



NWP and Seasonal Forecasting at the Bureau of Meteorology

Oscar Alves

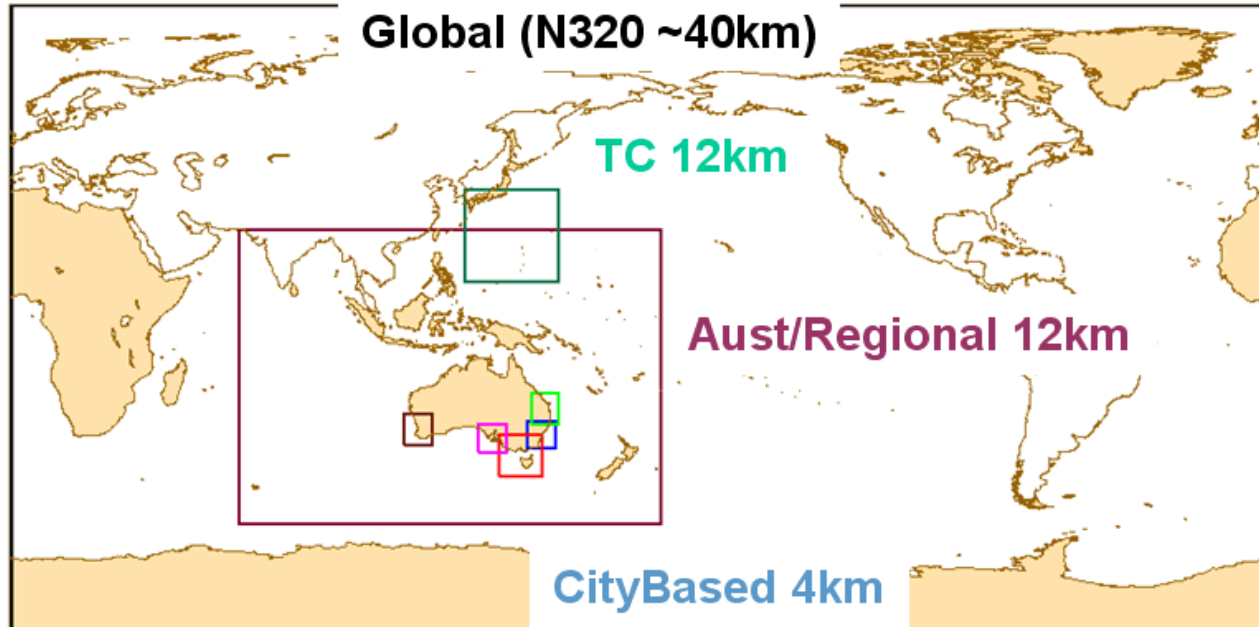
BoM, Melbourne



Australian Government
Bureau of Meteorology



A reminder on forecast system names



ACCESS – G / R / C / TC / GE (global-ensemble)

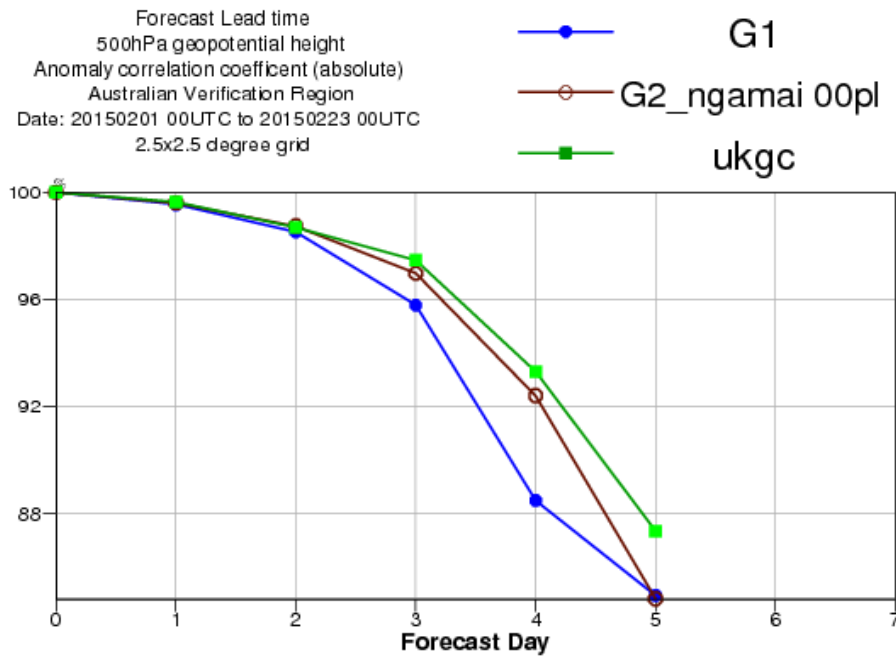
No new operational NWP system since Dec-19 2013



Towards APS2: ACCESS-G



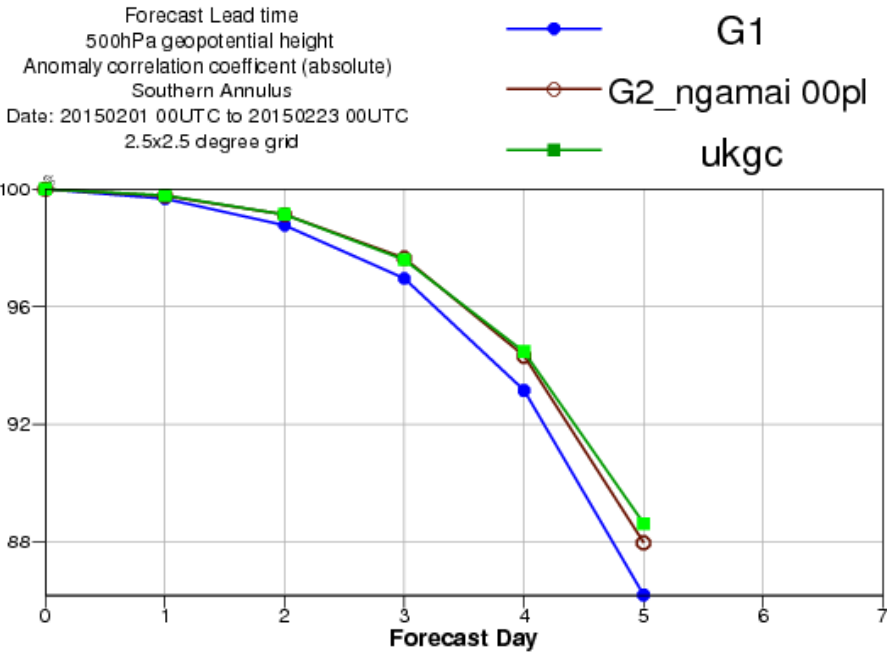
- N512 (25km), L70, UM 8.2 trial system running for over a year now
- Complete obs-set, including SSMIS, CrIS/ATMS, with exception of windsat
- Just handed-over to ops branch, expected to go operational mid-year.



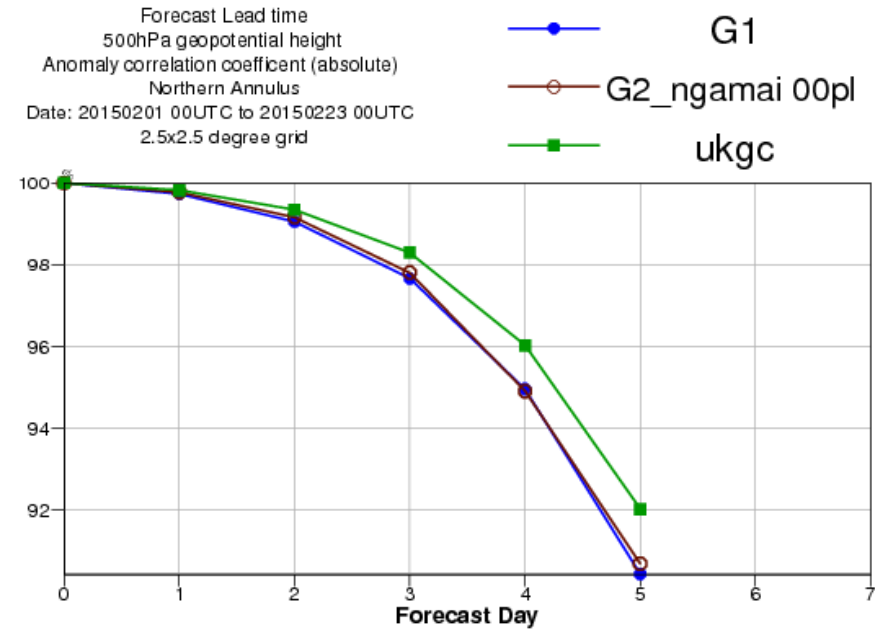
Aust



Towards APS2: ACCESS-G



SH



NH



Towards APS2: ACCESS-GE



- Will be our first ACCESS-based operational ensemble system
 - Based on UKMO MOGREPS
 - Global ensemble to 10 days
 - Global ETKF for initial condition perts
 - Stochastic model perturbations
 - Currently running 12Z daily at 60 km, 70 levels (N216L70)
- Comparable performance to major O/S systems
- Hand-over to operations expected in 3rd-quarter



Towards APS2: ACCESS-C



- C2 is still a down-scaler (FC-only) system, like C1
- Convection-permitting (ala UKV): 1.5km res, down from 4km.
 - Significant computational challenge to "fit" on current SC
- Trial evaluation currently underway
 - Several examples of C2 avoiding the coastal-locking of rainfall in certain scenarios in C1.
- Hand-over to operations anticipated in July



Projected NWP Roadmap



| Capability | Current HPC system | New HPC systems (2016 to 2021) |
|--|--|---|
| <i>Model grid resolution (horizontal)</i> ACCESS-G (global) ACCESS-R (regional) ACCESS-C (city) | <ul style="list-style-type: none"> 40 km 12 km 4 km | <ul style="list-style-type: none"> 17 km > 12 km 8 km > 5 km 1.5 km > 1 km |
| <i>Regular forecast updates (times per day)</i> Global Regional City and on-demand | <ul style="list-style-type: none"> 4 4 4 | <ul style="list-style-type: none"> 4 8 Up to 24 |
| Tropical cyclone forecasts <i>(horizontal grid resolution)</i> <i>(forecast length)</i> | <ul style="list-style-type: none"> 12 km Out to 3 days | <ul style="list-style-type: none"> 8km > 5km > 2.5km Out to 5 days |
| Ensembles Forecasts (Certainty for decision makers) | None | Yes (Global, Regional, City, Tropical Cyclone, and others to be considered in development) |
| Capability to produce additional, on-demand, high-resolution forecasts for extreme weather | None | <ul style="list-style-type: none"> 1.5 km > 1 km Up to 4 concurrent events Up to 24 times per day |

New Multi-Week/Seasonal Prediction Strategy

Currently POAMA-2 operational T47L17



| | Previous Plan | New Plan |
|----------------------------|--|---|
| Coupled Model | Built locally from overseas components: UKMO Atmosphere GFDL Ocean etc | Latest UKMO Coupled model GC2/3 under joint partnership |
| Operational System in 2016 | N96 Atmos (~130km) 1 degree ocean | N216 (65km) Atmos ¼ degree ocean |
| Initialisation | Weakly Coupled EnKF | 2016 – UKMO initial conditions (+our ensemble perts) 2018 – Our coupled EnKF |
| Hindcasts | Done locally | Done locally but potential for sharing with UKMO (e.g. extend hindcast period and increase ensemble size) |
| Operational | Done locally | Potential for joint real-time ensemble |
| Model Development | Local enhancements to overseas models | Direct with UKMO under joint partnership for future versions of coupled model |

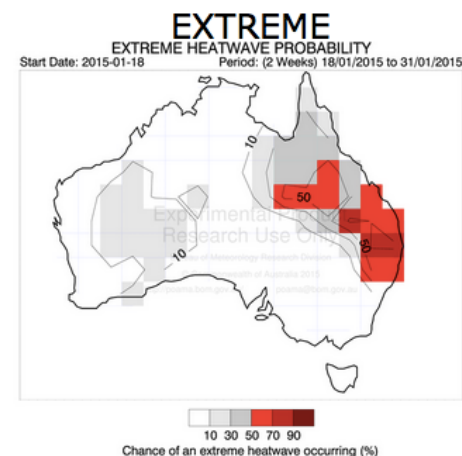
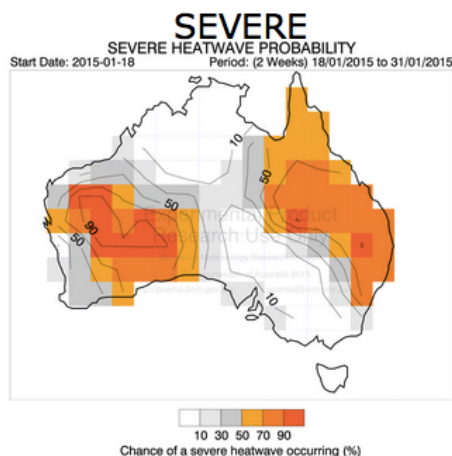
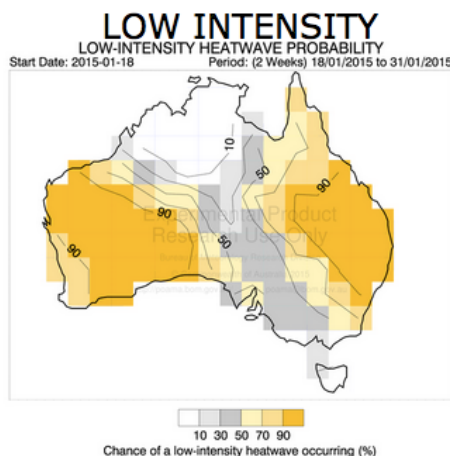
New plan: seamless with NWP and consistent with coupled NWP in the longer term



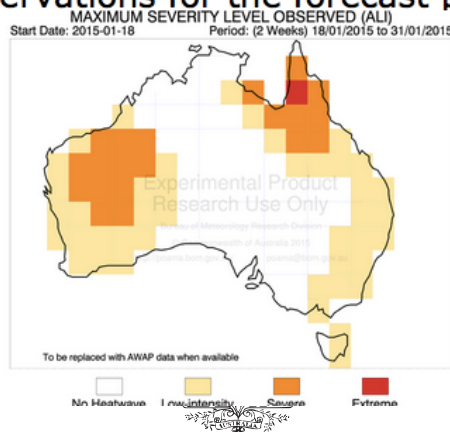
Heatwave forecast for Australia

In January 2014 the Bureau launched a new Pilot Heatwave Program, issuing forecasts for the location of heatwaves, severe heatwaves and extreme heatwaves over Australia for the current day and for the subsequent four days (<http://www.bom.gov.au/australia/heatwave/>). The experimental products shown here extend this product to the multi-week timescale. They show the chance of a heatwave occurring at anytime within the forecast period. A heatwave is defined as three or more days of high Tmax and Tmin, and three categories of heatwave severity are shown (see <http://www.bom.gov.au/weather-services/about/heatwave-forecast.shtml> for more details of the heatwave definition).

StartDate: < 2015 > < Jan > < 18 > Forecast for: ☐ Hindcast ☒ Realtime
 < Week 1 and 2 >



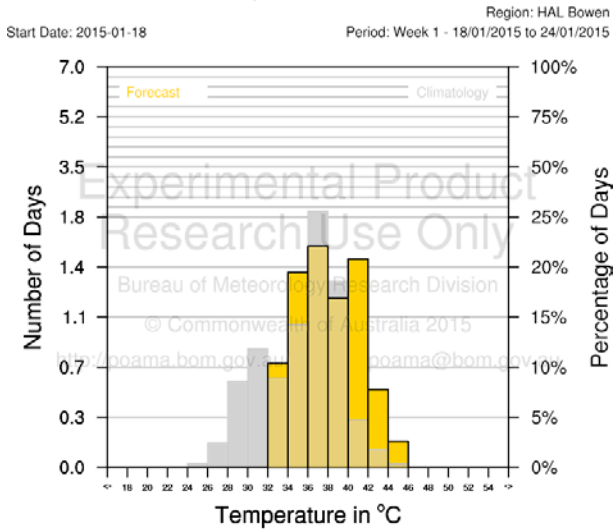
Observations for the forecast period



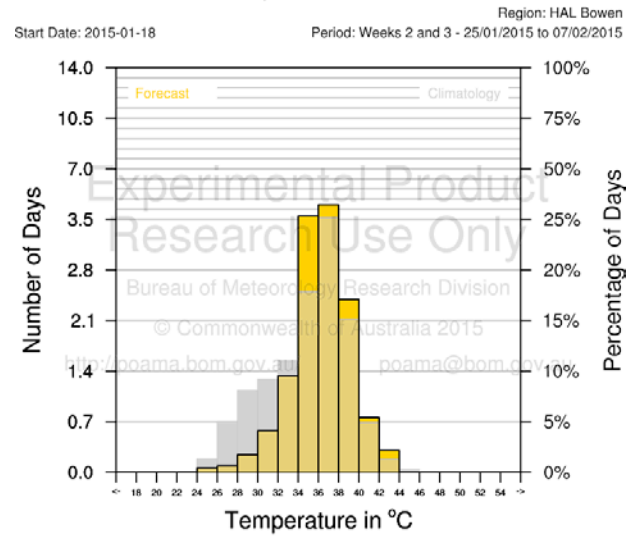
Seamless Forecasting



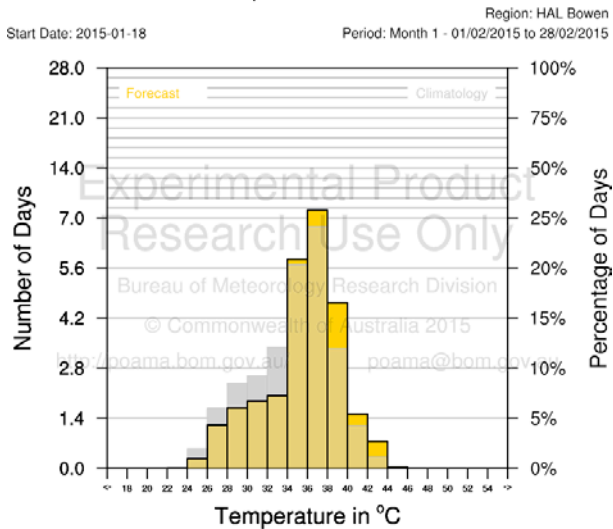
Forecast Maximum Temperature



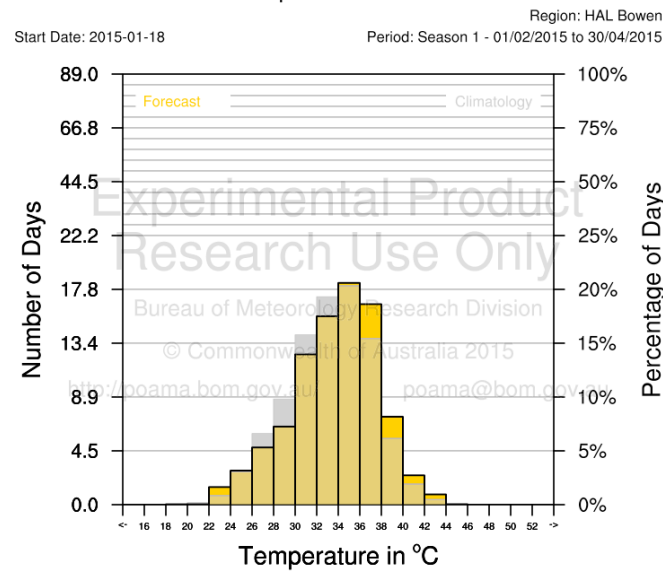
Forecast Maximum Temperature



Forecast Maximum Temperature



Forecast Maximum Temperature

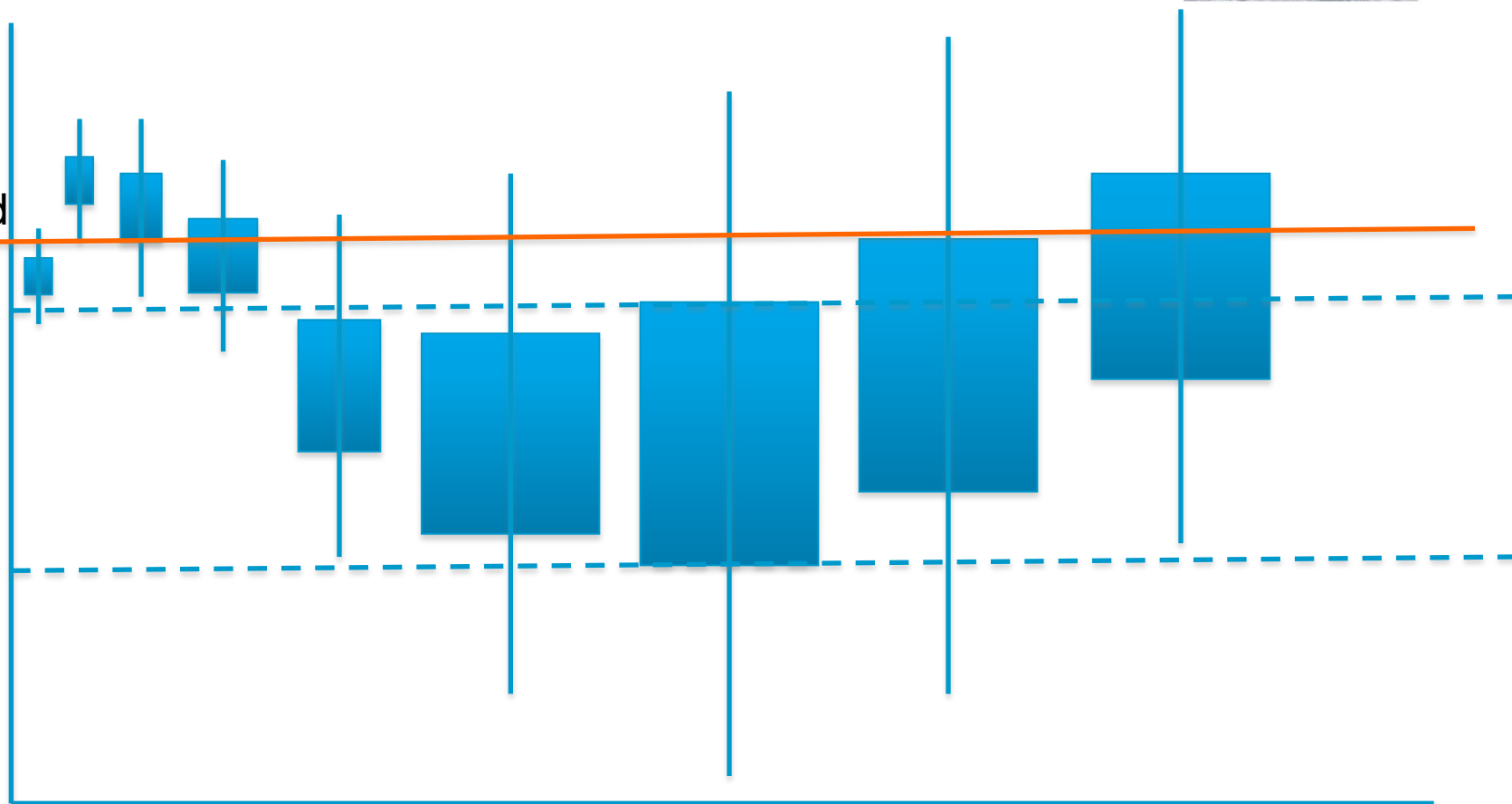


Seamless Forecasting Products (NWP+Seasonal)



Quantity

Threshold



Time

