Numerical Weather Prediction at the Deutscher Wetterdienst

Global Model

Regional Models

GME

Operational hydrostatic global model

Icosahedral-hexagonal grid

Mesh size ~ 30 km, 655362 grid points/layer 60 layers, top layer at 5 hPa

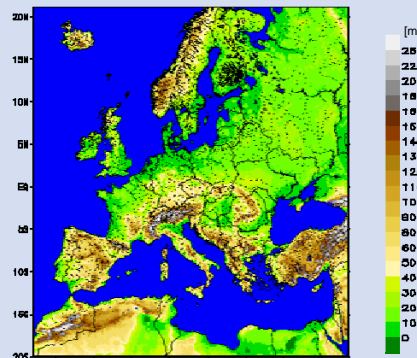**Prognostic variables: u, v, T, p_s, q_v, q_c, q_i, q_r, q_s, O_3**
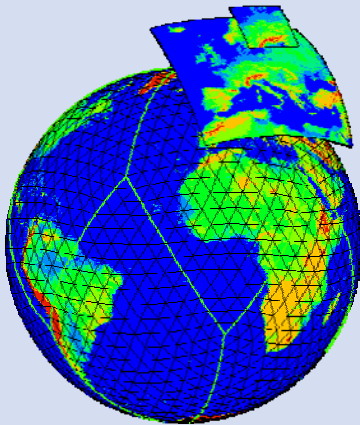
Structure of GME grid and model domains of COSMO-EU and COSMO-DE.

COSMO-EU

Operational non-hydrostatic, fully compressible limited area model

Rotated latitude-longitude grid

Mesh size ~ 7 km, 665 x 657 grid points/layer 40 layers, top layer at 22 km above mean sea level

Prognostic variables: u, v, w, T, p´, q_v, q_c, q_i, q_r, q_s, TKE


Model domain of COSMO-EU.

COSMO-DE

Model for very short-range NWP with rapid update cycle

Data assimilation including radar data (via LHN) Runge-Kutta 3rd order (2 time level) time-splitting scheme 5th order upwind horizontal advection 6-class cloud microphysics scheme No parameterization of deep convection

Mesh size ~ 2.8 km, 421 x 461 grid points/layer 50 layers, top layer at 22 km above mean sea level

Prognostic variables: u, v, w, T´, p´, q_v, q_c, q_i, q_r, q_s, q_g, TKE
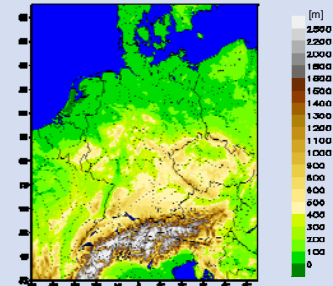

Model domain of COSMO-DE.

High-resolution Regional Model HRM

Operational hydrostatic regional model at more than 25 NMS worldwide Lateral boundary conditions up to 120 h provided by GME

Rotated (regular) latitude-longitude grid

Mesh size ~ 7 - 22 km, different model domains 40 to 60 layers, top layer at 5 - 10 hPa

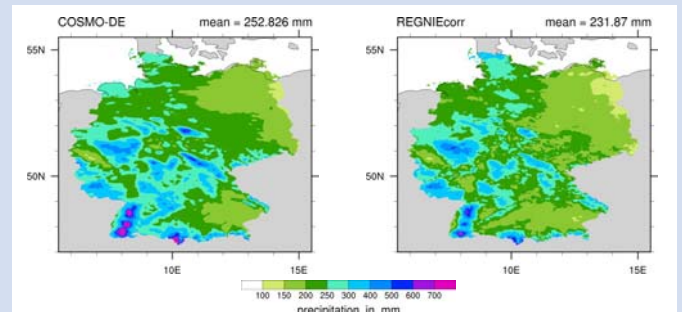**Prognostic variables: u, v, T, p_s, q_v, q_c, q_i**
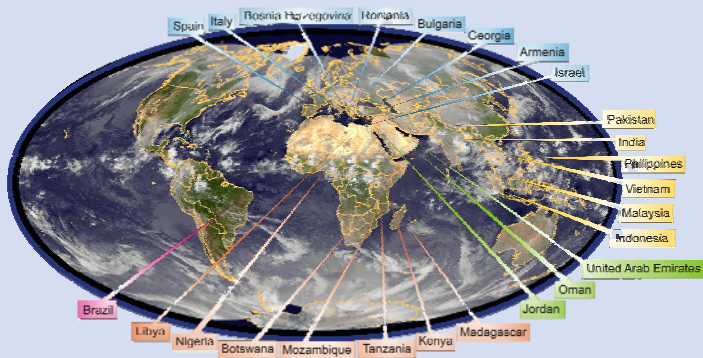
HRM group.

Verification results
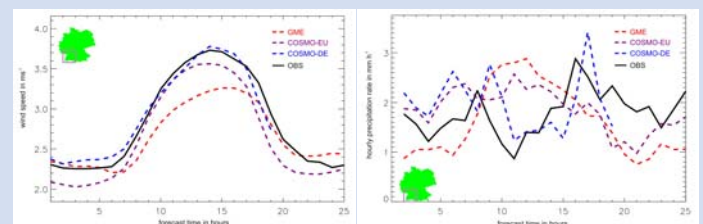
Left: Mean diurnal cycle of wind speed in summer 2009 over South-Western Germany.
Right: Mean diurnal cycle of hourly precipitation rate.
Comparison between observations (solid black) GME (red), COSMO-EU (magenta), and COSMO-DE (blue).

Accumulated precipitation amounts for 1 Nov 2009 to 31 Jan 2010.
For the model the 06-18 h forecasts of 00 and 12 UTC runs are accumulated.
The observation field is based on spatial interpolated high resolution gauge data.