



## Recent development in NWP at the Met office

Andy Brown

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## Global model upgrades

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## Cycle G46 27 November [+2.5 NWP index]

### 1) IASI (METOP)

- High vertical resolution temperature and humidity profile information (AIRS used operationally since 2004).
- 138 channels assimilated (including WV channels peaking below 400hPa); data thinned to one observation in four before storage.

### 2) ASCAT (METOP)

- Introduction of ASCAT scatterometer data

### 3) GPSRO

- Increase the number of COSMIC GPS radio occultation satellites from 4 to 6 to give a more uniform global coverage

### 4) PF convection model

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## Cycle G47 1 April 2008 [+1-2 in summer]

- Two changes to UM soil properties:

### a) Correction of UM soil hydraulic properties

### b) An improved parameterisation of soil thermal conductivity.

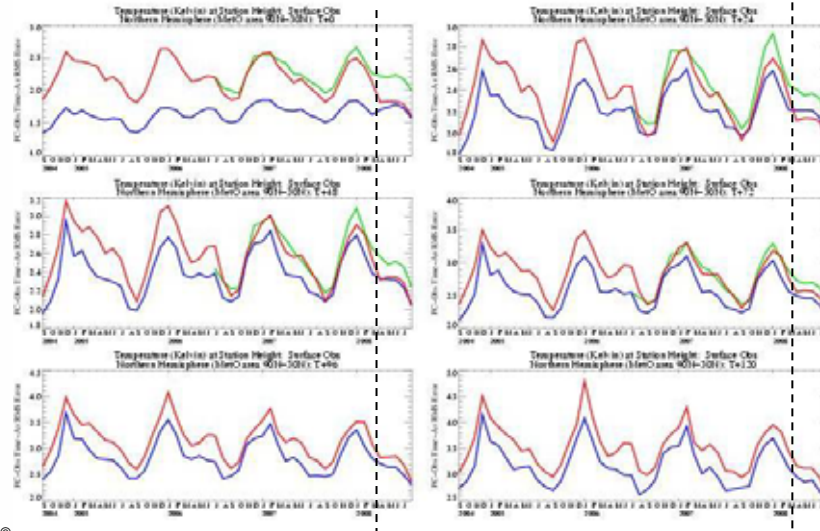
- Assimilation of surface T, RH and winds over land
- Removal of RH boost for sondes.
- GPSRO. Increase vertical range over which COSMIC refractivity data is assimilated from 4-27km to 0-40 km

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## Impact on screen temperature

Cases: — UK 00Z & 12Z — ECMWF 00Z & 12Z — NCEP 00Z & 12Z — FR 00Z & 12Z



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## Cycle G48 22 July 2008 [+0.5]

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- Surface stationlist height corrections (SYNOP).
- GPSRO: Add CHAMP and GRACE to current set of (6 COSMIC) satellites.
- Assimilation of cloudy AIRS radiances.
- Satwind changes: update the observation errors to allow for errors in satellite wind height

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## Cycle G49 November 2008 [+0.5]

- New snow analysis (based on NESDIS product)
- Updated covstats
- Various physics changes (e.g. microphysics)

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## Regional model upgrades

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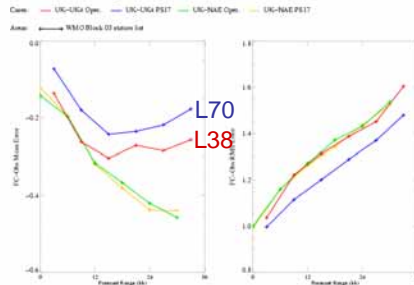
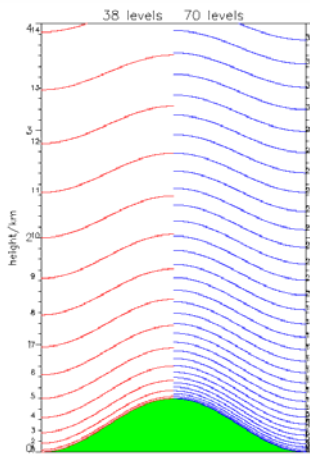
NAE (North Atlantic + Europe) : 12km  
UK : 4km

- Changes broadly in line with global (e.g. IASI in NAE Nov 07; soil properties April 08)
- Also
  - UK4 to 70 levels Nov 07
    - Marked improvement in most variables (especially screen temperature and cloud)
  - `Murk' to be linked to microphysics; MOPS cloud in Var (Nov 08)

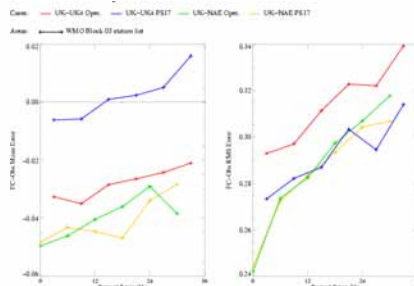
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## Impact of L70 in UK4



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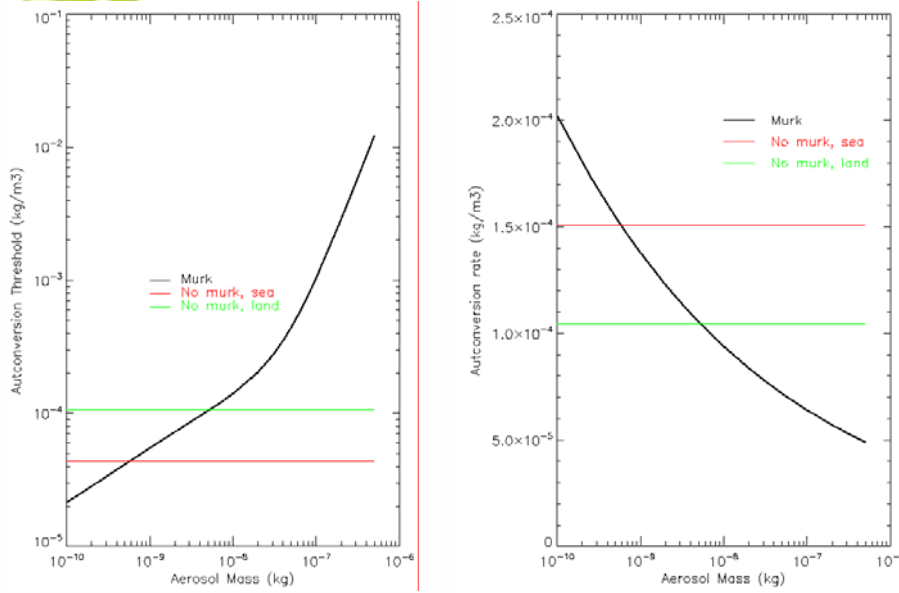


Cloud

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## Murk link to autoconversion



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## Ensembles (MOGREPS)

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## MOGREPS

- Now operational
  - 24 member global (N144)
  - 24 member NAE (24km)
- Initial perturbations
  - Global: localized ETKF (2000km)
  - Regional
    - (non-localized) ETKF shown to be outperformed by simple downscaling of global  $\Rightarrow$  reverting to this for now
- Future
  - NAE EPS to 16km / 70 levels
  - Revisit regional ETKF
  - Investigate vertical localization (want less spread in stratosphere; more in boundary layer weather parameters)
  - Upgrades to stochastic physics

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# New Supercomputer

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# High Performance Computing

Now

2009

2011



**NEC SX-6/8**

6x



**Phase I: IBM**

3x



**Phase II: IBM**

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## Summary compared with NEC

	<b>NEC SX6/8 3 systems</b>	<b>IBM Power6 3 systems</b>	<b>Factor</b>
<b>CPUs or Cores per Node</b>	8	32	4
<b>Peak Performance per node (GFLOPS)</b>	128 (for SX8)	600	4.6
<b>Number of Nodes</b>	59 (SX6/SX8 mix)	208	3.5
<b>Total Peak Performance (TFLOPS)</b>	5.4	125	23.1
<b>Number of CPUs / Cores</b>	472	6656	14.1
<b>Total Memory (TBytes)</b>	2.7	13.3	4.9
<b>Total Disk (TBytes)</b>	36	776	21.5
<b>Disk Performance (GB/s)</b>	~0.15	>1 (24 total per cluster)	~7

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## Provisional Model Upgrade Timetable

- May 2009
  - System Acceptance
  - UK 1.5km Model trial
- September 2009
  - Global and NAE to 70 levels
  - Global EPS to 60km / 70levels
- December 2009
  - Global Model to 25km
  - NAE EPS to 16km / 70 levels
- 2011/12
  - Global Model to 16km
  - NAE EPS to 12km
  - UK 1.5km EPS

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## Collaboration status

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## Current UM partners

1. Norwegian Meteorological Institute. met.no (Feb 2007)



2. South African Weather Service (Mar 2007)



3. Australian Bureau of Meteorology & CSIRO (Mar 2007)



4. New Zealand NIWA Ltd (Dec 2007)



5. Indian Ministry of Earth Sciences (Aug 2008)



6. (South) Korea Meteorological Administration

