Tracking propagation of the MJO with MPAS

Ability to represent MJO in global model and to sustain it or Modelling issues

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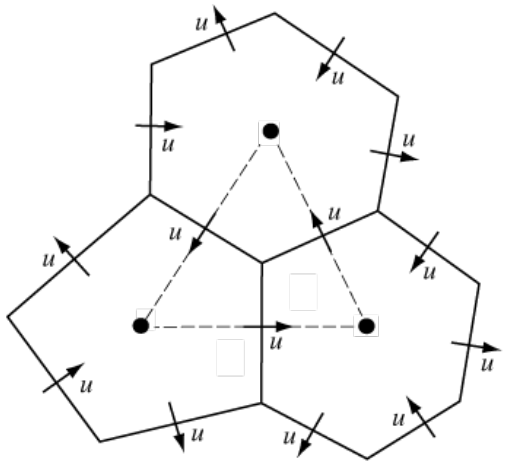
MPAS Atmosphere

MPAS: Model for Prediction Across Scale

- Unstructured spherical centroidal Voronoi mesh: uniform and variable-resolution meshes



- Fully compressible nonhydrostatic equations
- Integration schemes are similar to WRF.
- 41 vertical levels

Is MPAS able to simulate MCS?

Approach:

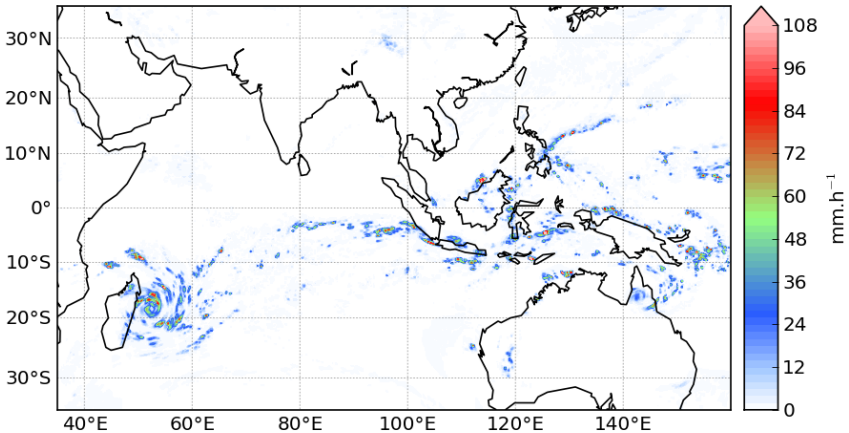
Different uniform meshes, same set of physics

15km → parametrised shallow/deep convection (Tiedtke scheme) →

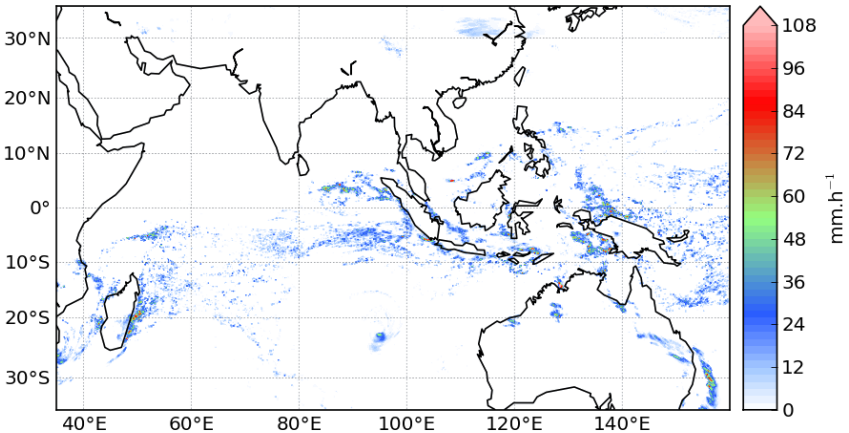
3km explicit convection

Shallow/Deep convection: resolved (3km) or Tiedtke (15km);
PBL scheme: YSU; Microphysics: WSM6;
RRTMG longwave and shortwave radiation; Noah LSM

15k



3km

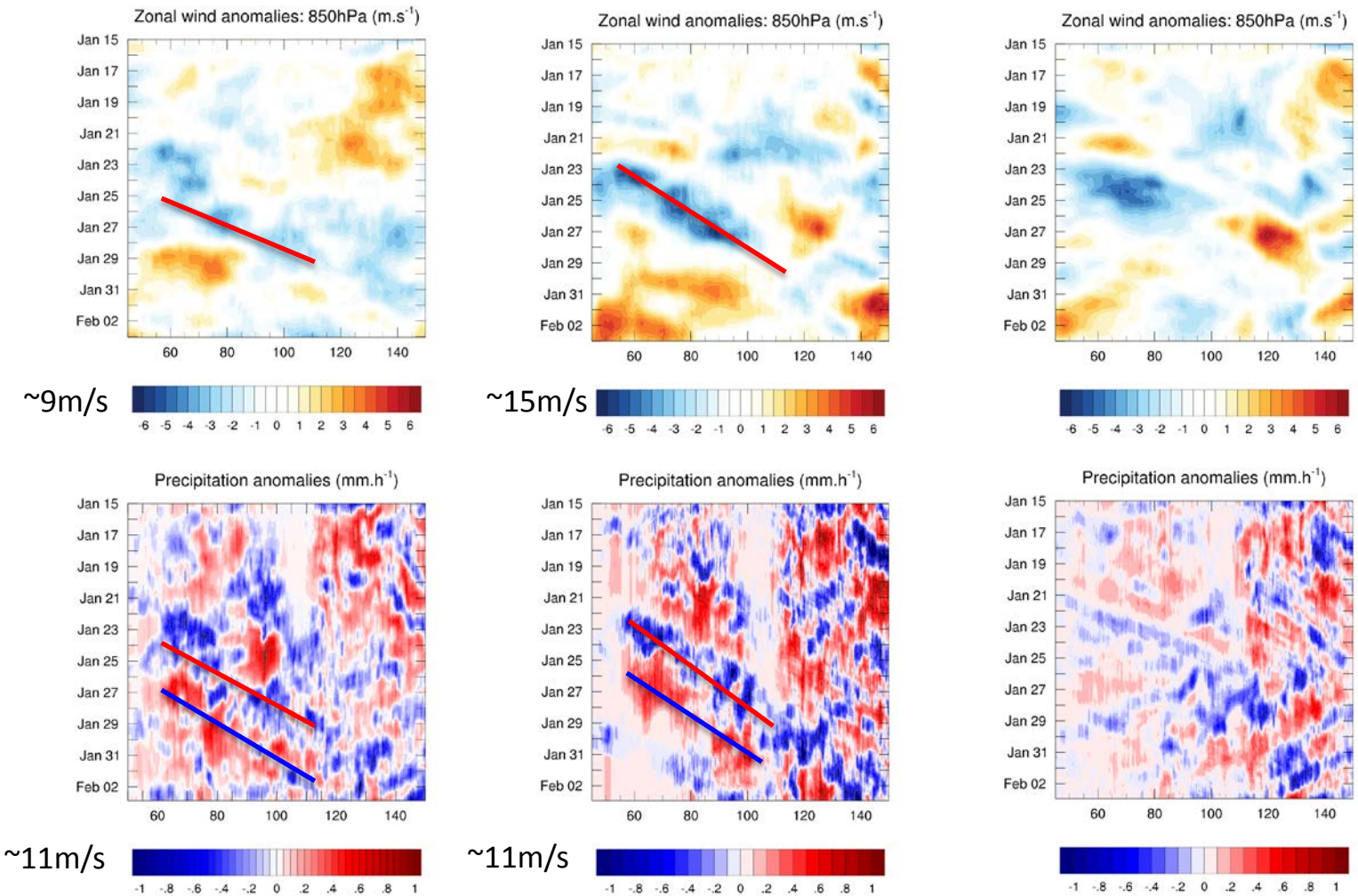


MJO of January/February 2009: precipitation the 31th

Is MPAS able to simulate the MJO?

MJO January/February 2009

Reanalysis/obs | 15km | 3km



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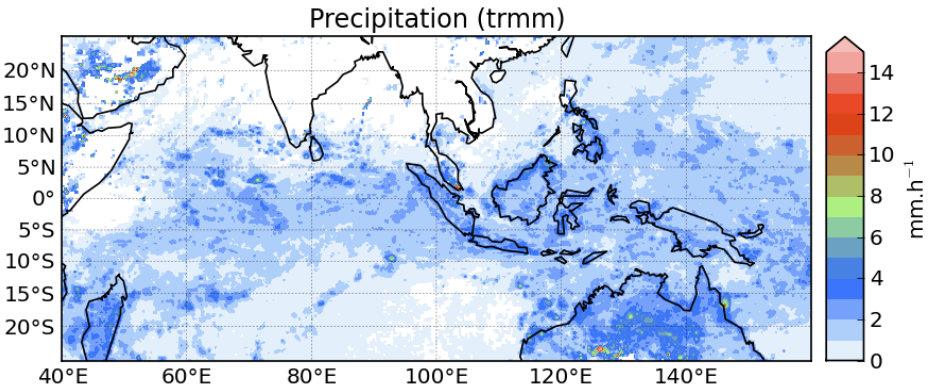
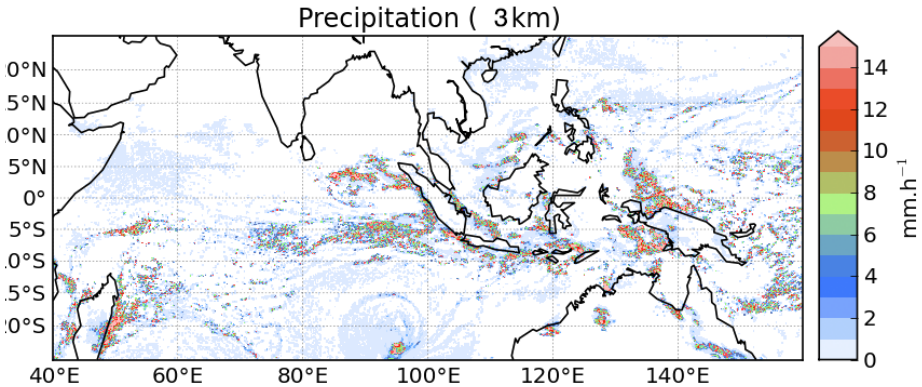
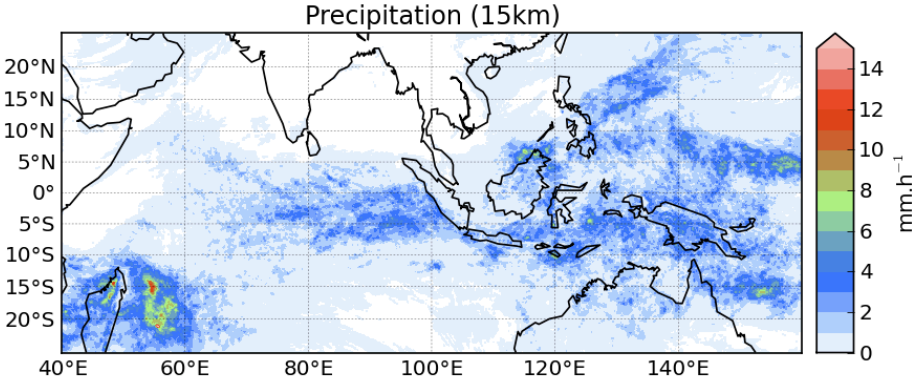
Modelling issues

MJO January/February 2009







Averaged precipitation

In the 3km resolution simulation:
Precipitation tends to peak
(stratiform precipitation too high,
not enough convective precipitation)
→ Problem with the microphysics?

Next steps

Other diagnostics to assess the simulation of MJO
characteristic of MJO: strength, …

Simulate the November 2011 Dynamo MJO and see what will happen

Find a way to improve the simulations:
variable mesh (60 to 15-3km)
improve the representation of convection in MPAS
go cloud permitting

Thank you