The Global Seasonal Climate Update (GSCU)

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What is GSCU?

- An extension of WMO's El Niño/La Niña which includes other large-scale climate indices with impact on regional seasonal climate around the world.

- Initiated in 2010; endorsed by Cg-16 in 2011

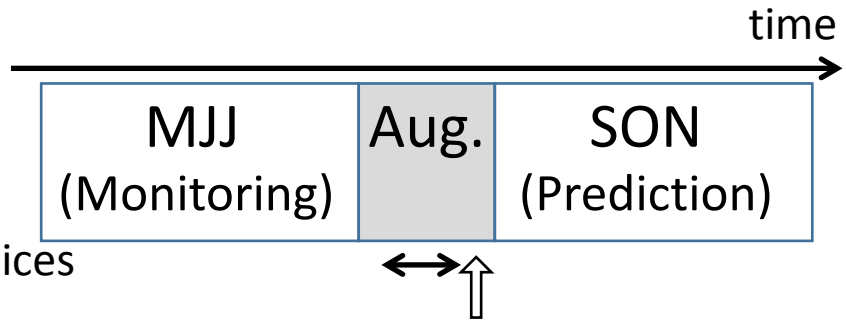
- Aimed at assisting NMHSs, RCCs, RCOFs in production of their seasonal outlooks, by providing global-scale expert assessments of the ongoing and upcoming seasonal climate along with information on robustness of the available forecast signals

What is GSCU?

- GSCU summarizes the current (monitoring) and the expected future (prediction) state of the seasonal climate including major atmospheric general circulation features and large-scale oceanic anomalies around the globe (e.g., El Niño/Southern Oscillation, Indian Ocean Dipole, North Atlantic Oscillation) and their likely impacts on surface temperature and precipitation patterns as predicted by GCMs from the Global Producing Centres of Long-Rage Forecasts (GPC-LRF).

- It is proposed to be issued every three months, a few days ahead of each of the standard meteorological seasons.

Draft GSCU (trial in Aug. 2015)



Summary

1. Observations (May-July 2015)

1.1 Large-scale sea surface temperature (SST) indices

1.2 Observed temperature

1.3 Observed precipitation

2. Potential evolution of the state of the climate over the next three months (September-November 2015)

2.1 Large-scale SST-based indices, September-November 2015

2.2 Predicted temperature, September-November 2015

2.3 Predicted precipitation, September-November 2015

3. How to use the Global Seasonal Climate Update

Designated and developing Regional Climate Centres and Regional Climate Centre Networks

References / Resources / Acknowledgements

Draft GSCU (trial in Aug. 2015)

1. **Observations** (May-July 2015)

1.1 Large-scale sea surface temperature (SST) indices

<<< explanation >>>

Month	Niño 1+2	Niño 3	Niño 4	Niño 3.4	IOD	NTA	STA
May 2015	2.43	1.19	1.09	1.03	0.5	-0.37	0.45
June 2015	2.54	1.66	1.09	1.32	0.6	-0.40	0.00
July 2015	2.87	2.17	1.00	1.60	0.3	-0.32	-0.15
May-July 2015	2.61	1.67	1.06	1.32	0.5	-0.36	0.10

Table 1: Large-scale oceanic indices (˚C). Anomalies are with respect to the 1981–2010 average, with the exception of the IOD which is with respect to the 1983–2005 average. (Source: U.S. Climate Prediction Center).

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2. Potential evolution of the state of the climate over the next three months (September-November 2015)

2.1 Large-scale SST-based indices, September-November 2015

Month	Niño 1+2	Niño 3	Niño 4	Niño3.4	IOD	NTA	STA
September 2015	1.78±0.56	2.75±0.75	1.46±0.54	2.58±0.73	0.47±0.38	0.02±0.20	-0.18±0.18
October 2015	1.78±0.76	2.75±0.90	1.69±0.68	2.65±0.84	0.43±0.28	0.08±0.21	-0.01±0.17
November 2015	1.70±0.74	2.71±0.93	1.70±0.77	2.63±0.91	0.25±0.14	0.09±0.18	0.11±0.19
September-November 2015	1.75±0.67	2.73±0.86	1.67±0.66	2.62±0.82	0.38±0.24	0.06±0.20	-0.03±0.17

Table 2: Multi-model forecasts for oceanic indices (˚C), with standard deviation. Values are the equal-member-weighting average of those derived, using each GPC models own hindcast climate mean, from the 9 GPCs supplying SST forecasts (GPC Seoul, Montreal, Tokyo, ECMWF, Exeter, Toulouse, Beijing, Melbourne and Pretoria). The standard deviation is calculated on all ensemble members, except for GPC Toulouse (GPC Toulouse provides only ensemble mean anomaly). The latitude/longitude bounds of the regions are given in the supplementary information section.

(Source: WMO LC-LRFMME (& GPCs))

Draft GSCU (trial in Aug. 2015)

1. **Observations** (May-July 2015)

1.2 Observed temperature

For more detailed information about regional climate anomalies, the reader is referred in the first instance to the concerned WMO Regional Climate Centres (RCCs), listed in Section 3.

<<< explanation >>>

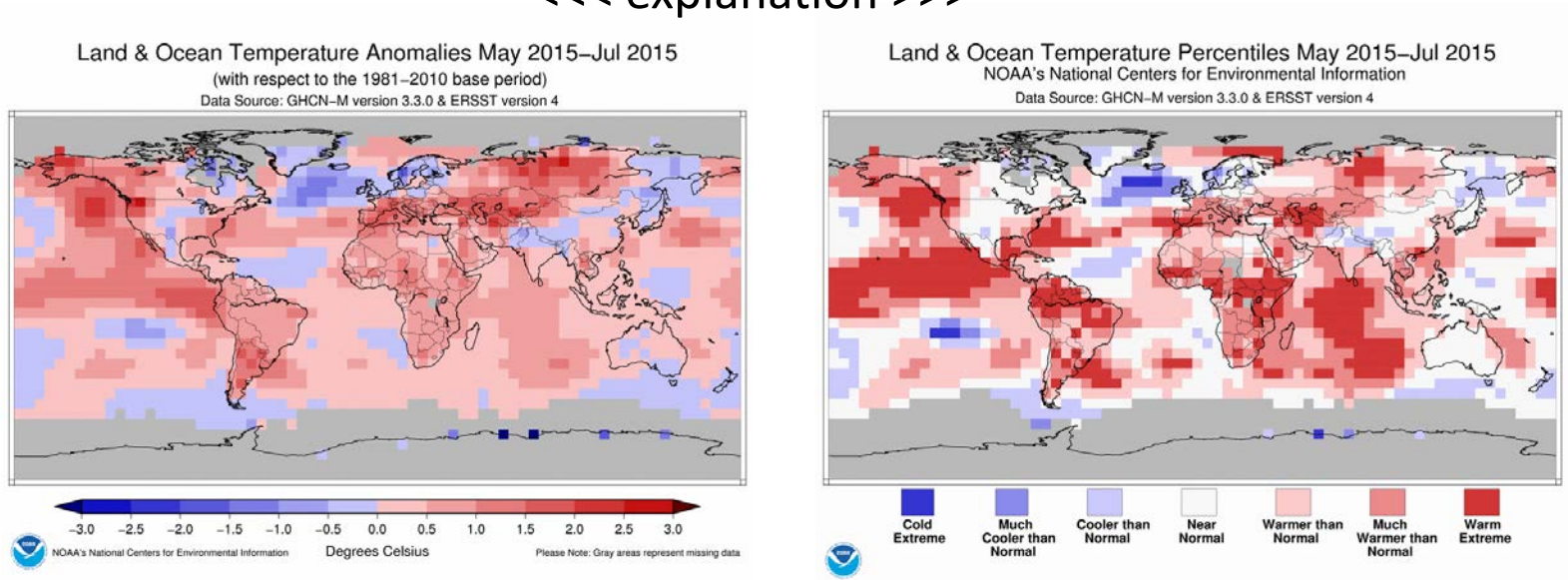

Figure 2: Observed May–July 2015 near-surface temperature **anomalies** relative to 1981–2010 (left panel) and near-surface temperature **percentiles** relative to 1981–2010 base period (right panel). The *Cooler than Normal*, *Near Normal*, and *Warmer than Normal* shadings on the percentile map represent the bottom, middle, and upper tercile of the 1981–2010 distribution, respectively. The lowest and highest decile (or 10%) of the distribution are marked as *Much Cooler than Normal* and *Much Warmer than Normal*, respectively. The *Cold Extreme and Warm Extreme* shadings indicate that the May–July 2015 value exceeded the coldest and warmest values of the 1981–2010 period. Grey shading indicates areas where there are no observations. (Source: U.S. National Center for Environmental Information)

Draft GSCU (trial in Aug. 2015)

2. Potential evolution of the state of the climate over the next three months (September-November 2015)

2.2 Predicted temperature, September-November 2015

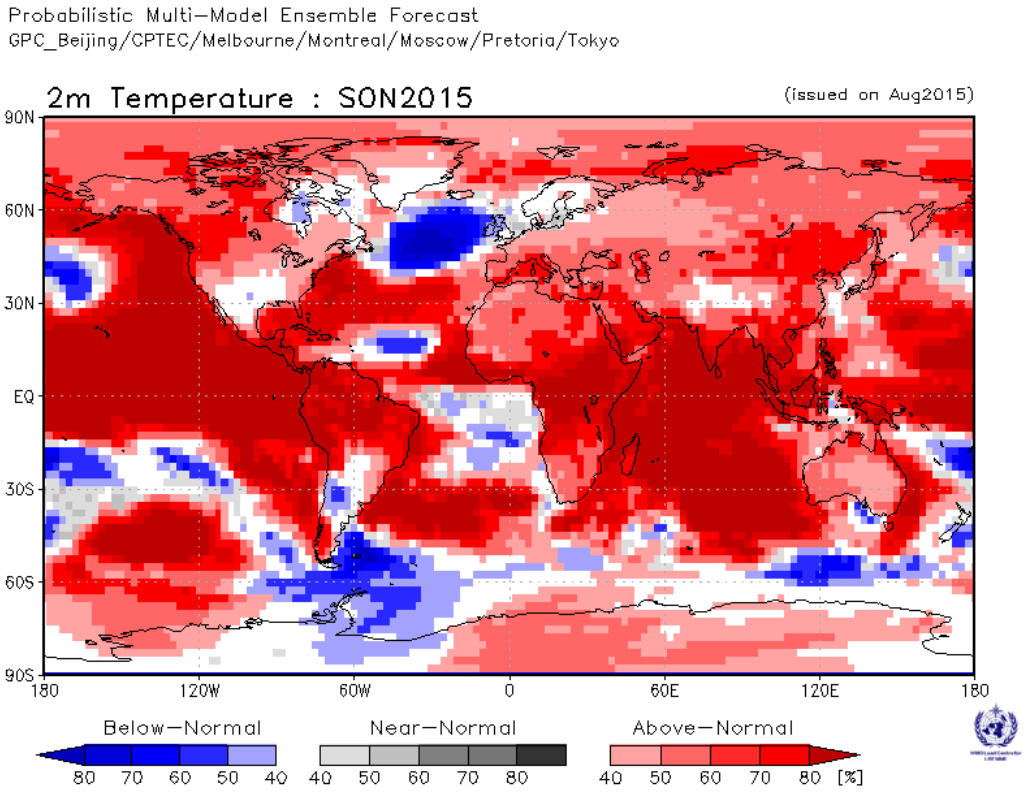

Figure 4: **Probabilistic forecasts** of surface air temperature for the season September-October-November 2015. The **tercile category with the highest forecast probability** is indicated by shaded areas. The most likely category for below-normal, above-normal and near-normal is depicted in blue, red and grey shadings respectively. White areas indicate equal chances for all categories in both cases. The baseline period is 1983-2001.

(Source: WMO LC-LRFMME and GPCs)

Draft GSCU (trial in Aug. 2015)

2. Potential evolution of the state of the climate over the next three months (September-November 2015)

2.2 Predicted temperature, September-November 2015

<<< explanation >>>

- description, by WMO Regional Association (RA), of MME prediction
- some interpretation of consistency of signals between individual GPC forecasts and with predicted or observed large-scale features

General

RA I (Africa)

RA II (Asia)

RA III (South America)

RA IV (North America, Central America and the Caribbean):

RA V (South-west Pacific)

RA VI (Europe)

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Supplementary information (in appendix)

- Atmospheric indices (SOI, PNA, AAO, AO, NAO, EA/WR, SCAND) – monitoring and prediction; need to calculate skill for predictions
- Circulation diagnostics (including upper air)

- Individual model predictions, deterministic and probabilistic
- Consistency between models
- Skill metrics (ROC area, reliability and sharpness, correlation)

Expert review (July 2015)

The prototype of GSCU was submitted for expert review to:

- ET-OPSLS / WGSIP / ET-RCCs / TT-RCOFs / TT-NCMP
- RCCs, including those in demonstration phase

Questions covered:

- Likely usefulness; desirable schedule and lead time for publication
- Content: missing information, potential for conflict with other sources
- Adequacy of scientific basis
- Adequacy of communication features (vocabulary, length/complexity of text, including potential need for a summary)

Constraints on GSCU pre-operational trial

- Timing of preparation and production of GSCU is a compromise
  - Operational schedules of centres producing inputs, on monitoring or prediction (including generation of MME products)
  - Availability of individual contributors who write the text and review the draft
- Potential for discrepancies between GSCU and RCCs/RCOFs/NMHSs
  - GSCU monitoring is based on the gridded and global products, which may not reflect the local information suitably well
  - It represents the view of the climate system in light of the combination of (up to) 13 GCM forecasts (is this too few? too many?)
- Design of contributing forecast systems is driven by priorities other than MME
  - short baseline period for MME, inconsistent with monitoring baseline
  - high maintenance necessary for documentation

‘Useful’?

- Pre-selected inputs
- Pre-processed information
- Graphical products not optimal, and not sufficient
- May not meet timeliness criteria, or target suitable periods
- Not sufficiently frequent updates?

But there are useable elements:

- Discussion on sources of predictability other than ENSO
- Indices (ocean and atmosphere), observed and predicted
- Information on skill of individual prediction systems

What next? – personal perspective

- Documentation
  - For users and providers
- Revision of methods – process for continual ‘scrutiny’
  - Current method devised at the very beginning; many inputs have changed significantly since
- More ambitious operational schedule and procedure
  - Earlier, predictable (and more frequent?) publication time (comes at a cost!)

Thank you!