Met Office centre report

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WGNE30

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NWP model suite

Global deterministic

- 17km 70 Levels
- 48hr forecast twice/day
- 144hr forecast twice/day

MOGREPS-G

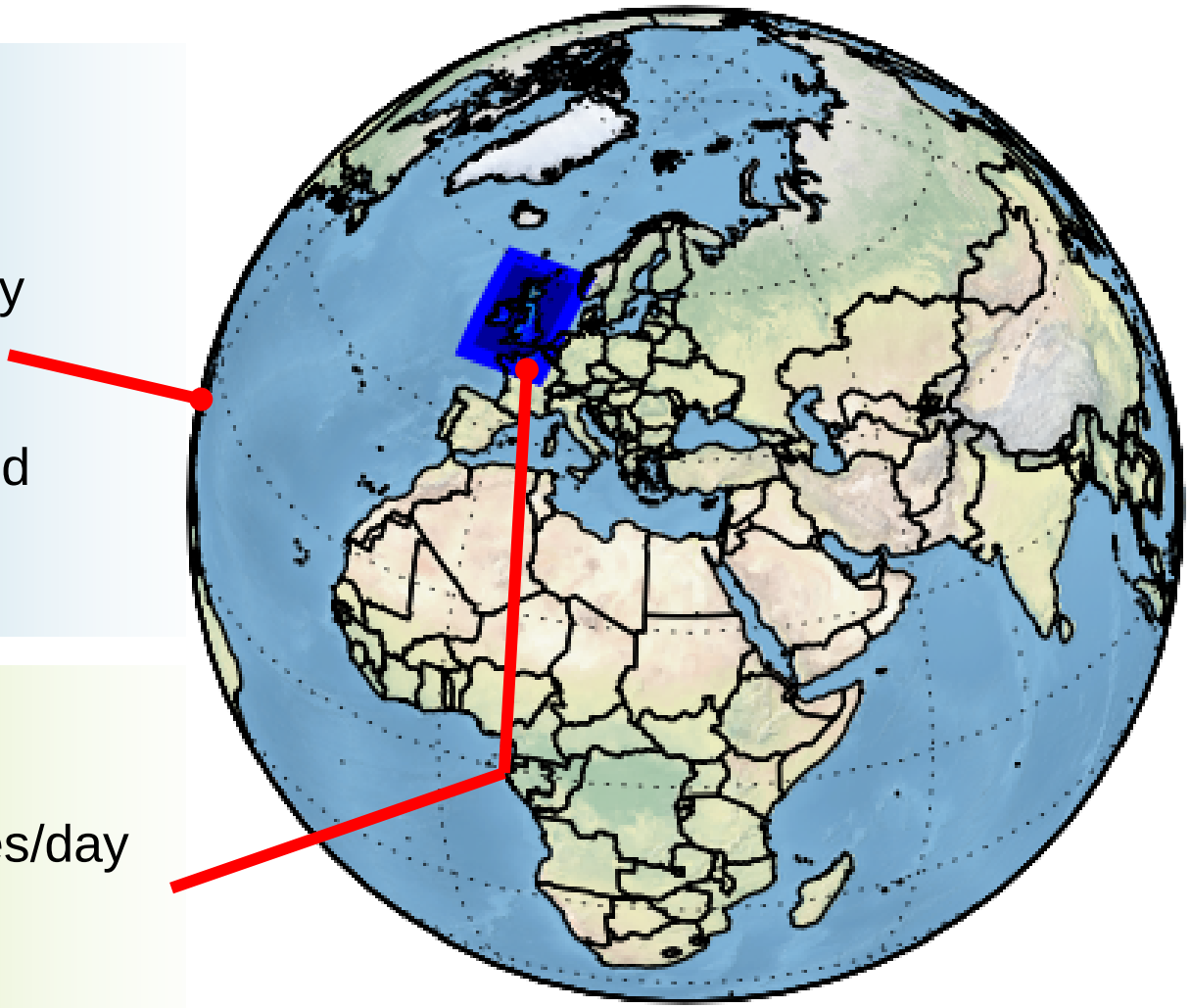
- 12-member (24m lagged products) EPS 33km 7-day forecast 4/day

UKV

- 1.5km 70 Levels
- 36hr forecast eight times/day

MOGREPS-UK

- 12-member EPS - 2.2km 36hr forecast 4/day



Plus 4km downscalers over a number of regions for particular customers

Operational upgrades this year

- PS33 (4th Feb 2014)
  - Technical change to use ROSE (https://github.com/metomi/rose/) for managing and running suites
- PS34 (15th Jul 2014)
  - Upgrade science in global NWP systems to use GA6.1:
    - ENDGame revision to dynamical core
    - Numerous physics changes
  - Horizontal resolution of deterministic to N768 (17km)
  - MOGREPS-G extended to 7 days
- PS35 (3rd Feb 2015)
  - Upgrade science in global coupled/ocean systems to GC2 (uses GA6 atmosphere)
  - Upgrade science in convective permitting models:
    - ENDGame revision to dynamical core
    - Several physics changes incl. blended BL scheme
  - Routine DA changes to global and UKV

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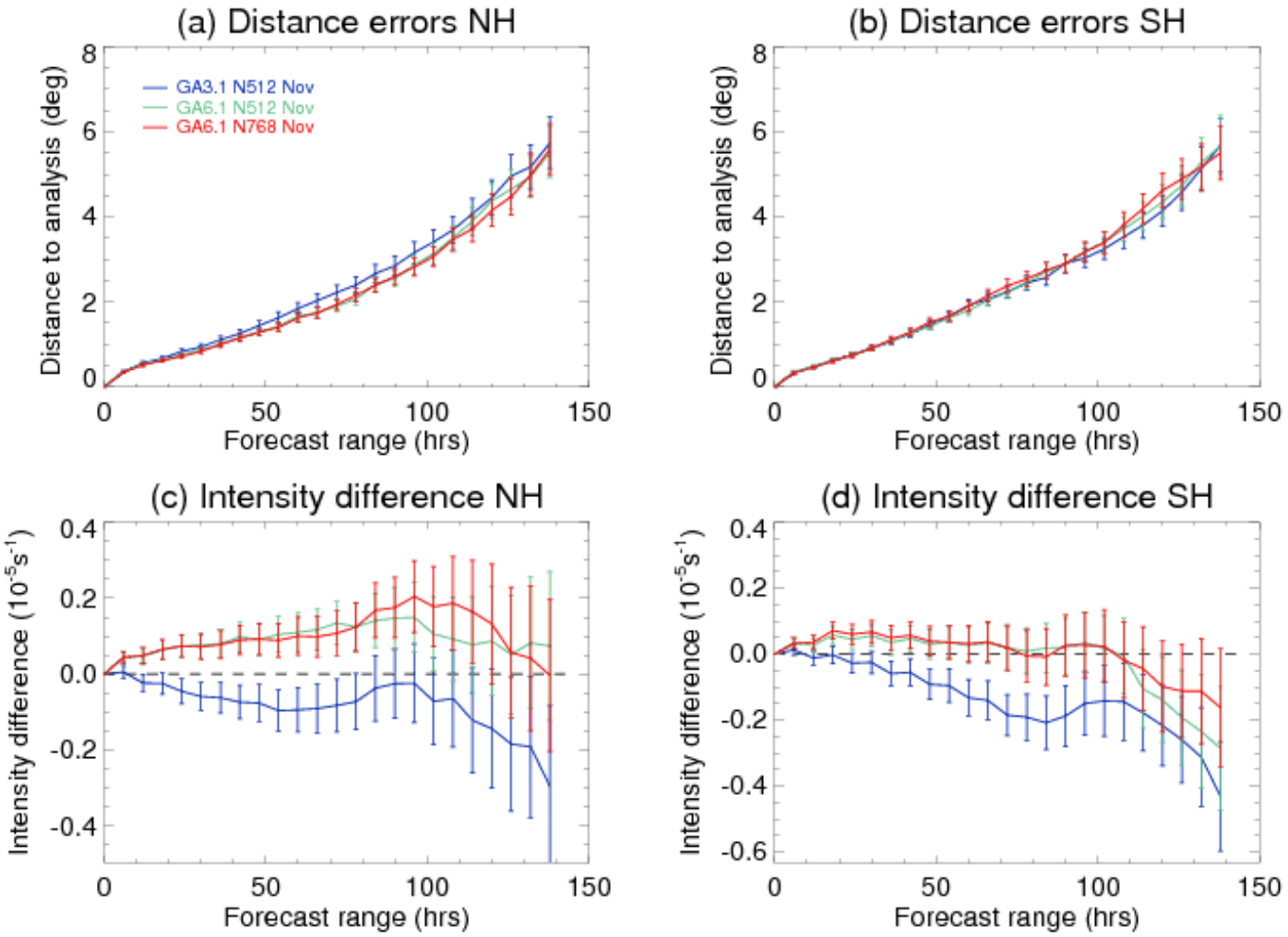
Improvements in mid-latitude variability



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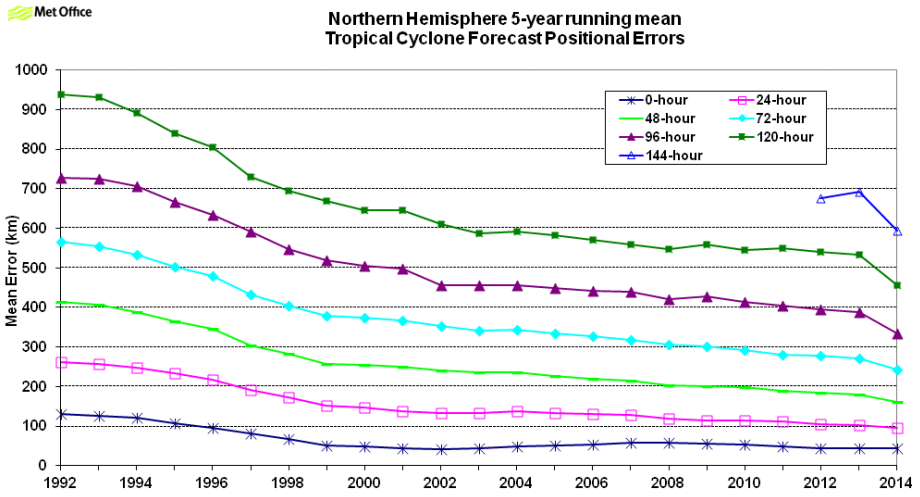
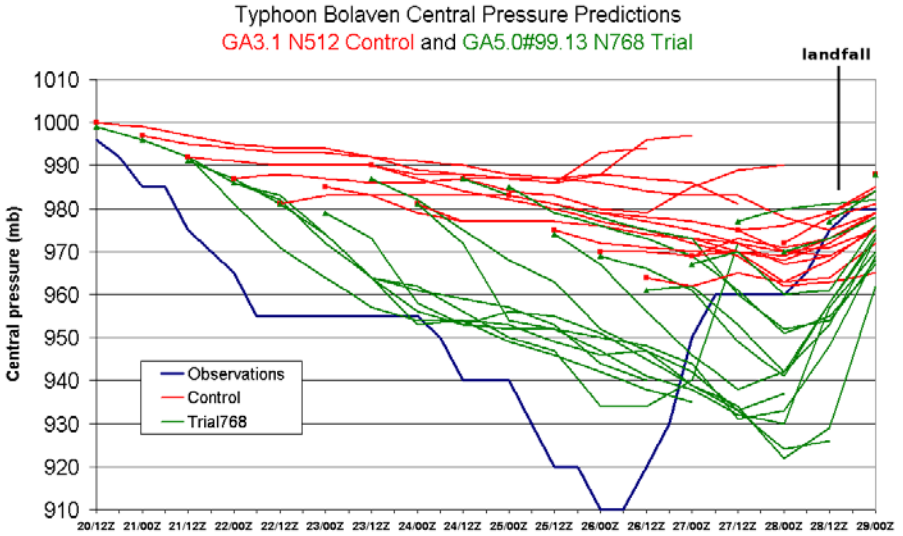
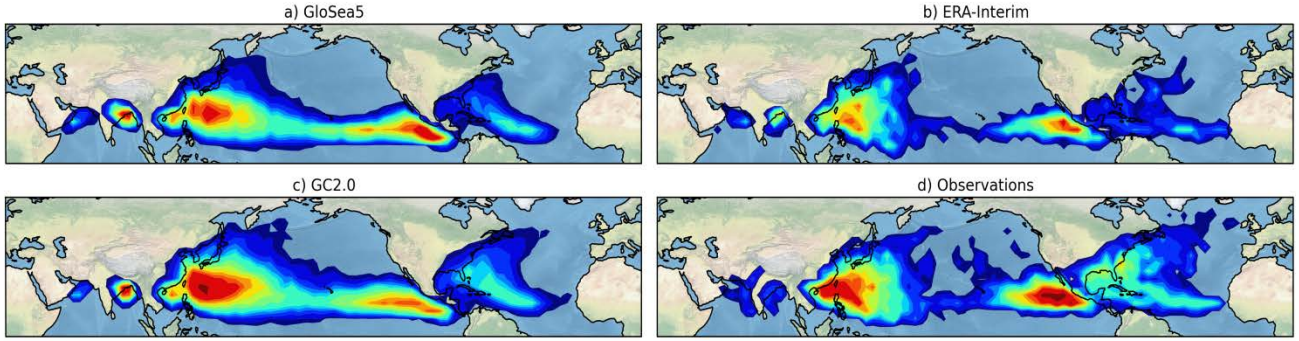
Improvements to tropical cyclone track and intensity







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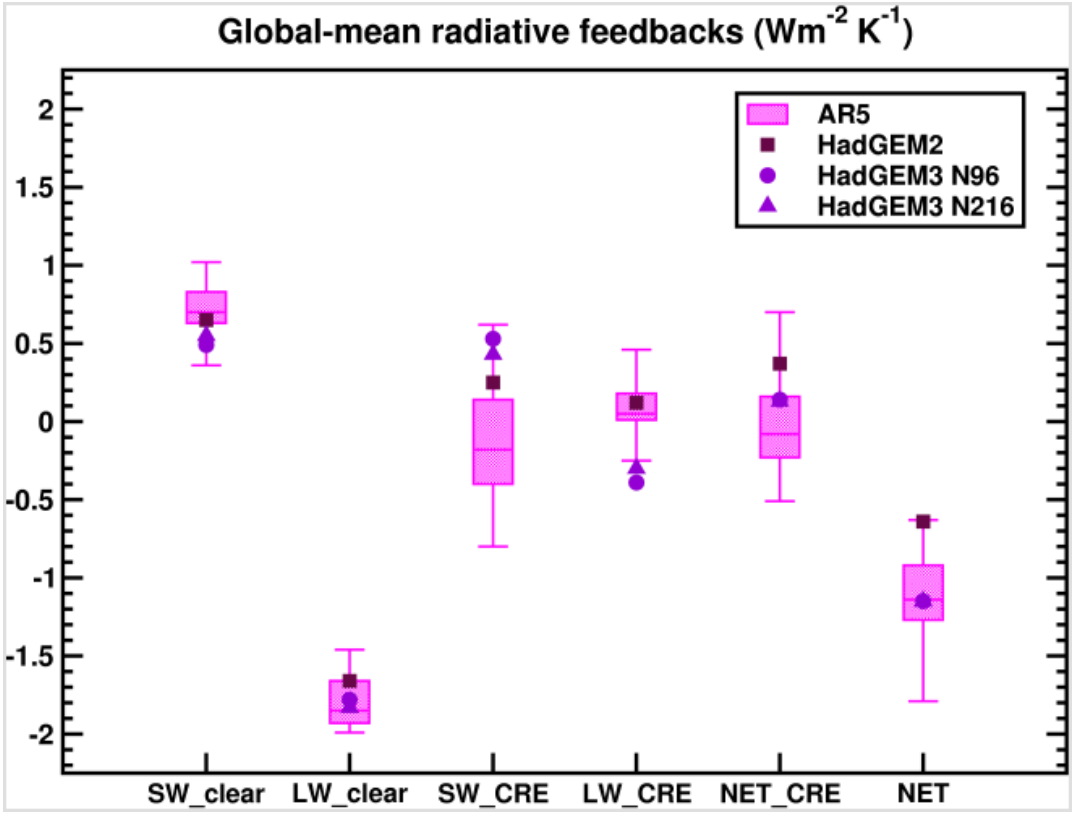
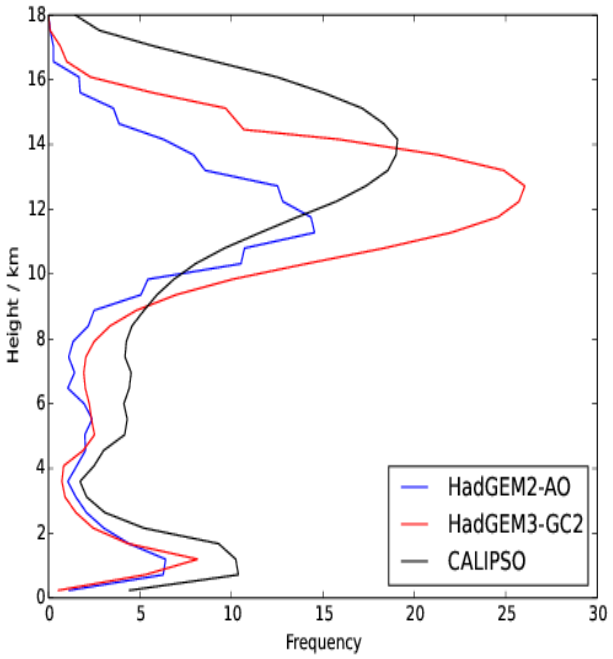
GC2 Climate change simulations



Vertical profile of CALIPSO cloud amount



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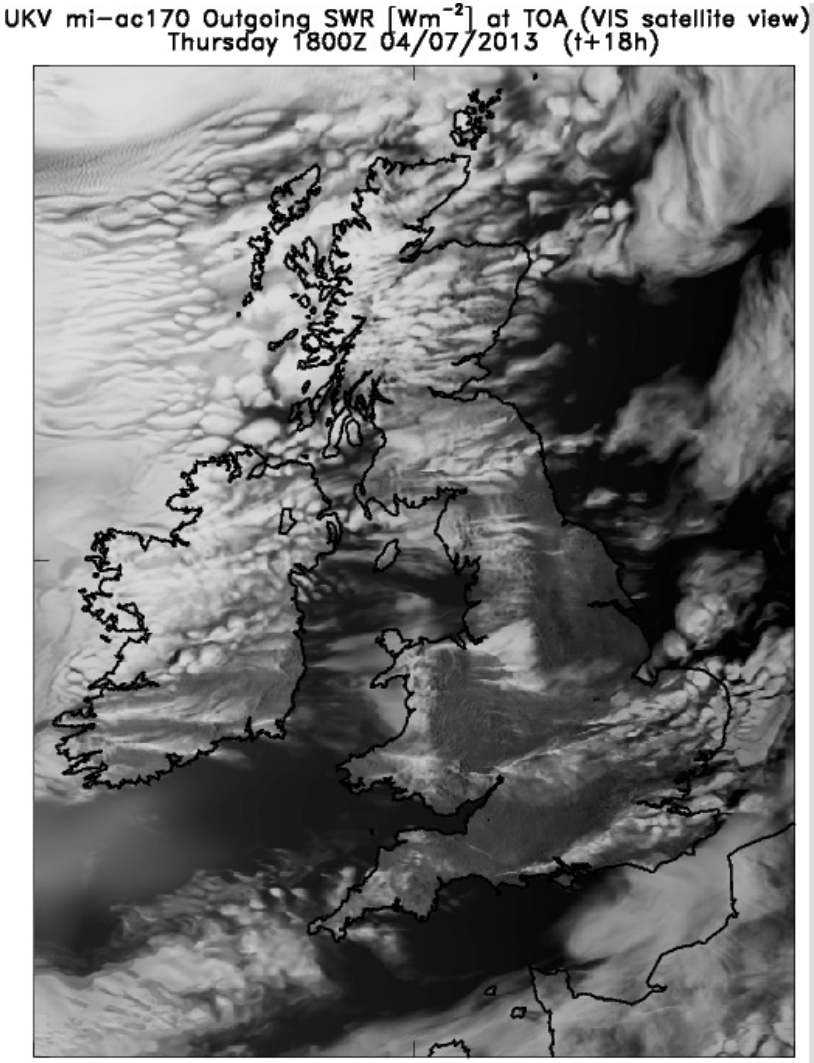
ENDGame in UKV: Improved accuracy enabling gravity wave activity

New Dynamics



ENDGame P1

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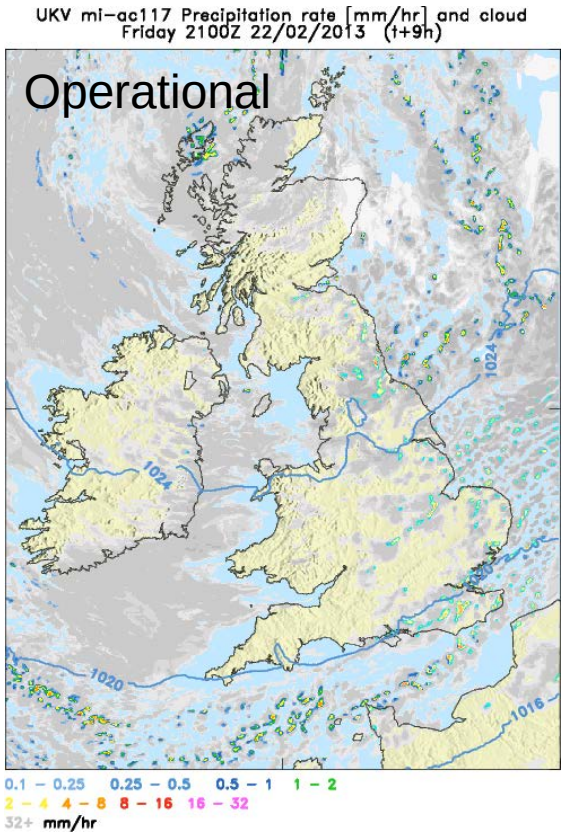
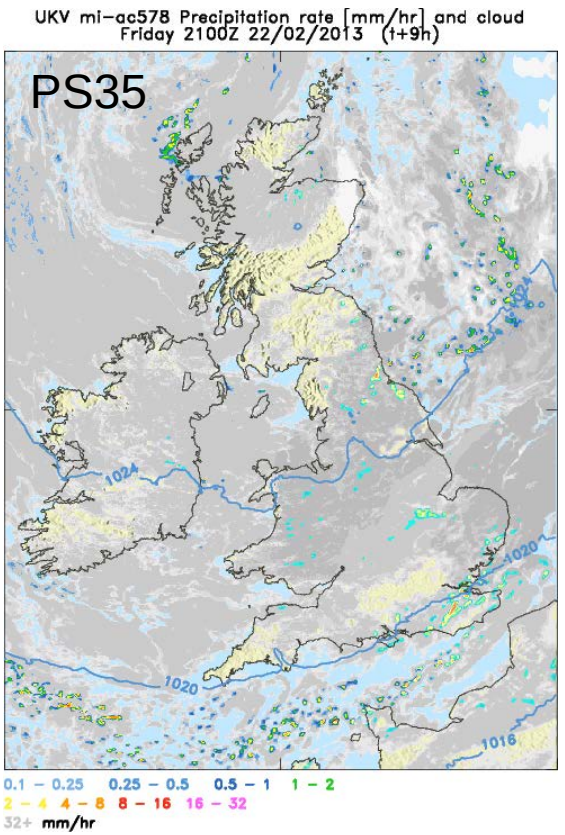
Blended-BL scheme

- Scale-aware blending of boundary-layer and Smagorinsky turbulence schemes
- Gives a scale-dependent blend as the flow transitions from unresolved to resolved turbulence
- Self-adapting for all high resolution configurations
- In UKV tends to suppress spin-up of near grid-scale circulations which, in stratocumulus, helps to suppress spurious break-up





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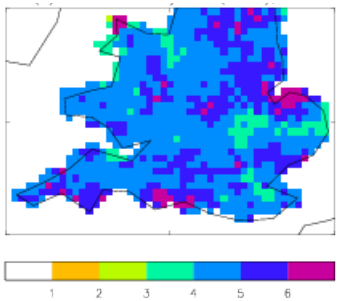
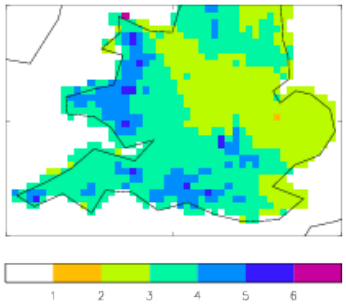
Use of UKV for climate - Future change in heavy rainfall at hourly timescale

Observed heavy rain (radar)



Summer

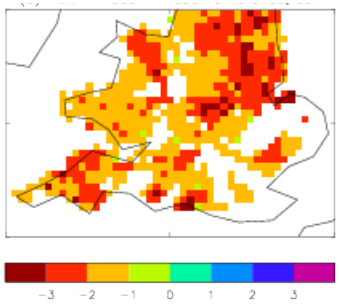
Observed heavy rain (radar)



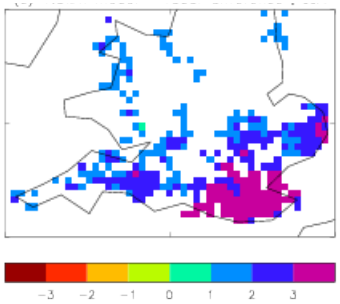
Winter

Kendon et al, 2014, Nature Clim. Change

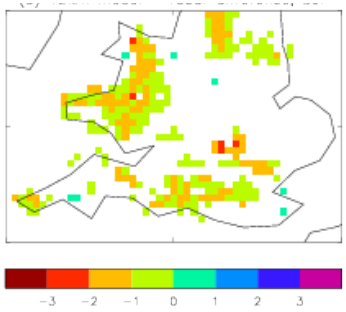
12km model - radar



1.5km model - radar



12km model - radar



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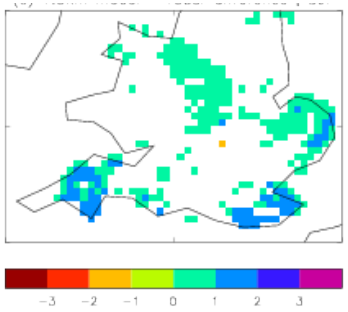
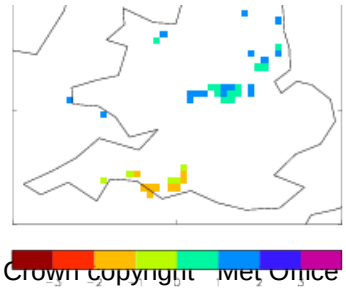


12km model future change



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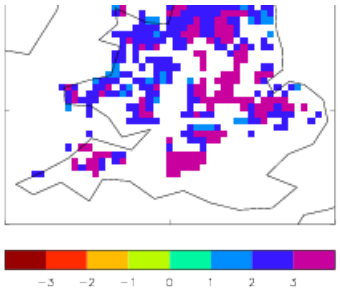
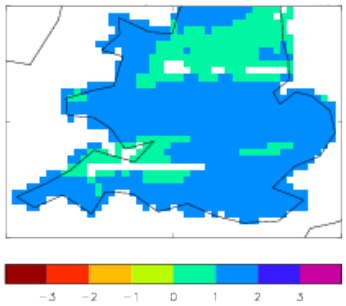


12km model future change



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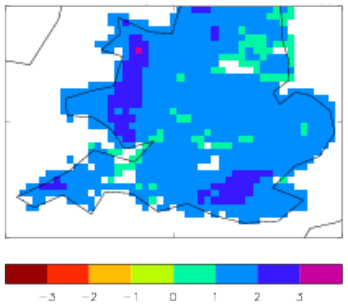

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Plans for this year

- PS36 (July 2015)
  - Migration to new supercomputer
- PS37 (October 2015)
  - DA and data changes (VarBC)
  - Routine science changes to UKV
- PS38 (Spring 2016)
  - Increases in resolution/number of ensemble members
  - Scheduling changes (poss. incl. extend UKV fc range)
  - Upgrade science in global systems to GA7/GC3
    - Package of physics changes, mainly improving cloud.
  - GA7/GC3 will form the physical model to which earth system components will be added to form UKESM1 – our CMIP6 submission

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