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| WORLD METEOROLOGICAL ORGANIZATIONCOMMISSION FOR BASIC SYSTEMS OPAG on DPFS Meeting of the Expert Team on Operational Prediction from  Sub-seasonal to Longer-time Scales  Beijing, China, 11-15 April 2016 |  | CBS-DPFS/ET-ELRF /Doc. 4.1(5)  (22.III.2016)  \_\_\_\_\_\_\_  Agenda item : 4.1  ENGLISH ONLY |

**REVIEW OF THE WORK, FUNCTIONS AND SPECIFIC NEEDS OF THE GLOBAL PRODUCING CENTRES (GPCs)**

**STATUS / PROGRESS REPORT FOR *GPC PRETORIA***

*(Submitted by Asmerom Beraki)*

##### Summary and purpose of document

This document provides an update on the state of GPC-Pretoria and is provided for the information of the ET on Operational Predictions from Sub-Seasonal to Long Time-Scales

##### Action Proposed

The meeting is invited to note the contents.

**STATUS / PROGRESS REPORT FOR *GPC PRETORIA***

**1. FORECASTING SYSTEM**

1.1 Description of the forecasting system specification

Seasonal operational forecasting system of GPC Pretoria relies on a Coupled (ocean-atmosphere) General Circulation model (CGCM) referred to as the SAWS Coupled Model (SCM; Beraki et al., 2014; 2015). The CGCM uses T42 (triangular truncation at wave number 42) horizontal resolution and 19 unevenly spaced hybrid sigma layers, the OGCM (Ocean General Circulation Model) has a 0.58o uniform zonal resolution, with a variable meridional resolution of 0.5o between 10o S and 10o N, gradually increasing to 1.5o at 30oS and 30o N and fixed at 1.5o in the extratropics. In the vertical, the OGCM uses 25 layers with 17 layers in the upper levels between 7.5m and 450m. The model is initialized with the NCEP/DOE daily atmospheric initial states, suitably transformed and interpolated into the AGCM’s vertical and horizontal resolution. The ocean initial states are taken from ODA (Ocean Data Assimilation) system produced at the GFDL (Geophysical Fluid Dynamics Laboratory) for the handcast integrations. However, the real-time forecasts use the Global Ocean Data Assimilation System (GODAS) pentad ocean state anomalies added to the GFDS ODA climatology to minimize the potential mismatch between the hindcast and forecasts. The hindcast (1982-2009) and real-time forecasts consist of 10 and 40 ensembles respectively. Each forecast integration is of 9 months length. This CGCM has been used operationally since 2014.

Forecasts are displayed in real-time at:

<http://www.weathersa.co.za/home/seasonal>

Beraki A.F., W. Landman, and D. DeWitt, 2015: Comparison on the seasonal predictive skill of global circulation models: coupled versus uncoupled, *Journal of Geophysical Research Atmosphere,* 120, doi:10.1002/2015JD023839*.*

Beraki, A.F., D. G. DeWitt, W.A. Landman, and C. Olivier (2014) Dynamical seasonal climate prediction using an ocean-atmosphere coupled climate model developed in partnership between South Africa and the IRI, J. Climate, 27,1719-1741.

Landman, W. and A. Beraki 2010: Multi-model forecast skill for mid-summer rainfall over southern Africa, *International Journal of Climatology, Vol. 32,303-314*

1.2 Content of basic forecast outputs

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| --- | --- |
| Issue frequency | *Monthly* |
| Temporal resolution | 40 ensembles (as a function of 10 and 3 slightly different atmosphere and ocean states respectively) are updated every month. |
| Spatial resolution | *2.5°x2.5°* |
| Spatial coverage: | *Global* |
| Lead time: | *1* Forecasts are from 0 months to 9 month lead |
| Output types: | Graphical products are partially available from the web site (web site under construction). |
| Verification as per WMO SVSLRF | Verification information for the SCM is provided to the LC-SVLRF. The graphic will also be available in the SAWS web (web site under construction). |

**2. PRODUCTS**

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| --- | --- | --- | --- | --- |
| Variable: | | Probabilities for tercile categories of 2m temperature | Probabilities for tercile categories of precipitation | Probabilities for tercile categories of SST (coupled models only) |
| Spatial resolution: | | *2.5°x2.5°* | *2.5°x2.5°* |  |
| Temporal Resolution: | | *3 month seasons* | *3 month seasons* | Month |
| Coverage: | | *Global* | *Global* | *Global* |
| Issue frequency: | | *Monthly* | *Monthly* | *Monthly* |
| Lead-time | L0 | *N* | *N* | N |
| L1 | *Y* | *Y* | *Y* |
| L2 | *Y* | *Y* | *Y* |
| L3 | *Y* | *Y* | *Y* |
| L4 | *N* | *N* | *N* |
| L4+ | *N* | *N* | *N* |
| Location of rendered images: | | <http://www.weathersa.co.za/home/seasonal> | | |
| Location of digital data (if available): | | [ftp.weathersa.co.za](ftp://ftp.weathersa.co.za) (Access on request) | | |
| *[For non-compliant elements, please indicate intended date of compliance]* | |  |  |  |

**3. VERIFICATION**

3.1 SVSLRF Level 1 scores

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable: | 2m temperature | Precipitation | SST (coupled models only) | Niño region indices |
| Seasons: | *All 12* | *All 12* | *All 12* | Calendar month |
| Leads: | Y | Y | Y | Y |
| ROC curves: | Y | Y | Y | Y |
| ROC area: | Y | Y | Y | Y |
| Reliability curve: | Y | Y | Y | Y |
| Frequency histograms (sharpness) | Y | Y | Y | Y |
| MSSS | Y | Y | Y | Y |
| Location of scores: | *LC-SVSLRF website* | *LC-SVSLRF website* | *LC-SVSLRF website* | *LC-SVSLRF website* |
| Scores’ availability on the LC-SVSLRF web site | *N* | *N* | N | N |
| *[For non-compliant elements, please indicate intended date of compliance]* | Verification score are provided to LC-SVSLRF; Future progress is contingent on the outcome related to ongoing discussions by TT2 | | | |

3.2 SVSLRF Level 2 scores

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| --- | --- | --- | --- |
| Variable: | 2m temperature | Precipitation | SST (coupled models only) |
| Seasons: | *All 12* | *All 12* | *All 12* |
| Leads: | *1,2,3* | *1,2,3* | *1,2,3* |
| ROC maps: | *Y* | *Y* | *Y* |
| MSSS maps: | *Y* | *Y* | *Y* |
| MSSS 1 maps: | *Y* | *Y* | *Y* |
| MSSS 2 maps: | *Y* | *Y* | *Y* |
| MSSS 3 maps: | *Y* | *Y* | *Y* |
| Location: | *LC-SVSLRF website* | *LC-SVSLRF website* | *LC-SVSLRF website* |
| *[For non-compliant elements, please indicate intended date of compliance]* | Verification score are provided to LC-SVSLRF; Future progress is contingent on the outcome related to ongoing discussions by TT2 | | |

**4. DISSEMINATION**

Graphical – All products freely available

Digital - ftp.weathersa.co.za, (restricted access; also available via LC-LRFMME)

**5. LRF MULTI-MODEL ENSEMBLE**

GPC Pretrial uses inputs from set of global models to produce a regional (southern Africa region) for rainfall and temperature seasonal outlook. (Landman and Beraki, 2012). This product is also available on the SAWS website.

**6. ADDITIONAL INFORMATION PROVIDED BY THE GPC**

GPC Pretoria is in the process of implementing a sub-seasonal (Extended range) forecasting system. The hindcast (2000 – 2013) is based on 24 ensembles. The forecast is updated weekly.

**7. CAPACITY BUILDING AND TRAINING**

Interpretation and use of products (on a request basis)*.*

**8. SPECIFIC NEEDS**

Verification Scores summited to LC-LRFSVS need to be displayed on the LC-LRFSVS depending on the decision of the ET on the issue of verification.

**9. FUTURE DEVELOPMENTS**

None planned for immediate future.

**10. USERS OF THE LRF**

Data and graphical display of the forecast is put on the web and is freely accessible by anyone. GPC Pretoria also provides real-time forecasts to the LC-LRFMME.

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