VERIFICATION OF PREVIOUS ARAB-COF CLIMATE OUTLOOK

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CONTENTS

• ARABCOF-3 DJF 2018/2019 forecast verification.
• WMO LRF MME Models Verification.
• Models Performance.
• Summary and Conclusion.
ARABCOF-3
CONSENSUAL SEASONAL FORECAST OUTLOOK OVER ARAB REGION
FOR DECEMBER JANUARY FEBRUARY 2018/19
Cairo, November 28, 2018

Temperature:

Data: ERA-5
Precipitation:

Data: ERA-5
MODELS VERIFICATION

Hindcast Dataset:
WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble (WMO LRF MME).

Available Datasets:
Offenbach, Moscow, Pretoria, Beijing, Seoul, Melbourne, Montreal, CPTEC.
VERIFICATION METHODS

Anomaly correlation - \[ AC = \frac{\sum (F - C)(O - C)}{\sqrt{\sum (F - C)^2 \sum (O - C)^2}} \]

Root mean square error - \[ RMSE = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (F_i - O_i)^2} \]

Verification Hindcast

Anomaly correlation - \[ AC = \frac{\sum (F - C)(O - C)}{\sqrt{\sum (F - C)^2 \sum (O - C)^2}} \]

Addresses the question: How well did the forecast anomalies correspond to the observed anomalies?

Range: -1 to 1. Perfect score: 1.

Characteristics: Measures correspondence or phase difference between forecast and observations, subtracting out the climatological mean at each point, C, rather than the sample mean values. The anomaly correlation is frequently used to verify output from numerical weather prediction (NWP) models. AC is not sensitive to forecast bias, so a good anomaly correlation does not guarantee accurate forecasts. Both forms of the equation are in common use – see Jolliffe and Stephenson (2012) or Wilks (2005) for further discussion.

In the example above, if the climatological temperature is 14°C, then \( AC = 0.904 \). AC is more often used in spatial verification.
EXAMPLE

Hindcast Verification:

Model: CPTEC
ReAnalysis: ERA5
Variable: Precipitation
Horizontal Resolution:
CPTEC: 2.5° x 2.5°
ERA5: 0.25° x 0.25°
Verification Method: RMSE
Season: DJF
ROOT MEAN SQUARE ERROR
DECEMBER (1980 – 2010)

WMO LRF (CPTEC)

CPTEC / ERA5
Models verification
Method : RMSE
Models verification
Method: RMSE
ANOMALY CORRELATION
DECEMBER (1980 – 2010)

WMO LRF (CPTEC)  CPTEC / ERA5
Models verification
Method: ACC
Models verification
Method: ACC
## MODELS PERFORMANCE

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<th>Model</th>
<th>ACC DEC</th>
<th>ACC JAN</th>
<th>ACC FEB</th>
<th>RMSE DEC</th>
<th>RMSE JAN</th>
<th>RMSE FEB</th>
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Over Arabian Peninsula Region
SUMMARY AND CONCLUSION

• ARABCOF-3 prediction for temperature and precipitation for DJF 2018/2019 was reasonably accurate.

• RMSE and ACC analysis were performed of 8 models.

• GPCP dataset was used for the verification over the Arabian region and Arabian Peninsula.

• The Findings show that the models ACC values differ from model to model on the study area of the Arabia Peninsula and in some they vary from month to month significantly.

• Further research is needed to rank the model’s performance over the study area.