UM User Newsletter No. 12, September 2015

Guest editorial by George Pankiewicz

Welcome to the September 2015 edition of the UM user newsletter, and a change to the look from the newest member of the UM partnerships team, Joao Teixeira, which we hope you like. It's impressive to see the full scope of the work of the partnership, covering development of both the science and application of the UM from regional to global atmosphere development and climate prediction. The articles on the upcoming convective scale workshop and plans for CMIP6 give a flavour of key activities being developed as part of the UM partner joint science programme. The newsletter also has a focus for individuals who are all important across the partnership, whether an early career visiting scientists (read the account of Indira Rani's secondment to the Met Office) or an award to a distinguished scientist (Kamal Puri was recognised in the Queen's birthday honours list). With NIWA now a core partner, SAWS an associate and major investment in HPC at the Bureau of Meteorology, I think this shows the continuing pace and breadth in UM use and development. As ever, we always welcome your feedback; please email the UM collaboration mailbox with your comments and suggestions for the newsletter or for the partnerships more broadly.

— George Pankiewicz - UM partnerships manager

Event Announcements

- **UM Convective Scale Workshop 2016:**

The first UM Convective Scale Workshop has been planned and a tentative date has been set for 22nd to 26th of February 2016. The motivation for this workshop is to accelerate our development and capabilities in convective scale modelling which is now a major priority for all Partners in the UM Consortium. Building on the two day convective scale sessions at the 2015 UM user workshop, a larger workshop involving UM Partners will be held to make steps to build a joint program to accelerate the development of the Unified Model for representing weather and climate at the convective scale. The goals of the meeting will be to:

  - Discuss relevant activities by UM partners;

- Agree priorities for work that will advance UM capabilities at the convective scale;
- Agree methods for working across Partners to optimize our collaboration in this area;
- Build a coordinated program of work across the partnership.

The workshop will be open to all UM users who have an interest in convective scale modelling. Those interested to take part should contact the person in their organisation who is coordinating the participation. George Pankiewicz or Charline Marzin can provide names of coordinators if needed.

- **UM User Tutorial 2016:**

The date of the 8th UMUT has been set and will take place 6-10 June 2016 at the Met Office in Exeter. As in previous years this is a week long event with a mixture of practical and presentation sessions. The Tutorial is aimed at experienced numerical model users wishing to run the UM suite operationally as well as research scientists with a good understanding of numerical modelling who wish to use the UM suite for research. Keep this date in mind if you wish to attend. Further information will be disclosed closer to the event.

- **UM User Workshop 2016:**

The date of the 10th UMUW has been set and will take place on 13-17 June 2016 at the Met Office in Exeter. Keep this date in mind if you wish to attend.

As part of this workshop there will be a 2 day model assessment workshop, in which we will be performing an assessment exercise where scientists and users of the global model in the Met Office and our collaborating partners will be asked to assess the model across all timescales and present the results. Further information will be disclosed closer to the event.

- **CAWCR 9th Annual Workshop - Coupled Modelling and Prediction: from Weather to Climate:**

The Collaboration for Australian Weather and Climate Research (CAWCR) will hold its 9th Annual Workshop from the 19-22 October 2015. The CAWCR workshop brings together Australian experts from the Bureau of Meteorology, CSIRO, the Universities and Research Centres, as well as a number of prominent overseas scientists. The workshop will be held at the Bureau of Meteorology, 700 Collins Street, Melbourne. This year's workshop will focus on coupled modelling and prediction across weather and climate timescales, encompassing the key components of earth system modelling: the atmosphere, land, ocean, ice and chemistry. It will address the status and prospects for improving our understanding, simulation and prediction of coupled processes, particularly as related to advancing our capability to predict high impact weather and climate. Further details are available at `http://cawcr.gov.au/events/AWS9/`.

Other Events and Visits

- ## UM User Workshop 2015:

The 9th UMUW ran from the 8-12 June 2015 at the Met Office. This year's attendance was the highest ever, 149 attendees, over 30 of which attended by video conference. The workshop was an opportunity for centres to exchange information on model implementation, status and plans, for a wide range of resolutions and timescales. The focal points this year were on working towards a regional atmosphere configuration, convective scale modelling, the work of the technical infrastructure programme and developing science programme, land surface and atmospheric composition. The Workshop twiki page has been updated with all the presentations. Generally all the participants found the workshop well run and enjoyable. In a broad sense, it was acknowledged that the diversity of topics presented was a great asset to the workshop.

- ## UM User Tutorial 2015:

The 7th UMUT took place at the Met Office 01-05 June 2015. The Tutorial page has been updated with the presentations from the week. 16 participants from eight organisations spent the week in Exeter, and included users from both weather and climate backgrounds, with interests ranging through: tropical convection, aerosols and atmospheric chemistry to satellite data assimilation.

Staff from across various Met Office science groups presented several topics over the course of the week, including data assimilation, climate configurations and ensemble prediction, reinforced through a number of hands-on exercises. In addition, participants gave short talks about their own work.

Novel to this years Tutorial was that it was solely based around Rose suites, replacing the previous UM user interface.

- ## CMIP6 preparation workshop:

A two day workshop was held at the Met Office on the 15th of June 2015 to discuss and prepare for the participation in the next Coupled Model Intercomparison Project (CMIP6).

The organisation of CMIP6 is more widely distributed than was the case for CMIP5. The CMIP panel is responsible for overall coordination and definition of standards. The WGCM Infrastructure Panel (WIP),

---

newly setup for CMIP6, is responsible for establishing standards for sharing climate model output.

CMIP6 design has been developed over last two years with a lot of consultation with climate community. It is based on World Climate Research Programme (WCRP) grand challenges and three key questions:

1. How does the Earth System respond to forcing?
2. What are the origins and consequences of systematic model biases?
3. How can we assess future climate changes given climate variability, predictability and uncertainties in scenarios?

This set should be consistent from one CMIP phase to another in order to provide some continuity. In addition, there will be the CMIP6 Historical Simulation, which will act as benchmark for the CMIP6 MIPs, and which will be consistent with forcing for CMIP6.

During the first day of the workshop Colin Jones described the overall aims of the meeting, stressing that it is important to Share information, develop collaboration, avoid duplication and to be ready in good time.

On the second day, some of our UM partners gave a short presentation on their plans for their plans for CMIP6. In particular:

- **CAWCR:** Tony Hirst described the Australian Community Climate and Earth System Simulator (AC-CESS), and their experience with it for CMIP5. ACCESS uses the UM; all their development work on this model will be accessible via the Met Office Science Repository Service (MOSRS).

  Post CMIP5, they're working with ACCESS-ESM1, which is based on ACCESS 1.4. They're doing further work on this in preparation for CMIP6. ACCESS-ESM1 will be used for several years to come, although they're hoping to use ACCESS-ESM2 for CMIP6 runs. ACCESS-ESM2 is initially based on ACCESS-CM2 (which incorporates GA7) plus a carbon cycle. There is parallel work being done by Matt Woodhouse on UKCA which will be incorporated into ACCESS-ESM2-ac; this will hopefully be used in the later stages of CMIP6.

- **KMA:** Young-Hwa Byun described KMA's work with K-ACE, their Advanced Climate Earth System model. K-ACE uses the UM - specifically v7.6, recently upgraded from v6.6.3 - plus OASIS, MOM and ISiS. They hope to use this as the physical model (along with UKESM1) for CMIP6.

  They will have a new Cray XC40 available for use in 2016; climate runs are expected to take around 20% of this resource.

- **NIWA:** Olaf Morgenstern described New Zealand's plans for participation in CMIP6. He said that the Southern Ocean bias is a major problem. The NIWA-UKCA model is currently giving an error in cloud-radiative forcing of 15-30 Wm^{-2}. This melts sea-ice and has many knock-on effects.

  It's believed that the problem is caused by aerosols, which may be due to the tuning applied in order to get the Northern Hemisphere aerosol correct. Model development and evaluation and contributions to CMIP6 analyses will be done as part of the Deep South project.

The CMIP6 would be actively run from 2016 to 2020, with models being ready for use (i.e. tuned, tested, spun up) by September 2016.

A detailed report of this workshop can be found on the shared trac twiki on the UKESM CMIP6 page.

UM, Parallel Suite and Technical Infrastructure News

- **New Package Delivery Method**

Global UM packages - GA/GC configurations - are now being delivered through the TRAC and JASMIN Systems. The advantages of this method are:

  – It's cleaner

  – The data is not deleted after 14 days contrary to the FTP server

  – The files in JASMIN can be synchronized, and so there is no need for huge data downloads

  – If there is any problem with the suite configuration we can take advantage of the shared repository for easy collaboration in fixing the problem

A HadGEM3-GA6 vn10.1 configurations has already been delivered according to this method, its installing instructions can be found at the Collaboration Twiki page GA6InstructionsVN101.

- **UM version 10.2 has now been released**

This was an open release and saw 215 tickets make it through to the trunk. Of these, 42 were science development tickets. UM10.2 is the third stable release of the UM on the shared repository. Please note that there has been a significant fix to ENDGAME reconfiguration during this release cycle and the *radiance_core* code has been taken out of the UM and is now maintained within its own repository, SOCRATES. Partners will need to set up a mirror of this new repository. For code developers it means any code changes that required changes in *radiance_core* directory will now need to also create a SOCRATES branch/ticket and also test using SOCRATES standalone tests.

Science changes in this release include:

  – Fixes to the mixing ratio calculations in ENDGame to ENDGame reconfigurations. Between UM8.6 and UM10.2 the calculations have set moisture 1 level out from that expected
  – Constants for generalised planet atmospheres
  – Enhancements to the multi-layer snow scheme
  – Updates to coupling with sea-ice, GSI7 and GSI8 code changes
  – Free the ice tile in JULES two-tile urban models
  – Enable mineral dust simulation in UKCA-mode
  – UKCA fixes

Technical changes in this release include:

  – Many tickets have been included to fix issues seen with the UM on the Cray XC40
  – Many tickets to the rose-stem testing system, supporting the Met Office migration to the XC40 and the use of SPICE, the new Met Office cluster. Partners have also contributed tests and rose stem config files

Partner Contributions:

  – NCI adding further rose stem tests
  – ACCESS fix an uninitialized variable within cumf
  – ACCESS code fixes for buffer overrun and OpenMP issues
  – NCAS Archer installation configs
  – NCI fix to out of date SCM tests in their rose stem
  – Exeter Uni adding Exoplanet tests to rose stem
  – UKCA (Leeds Uni) UKCA code dev

- Exeter Uni, Build configs and test configuration
- Exeter Uni Dirac build configs and test configuration

For more information on this release please refer to the UM vn10.2 User Release Notes.

- **UM version 10.1 was released on 27/02/2015**

  UM10.1 was the second stable release of the UM on the shared repository. It is bit comparable with the previous UM10.0 for the majority of model configurations and continues to support GA6 science.

  Significant changes of note include:

  - The introduction of *CreateBC*, the replacement for *MakeBC* to generate LBCs and FRAMES. We plan to remove MakeBC code and support from UM10.2
  - When generating the unique hash key for the items namelists the ancilfilename variable will no longer contribute to the hash hey. This will enable items namelists to be more easily compared between apps. The namelist indices should therefore be regenerated using the textitstash_indices. *TidyStashTransfor*m macro
  - This version provides a stash profile macro checker. It will check that all profiles requested in stash requests are present within the app and notify the app owner of profiles that are unused
  - A fairly significant overhaul of output file naming in the UM; almost all output file names and their destinations are now fully controllable via inputs, hopefully reducing or eliminating the need for extensive wrapper scripts to perform moving/renaming. This also sees the retirement of *RUNID*, *DATAM* and *DATAW* (as environment variables which are actually read in to the UM)

  For more information on this release please refer to the UM vn10.1 User Release Notes.

- **Small projects, systems and utilities**

  We have recently created a new repository on the Met Office Science Repository Service for hosting small collaborative code projects:

  `https://code.metoffice.gov.uk/trac/utils`

  This Trac environment and its associated Subversion repository is used to host and version control small projects which do not require a separate repository.

  - This system is accessible to anyone with an account on the Met Office Science Repository Service
  - Each project should provide information on licensing. If no information is provided this implies there is no license in place
  - The ticket system can be used to track issues for each project. The component field should be used to associate a ticket with a particular project. Note that milestones cannot be used (if your project needs managing to this level then it needs a separate Trac environment)
  - Each project needs an owner (or owners). The owner specifies which users are permitted to commit to the trunk
  - Projects hosted in this system may not follow such rigorous testing and review processes compared with larger, more formal projects. Users should take this into account when considering how to use and deploy these projects

  Requests for new projects or changes to the users permitted to commit to the trunk of a project should be made by opening a ticket in the admin Trac environment:

  `https://code.metoffice.gov.uk/trac/admin/newticket?type=general-task`

- ## OPS and VAR on MOSRS

Following the internal release of 32.0.0 builds for PS36 and Cray migration, the OPS and VAR systems were migrated to the Met Office Science Repository Service (MOSRS). This will benefit ongoing development and use of the DA systems at UM Partner sites, making it easier for those users to keep up to date with Met Office configurations and enabling pull through of scientific and technical contributions from our partners.

There should be little impact for Met Office developers of OPS/VAR, apart from the need for a MOSRS account and a change to the name/location of the repositories. Further information at

`https://code.metoffice.gov.uk/trac/ops` `https://code.metoffice.gov.uk/trac/var`

- ## Met Office's PS36 went live

PS36 went live on 25th August. This Parallel Suite is the result of the Met Office migration from the IBM to the CRAY HPC machine. Over the last four months, teams across the organisation have been working hard to ensure that all models are successfully ported and verified ahead of this critical milestone.

As a result, this migration is essentially a technical change rather than a scientific one. While there might be slight differences in individual forecasts in a side-by-side comparisons, a significant change in performance is not expected.

The relevant points of PS36 are:

- Operational suites were ported from the IBM to the Cray
- All system builds were upgraded to latest versions ie UM10.1, OPS32.0.0, VAR32.0.0, SURF31.2.0
- All suites were upgraded to use the ISO8601 date time format in cylc and rose

All optimisations were sufficient to match the current operational schedule with a small increase in the number of nodes. More information on the Parallel Suite can be found in their shared repositories/trac systems.

Moving forward, as we progress to the next phases of the CRAY installation and increase in compute capacity, there will be opportunities for larger science advances.

Sharing of PS36 suites

The following NWP model suite configurations have been made available on the MOSRS:

1. n768 PS36 global model summer
   - Rose suite u-aa437
2. UKV build and trial suite
   - UKVUM10.1 Documentation
   - Build Rose suite u-aa517
   - Trial Rose suite u-aa518
3. Euro4 UM10.1 PS36 configuration
   - Rose suite u-aa514

Model owners in the Met Office are supporting Partners where necessary.

Research and Model Development News

- ## GC3/GA7 development update

It's been some time since we've provided an update on the development of the Global Coupled 3.0 (GC3) configuration and its components: Global Atmosphere/Land 7.0 (GA7/GL7), Global Ocean 6.0 (GO6) and GSI8.0 (GSI8). There have been a number of delays over the past 6 months, caused partly by problems and delays with some of the individual changes and their interactions and partly by clashes with porting and other business as usual activities. We are now approaching the final stages of model development, however, aim to freeze the final configurations before the end of the calendar year.

GA7 includes a new internally mixed aerosol scheme (UKCA Glomap mode), GL7 includes a multi-layer snow scheme, GO6 extends the grid further to the south to allow the inclusion of an ice shelf model and GSI8 includes multi-layer ice thermodynamics. In addition, the component models contain a large number of improvements to their existing parametrisations that have been developed over the past few years to improve known model biases and the fidelity/consistency of the model's parametrisations.

For climate work, GC3 will form the "physical model" around which the various aspects of additional complexity and functionality will be built to develop the UK Earth System Model (UKESM1), which will be the UK's main model contributing to CMIP6. At shorter timescales, GC3 and its components will be used to upgrade our atmospheric NWP and ocean forecasting models, as well as our coupled monthly-seasonal and decadal predictions. It will also be used for continuing research work on coupled NWP and data assimilation.

As usual, following the freeze of the model we will be performing an assessment exercise where scientists and users of the model in the Met Office and our collaborating partners will be asked to assess the model across all timescales and present the results at a 2 day model assessment workshop, which will form part of the next UM user workshop in June 2016.

— David Walters at Met Office

- ## New Regional Atmosphere (RA) configuration development process

Mike Bush has been appointed to the new role of Regional Modelling Evaluation and Development (RMED) Manager. A key part of this role will be the management and coordination of standard configurations of the Regional Atmosphere UM (RA), in many ways similar to the GA configurations of the global model. This will aim to serve the needs of all applications of convective-scale regional modelling from nowcast to climate downscaling and in all regions of the world, although we anticipate that, at least initially, we will support more than one configuration - initially mid-latitude and tropical versions. This will be a collaborative effort not just across the Met Office, but also of course with our UM collaboration partners and academic partners.

— Mike Bush at Met Office

- ## UK Earth System Model Development

The UK Earth system modelling project is a joint venture between the Met Office Hadley Centre (MOHC) and the Natural Environmental Research Council (NERC) to develop and apply future UK Earth system models. To this end, the UKESM core group was established in the summer of 2013 and now consists of 18 scientists. The core group is responsible for developing the 1st UKESM model (UKESM1), bringing together a range of component model developments into a technically functioning and scientifically evaluated Earth system model (ESM).

The core of UKESM1 is the coupled physical climate model HadGEM3 (Hewitt et al. 2010) which represents key physical and dynamical processes in the atmosphere, ocean, land and sea-ice. UKESM1 will additionally include:

- The UKCA model of atmospheric chemistry and aerosols, including the two-moment GLOMAP-mode aerosol scheme
- The MEDUSA ocean biogeochemistry model
- Terrestrial carbon cycle developments within JULES
- The BISICLES ice sheet model, covering ice sheets on Greenland and Antarctica
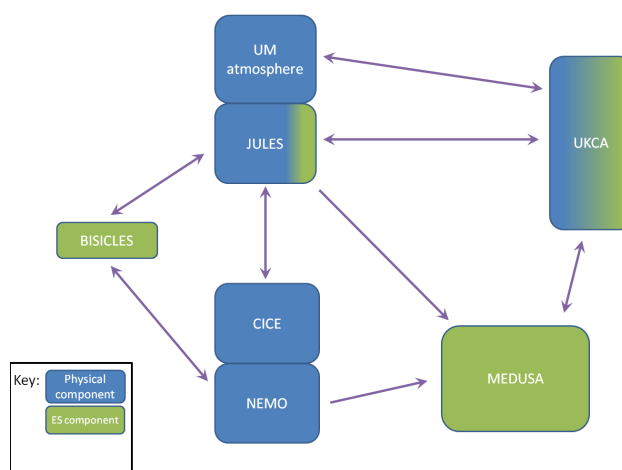
Work is currently ongoing in each of the component models of UKESM, building towards a coupled Earth system model. A large effort has been devoted to integrating the UKCA-GLOMAP-mode aerosol scheme in the GA7 configuration which will form the physical atmosphere of UKESM. Work has focused on understanding interactions between the new aerosol scheme and the other cloud and microphysics changes, and ensuring good performance against aerosol and radiation measurements. One of the key roles of the UKESM core group is to implement appropriate coupling between component models. To this end, Robin Smith (NCAS-climate), Pierre Mathiot (BAS) and Richard Hill (Met Office) have developed prototypes for the coupling between the NEMO ocean model, BISICLES ice sheet model and JULES land surface model, using the OASIS-MCT coupler. Coupling between BISICLES and NEMO in the ocean cavity under ice shelves will allow basal melt of the ice shelf to be parametrised, with the resulting loss of ice mass feeding into ocean freshwater, which in turn impacts on the ocean circulation in the neighbourhood of the ice shelves. Coupling between JULES and BISICLES will pass snow pack accumulations (surface mass balance) from the land surface to the ice sheet, altering the ice sheet thickness and hence flow dynamics.

Also in the ocean, Julien Palmieri and Andrew Yool (NOC Southampton) and Marc Stringer (NCAS-climate) have been implementing coupling between the atmosphere and the MEDUSA ocean biogeochemistry model. In UKESM1, the chemical air-sea coupling will comprise CO2, dimethyl sulfide (DMS) and iron. CO2 exchange allows the ocean biogeochemistry to feedback on atmospheric CO2 concentrations and hence on physical climate change, and also enables ocean acidification to be predicted. Marine emissions of DMS have a strong influence on sulphate aerosol formation, while the deposition of iron-containing dust from the aerosol scheme acts to fertilise ocean phytoplankton.

More information on the UKESM project can be found on the JWCRP website, including recent news articles.

— Alistair Sellar at Met Office

Reference: Hewitt, H. T., Copsey, D., Culverwell, I. D., Harris, C. M., Hill, R. S. R., Keen, A. B., ... & Hunke, E. C. (2010). Design and implementation of the infrastructure of HadGEM3: The next-generation Met Office climate modelling system. Geoscientific Model Development Discussions, 3, 1861-1937.

- **Progress in ACCESS-CM2 Development at CAWCR**

The CAWCR ACCESS-CM2 model has currently been configured with four resolutions:

1. The "standard" resolution: N96 UM/GA6+1-deg MOM5/CICE5 (referred to as N96O1)
2. "Mixed" resolution No 1: N96 UM/GA6+$\frac{1}{4}$-deg MOM5/CICE5 (N96O.25)
3. "Mixed" resolution No 2: N216 UM/GA6+1-deg MOM5/CICE5 (N216O1)
4. The high resolution: N216 UM/GA6+$\frac{1}{4}$-deg MOM5/CICE5 (N216O.25)

The N96O.25 and N216O.25 versions are being developed jointly with the ARC Centre of Excellence for Climate System Science, who provided the initial implementation of the $\frac{1}{4}$-deg ocean component.

In our test runs with pre-industrial forcing, while N216O1 and N216O.25 encounter a crash apparently in the UM at different stages, N96O1 and N96O.25 have successfully finished trial simulations of 200 years and 150 years, respectively. The computational efficiency of the N96O.25 version has recently been improved, and now yields 6 model years/day over 2100 cores on the NCI Fujitsu Primergy machine, on which all integration of ACCESS-CM2 is conducted.
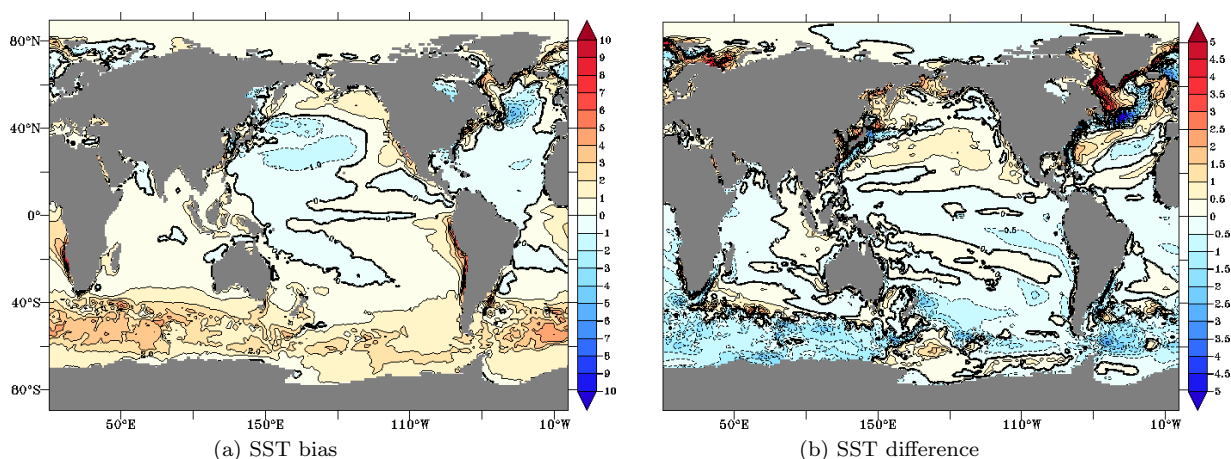

Figure 1: a) SST bias of N96O1 (Years 71 100 - "Obs"). b) SST difference (N96O.25 - N96O1). Observation is from the HadISST (Rayner et al. 2003) 1870-1899 SST reconstruction.

With no tuning work done yet, both the N96O1 and N96O.25 runs show comparable mild trend of global warming at the surface. However, there are significant differences between the two runs in terms of the simulated climates, particularly in the Southern Ocean. For example, the N96O.25 run simulates considerably weaker formation of Antarctic Bottom Water (AABW) and a stronger Antarctic Circumpolar Current (ACC) with evident multi-decadal variability. Also, the Southern Ocean warming bias, a common issue for coupled models, has been noticeably reduced in N96O.25 in comparison with N96O1.

Figure 1 shows the SST bias of the N96O1 run (30-year average for years 71-100) and the SST difference between N96O.25 and N96O1 for the same period. Clearly the Southern Ocean warming bias is broadly reduced in N96O.25. In fact, in the region south of 50 °S, N96O.25 has an average SST bias of just below 2 K, about 0.6 K lower than that of N96O1. We are conducting a set of experiments with the N96O.25 version to try to understand this difference in terms of ocean model parameter settings (given that the atmosphere is the same for both versions).

— Dave Bi, Tony Hirst and Simon Marsland at CSIRO

Reference: Rayner, N. A., D. E. Parker, E. B. Horton, C. K. Folland, L. V. Alexander, D. P. Rowell, E. C. Kent, and A. Kaplan (2003), Global analyses of sea surface temperature, sea ice, and night marine air temperature since the late nineteenth century, J. Geophys. Res., 108, 4407, doi:10.1029/2002JD002670, D14.

- **IMDAA - Indira Rani visit to the Met Office**

Indian Monsoon Data Assimilation and Analysis (IMDAA) is a Met Office (UK) project funded by MoES National Monsoon Mission (NMM), whose goal is to generate a 12-km regional reanalysis for the 1979 to present time period. Also, it aims to provide capacity building in Data Assimilation. This project proposes to make use of Indian satellite observations in the reanalysis, in addition to other observations. Under this project, Indira Rani has visited the Met office from September 2014 to March 2015, with the purpose of developing the data assimilation capability in the Met Office 4DVAR for the inclusion of Indian satellite observations with the help of Met Office Scientists. During the visit, OPS and VAR codes were developed to assimilate radiance from two Indian satellites, viz., Megha-Tropiques (MT) and INSAT-3D.

It was found that the SAPHIR, a six channel humidity sounder in the MT, radiance assimilation not only improves the analysis, but also increases the number of assimilated humidity sensitive microwave (MW) and infrared (IR) radiances from instruments on-board other satellites. SAPHIR radiance assimilation in the UM system showed clear improvements in the analysis and forecasts both globally and over the Tropics. The changes are visible mainly in fields of temperature, humidity and geopotential height. As a result of the assimilation of SAPHIR radiances, the NWP-Index improved by 1.82 %.

The impact of INSAT-3D sounder radiances in the Met Office 4DVAR was negligible. Though the assimilation of INSAT-3D sounder radiances increased the number of assimilated radiances from instruments on-board other satellites, the numbers were not significant compared to SAPHIR radiance assimilation.

NCMRWF has been using the UM assimilation-forecast system in near-real time since 2012 with all components like OPS, VAR, SURF in the IBM-P6 platform.

Indira Rani found working within the Met Office to be a pleasant experience, specially regarding the facilities as well as the support from the leading scientists in the area of data assimilation and satellite applications. The experience with OPS and VAR 27.2.0, which were being used at NCMRWF helped to understand the Met Office's operational version of OPS31.0 and VAR 31.0 without difficulty, even though significant changes had been implemented in the UM infrastructure related to user interface between these versions, together with other technical and scientific improvements. This visit also provided an oportunity for her to get familiar with rose/cylc environment and its different components. After return, the experience with rose/cylc environment helped her to implement rose/cylc based PS34 data assimilation suite at NCMRWF without difficulty.

— Indira Rani at NCMRWF

UM Support News

- **Congratulations to Dr. Kamal Puri**

Dr Kamal Purii, from the Australian Bureau of Meteorology, has been awarded a Public Service Medal (PSM) in the Queen's Birthday Honours List. This award recognizes the outstanding and sustained teamwork in building this world-class weather and climate simulation capability.

Kamal has worked in numerical weather prediction and earth system modelling in the Bureau of Meteorology for the last four decades. He is a Met Office Science Advisory Council member and has played a key role in development of our Unified Model partnership. In 2007 he helped develop the Australian Community Climate and Earth System Simulator (ACCESS) which has directly contributed to advanced warnings of hazards such as fires, heatwave, floods and cyclones, saving many lives.

- **Exciting changes in our partnerships**

  - **New Core Partner**
    On the first of July, NIWA has become a core member of the UM Science Partnerships.
  - **Associated Partnerships**
    On the first of April SAWS became the first UM Science Associated Partner.

- **Brand New Cray at The Bureau of Meteorology** The Bureau of Meteorology in Australia has a contract worth up to $53 million for a Cray XC40 supercomputer and a Cray Sonexion 2000 storage system. This further strengthens Cray's leadership position in the global operational weather and climate community as an increasing number of the world's leading centres rely on Cray supercomputers to run meteorological models.

- **Welcome João**

  João Teixeira joined the UM collaboration team at the start of May 2015 to provide support to climate UM users. Previously he worked at the Centre for Environmental and Marine Studies of the University of Aveiro on Climate change of precipitation extreme episodes in the Iberian Peninsula and its forcing mechanisms - CLIPE.

Met Office News

- **Met Office Science Seminars**

  A full list of the Climate Seminars series is now available in external Met office page.

  The Hadley Centre Climate Seminar series features both highlights from our internal science and talks delivered from both leading UK and international academics. Seminars are coordinated by Dr Ben Booth, Prof. Richard Betts and Alison Lee.

  For more information on how to access these seminar series please contact:

  - Alison Lee - for climate science seminars
  - Chelsey Cooper - for weather science seminars

- **Hadley Centre 25th Anniversary**

  The Hadley Centre was opened by then Prime Minister, Margaret Thatcher, on May 25 1990 to study, observe and predict our changing climate. Since then the centre has been right at the forefront of climate science and is respected around the world. It has produced research which has helped push the boundaries of what we understand about our changing climate and delivered tangible benefits for protecting lives and livelihoods the world over. The celebration event featured enthusiastic speeches in the Met Office street, numerous seminars, and delicious cake at the end.

- **Moving from IBM Power 7 to CRAY X40**

At the Met Office we upgraded our HPC from an IBM Power 7 to CRAY X40. The operational forecast has been running on the new machine since end of August. The Main clusters have been accepted, which completes Phase 1a of the installation. This means that the new CRAY supercomputer has similar amount of CPU capacity to the existing IBM Power 7 system. This work has been completed 5 weeks ahead of our published schedule. This fantastic achievement is due to the hard work of all those involved, internally from FSD, Government Services, Procurement, Property, Science and TIS, and externally from our supplier CRAY.

The implementation of the HPC is split into three phases:

- Phase 1a planned to go live in Autumn 2015 has been successfully completed five weeks ahead of schedule
- Phase 1b goes live (Spring 2016)
- Phase 1c goes live and IT Hall 3 operational (Spring 2017)

The next phase will be Phase 1b, the IBM systems will be powered off, thereby providing additional capacity for the installation of the Broadwell processor upgrade.

Discussion and Feedback

Please contact João Teixeira if you have any comments or queries regarding this newsletter, or if you have any suggestions or articles that you would like to share in the next issue of the UM User Newsletter.