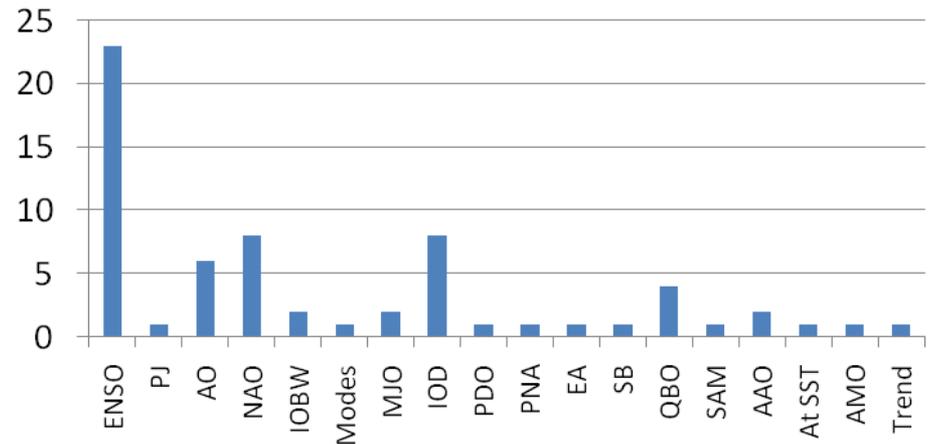
- Influences mainly well understood
- Most common modes: ENSO, IOD, NAO, AO, QBO

Use of MJO may pick up with S2S research

Q20. Understanding of influence of large-scale modes

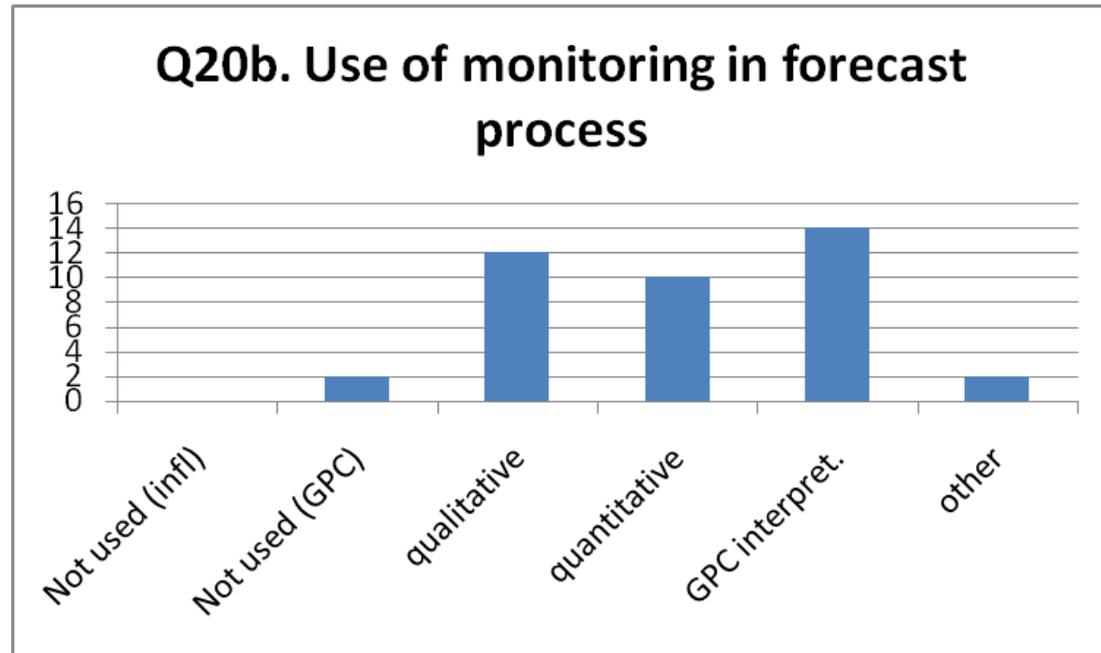


Climate Modes Used



Use of monitoring results in the forecast process

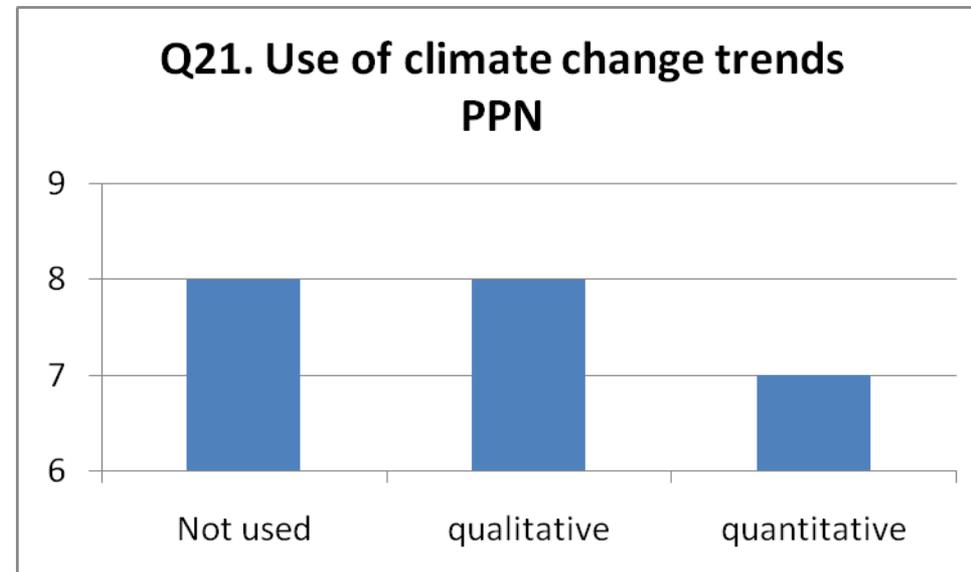
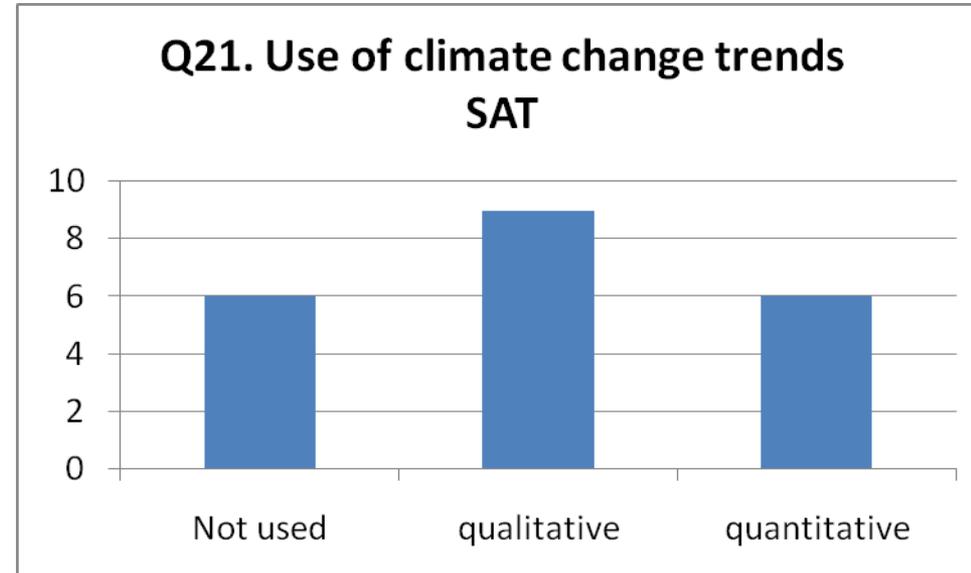
- Broad usage including qualitative, quantitative (SST regression), and interpretation of GPCs



Use of climate change trends in the forecast

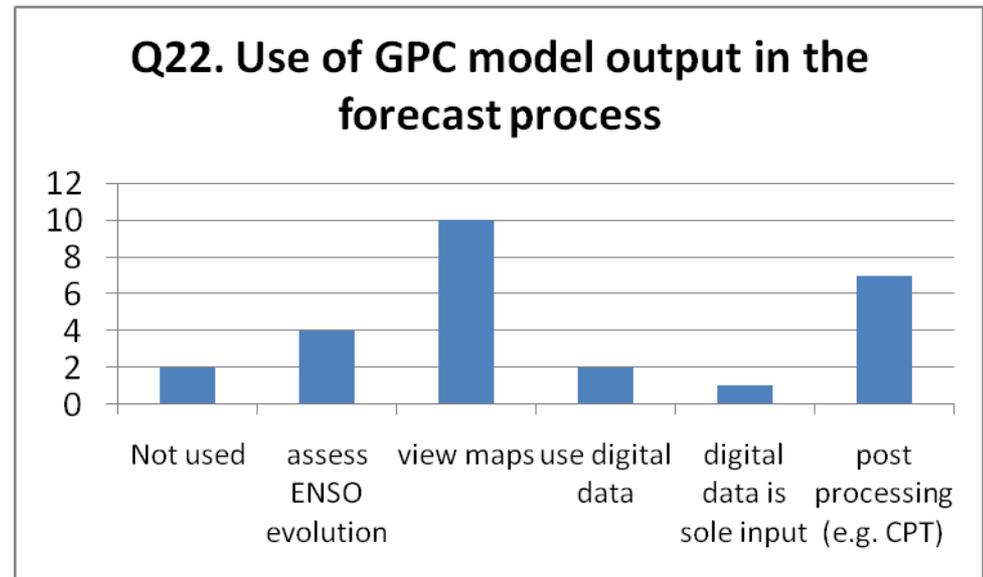
- About 2/3rds make some use – mainly qualitative
- At least some models include implicitly

Need to document which models include CO2 trends in hindcast/forecast?



Use of GPC model output in the forecast process

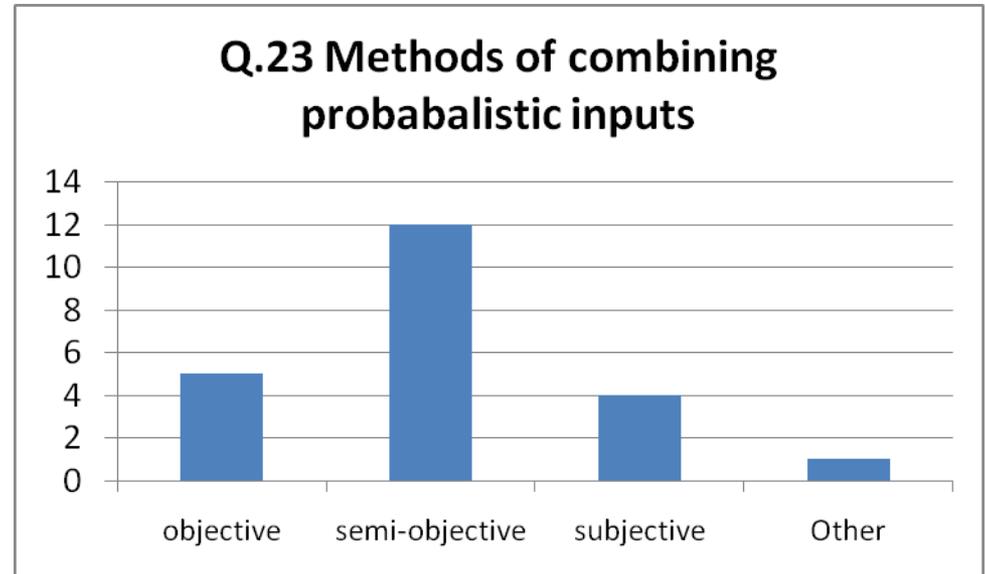
- Viewing maps remains main method (lack of access to data?)
- Use of data in CPT also prominent (7 centres)
- “raw” digital data used by only 3 centres



Review access to data products?

Methods for combining probabilistic inputs from different sources

- Majority use subjective or semi-subjective methods



Agreed procedures for subjective combining needed?

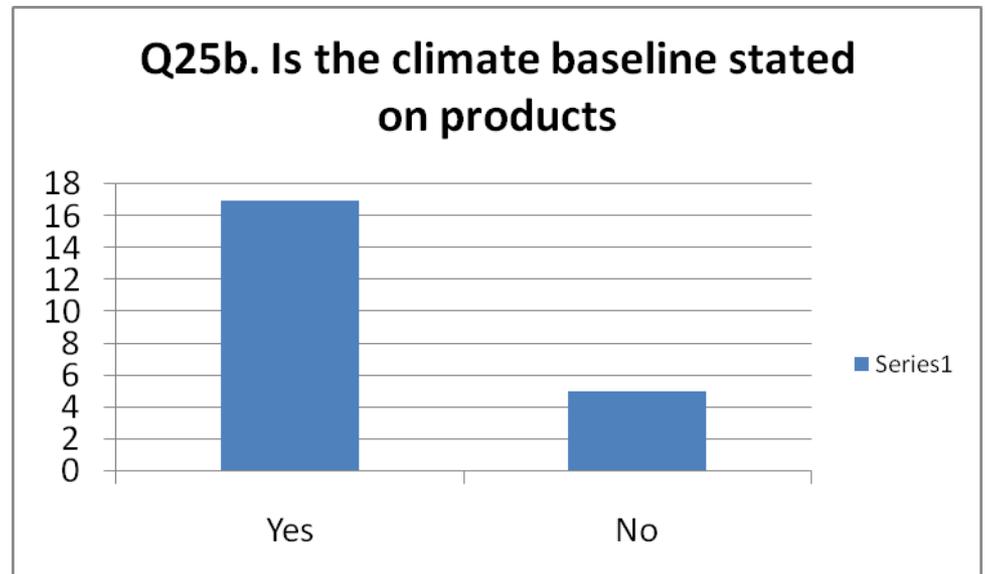
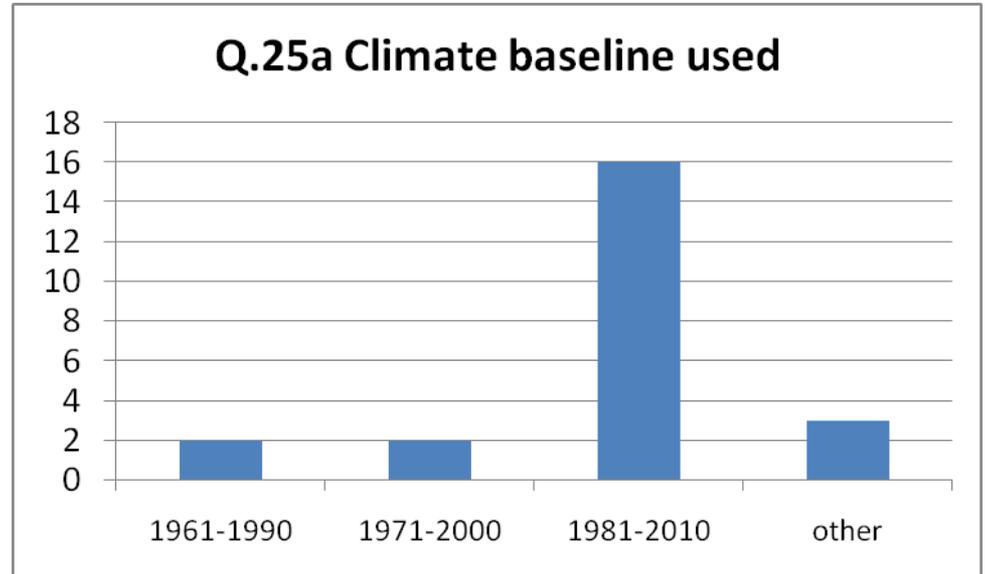


Climate baseline against which forecast is expressed / is it stated?

- Most but not all use 1981-2010
- 5 centres do not state baseline

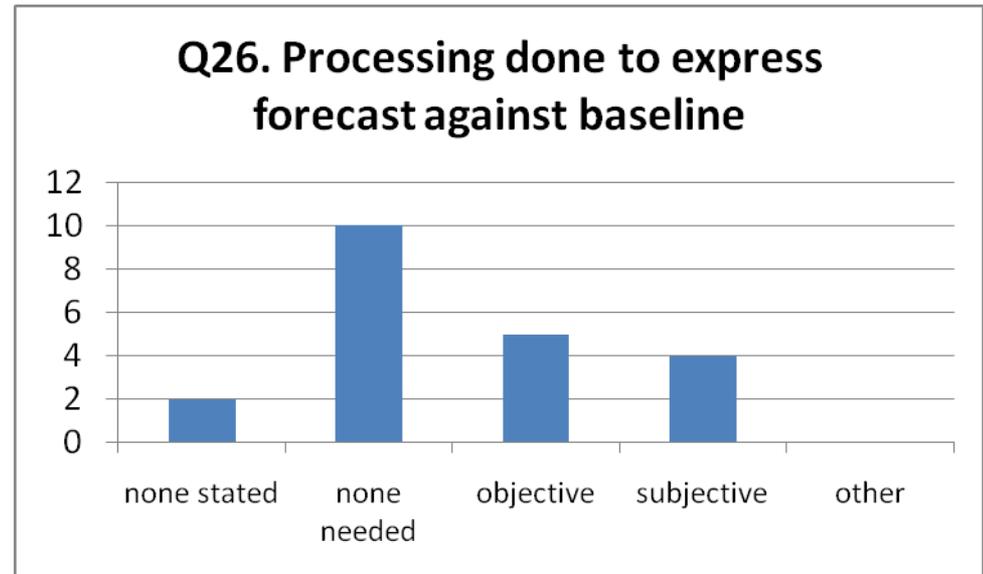
Reasons for not stating

- Inputs have different baselines (multi-model, GSCU)
- (some) users not interested?



Processing used to convert forecast to standard baseline

- Not needed in most cases (baseline of inputs is also 1981-2010)
- Of the rest – similar numbers following objective and subjective methods

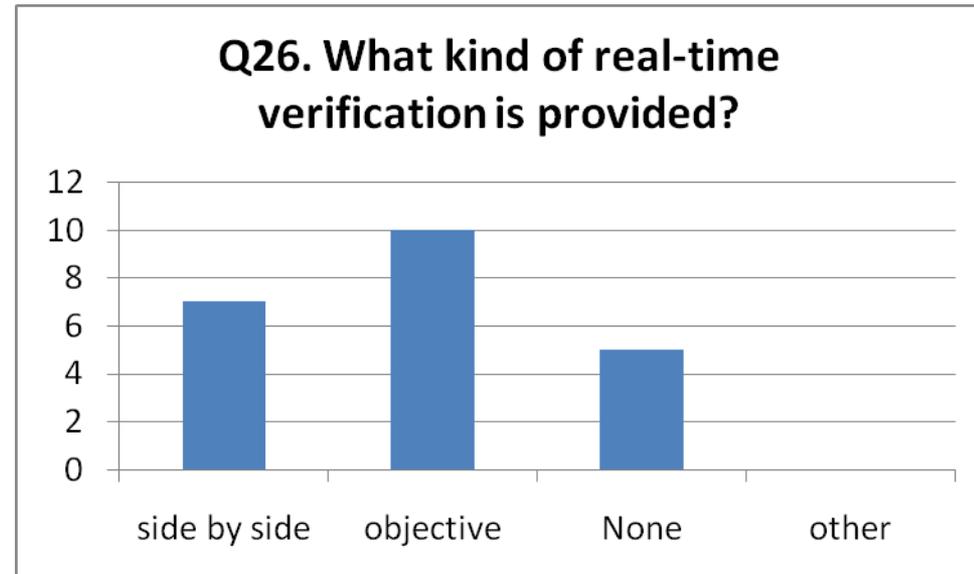


Advice on converting to standard baseline included in guidance?

Real-time verification

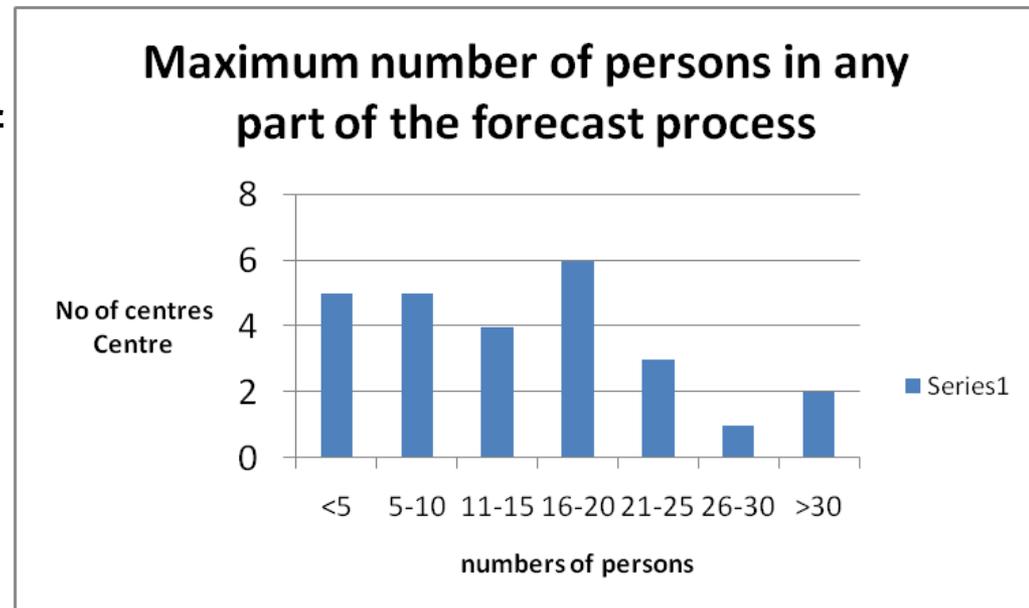
- Most provide (17) some kind of real-time verification

Recommend some common scores (e.g. Heidke)?



End-to-end process (can publish all results?)

- Data gathering (monitoring / forecast)
- Data analysis ahead of conference
- Forecast conference/meeting
- Finalising procedures
- Dissemination



Summary

- Very large diversity in practices
- Guidelines need to focus in general principles
- Forecast presentation formats may be dictated by user groups
- A few recommendations perhaps uncontroversial
 - Test skills of all inputs types (statistical/dynamical)
 - Formal documentation of procedures
 - Documentation of (expert) reasoning inputs
 - Clear statement of climate baseline
 - Values on quantile boundaries
 - Vigilance against forecast hedging (to average)
 - Evaluate skills – particularly if very small geographical areas used (find geographical scale with most skill?)

Break out groups

atrotman@cimh.edu.bb

Come up with:

- Guidelines of science practice
 - E.g. skill assessment of input sources (dynamical/statistical)
 - Avoidance of hedging in combining inputs
 - Aspiration to objective methods
- Guidelines on presentation
 - E.g. Use of deterministic
 - What to cover in text
- Guidelines on procedures
 - E.g. Single meeting to fix forecast **data**, sub-teams to determine **text**
- Guidelines on documentation
 - **SOPs**, documentation of forecast reasoning

Thank you

Any questions?
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