

# Understanding sources of predictability

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# Outline

- Practice in RCOFs
- Why is it important?
- How is it best achieved?
- ‘Predicted’ drivers of predictability
- Predictable vs unpredictable component – what is a fair way to verify such forecasts?
- ‘Users’: do they care about sources of predictability?

# Practice in RCOFs

- Start from known **list of drivers** of predictability
- Examine **current state** of such drivers (from observations or equivalent representations of reality)
- ‘Predict’ the **evolution** of these drivers during the period of interest (using persistence, empirical methods, GCMs)
- Derive **canonical associations/teleconnections** (from published literature, or from data analysis) of **individual** drivers
- Potentially **include this information in the consensus forecast** in subjective manner
- **Communicate the information on the sources of predictability** in some final document

*Some variations to this process exist.*

# What is it useful for?

- To assess 'predictability' of the situation
- To qualify the level of confidence in the model predictions
- To anticipate the likely scale of the predictive signals (?)

# How is it best achieved?

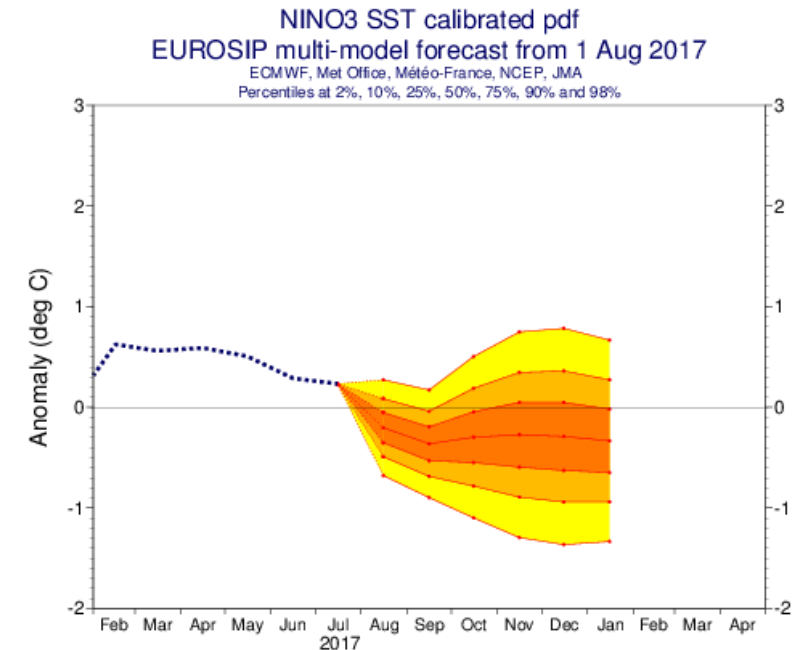
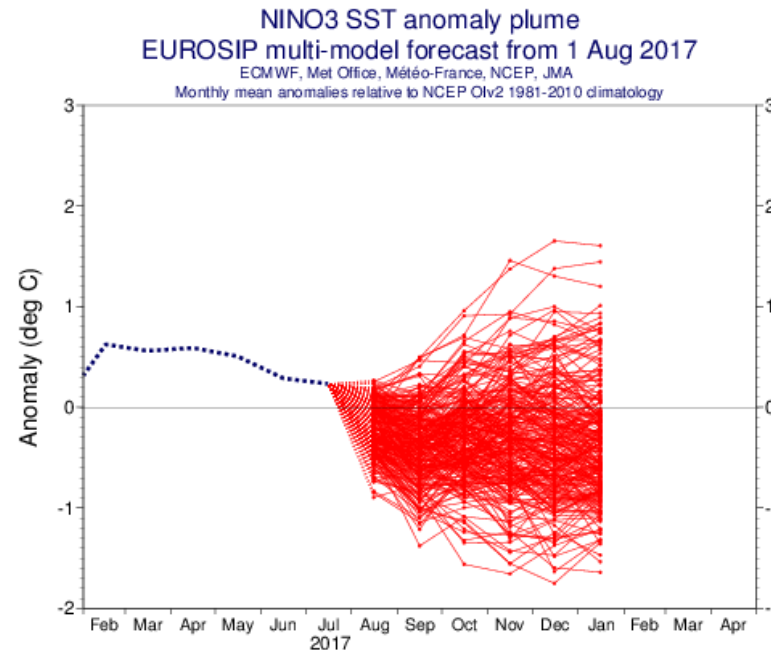
- Conduct/commission specific research into understanding the regional variability and predictability for each RCOF, rather than relying on existing studies which may not be directly relevant.
- Back up observed teleconnections with theoretical or modelling evidence.
- Before modifying the model output on this account, examine if the effect is already represented by the model in question.

## **Issues:**

- How does the information on skill coexist with information on predictability?
- What value do these analyses have when several independent factors influence predictability? What are the best tools to combine the individual influences?

# 'Predicted' drivers of predictability

- Need to know skill of (all) models in predicting the modes of variability; the temptation is to take skill for granted (e.g. IOD)
- Predictability of drivers of predictability may not operate on seasonal timescales (e.g. shorter lead time than desired, shorter influence than the period of interest) (e.g. stratospheric warmings)
- Integrating information from several sources – multi-model combination for modes of variability



# How to interpret information on drivers of predictability?

- Should the prediction follow the canonical teleconnections?

## Verification

- When high confidence predictions do not match reality, consider it a failed forecast? It may be that the outcome was not predictable.

(e.g. example of WAM: all models predicted canonical response to N Atlantic driver, the opposite was observed. The RCOF went against the model consensus – how likely is their success to have been a fluke?)

- If the unpredictable component is large, is it a failed forecast?

(e.g. TS over Philippines in El Niño year)

# Sources of predictability and users

- Should information on predictability be incorporated in the probabilities of the definitive forecast?
- Is it helpful to convey the information on predictability in subjective terms to non-specialist users? Or better to tailor the products to take this into account?



# Conclusion and discussion points

- The analysis of sources of predictability adds information of value to forecasters and to some users (predictability, scale of patterns).
- Understanding the sources of predictability is not the same as having a clear path to using them:
  - where does this leave the GCM output?
  - what use is the information on average skill?
  - how do we deal with combined influences from several sources?