

Characteristics of Global Deterministic NWP System

1. System	
Model (version)	Global Spectral Model (GSM1603)
Date of implementation	24 March 2016
2. Configuration	
Horizontal resolution (Grid spacing)	Spectral triangular 959 (TL959), reduced Gaussian grid system, roughly equivalent to $0.1875 \times 0.1875^\circ$ (20 km) in latitude and longitude
Vertical resolution (model top)	100 unevenly spaced hybrid levels (0.01 hPa)
Forecast length (initial time)	84 hours (00, 06, 18 UTC) 264 hours (12 UTC)
Coupling to ocean/wave/sea ice models	--
Integration time step	400 seconds
3. Initial conditions	
Data assimilation	Four-dimensional variational (4D-Var) method
4. Surface boundary conditions	
Treatment of sea surface	Climatological sea surface temperature with daily analysis anomaly Climatological sea ice concentration with daily analysis anomaly
Land surface analysis	Snow depth: two-dimensional optimal interpolation scheme Temperature: first guess Soil moisture: climatology
5. Other details	
Land surface and soil	Simple Biosphere (SiB) model
Radiation	Two-stream with delta-Eddington approximation for short wave (hourly) Two-stream absorption approximation method for long wave (hourly)
Numerical techniques	Spectral (spherical harmonic basis functions) in horizontal, finite differences in vertical Two-time-level, semi-Lagrangian, semi-implicit time integration scheme Hydrostatic approximation
Planetary boundary layer	Mellor and Yamada level-2 turbulence closure scheme Similarity theory in bulk formulae for surface layer

Convection	Prognostic Arakawa-Schubert cumulus parameterization
Cloud	PDF-based cloud parameterization
Gravity wave drag	Longwave orographic drag scheme (wavelengths > 100 km) mainly for stratosphere Shortwave orographic drag scheme (wavelengths approx.. 10 km) for troposphere only Non-orographic spectral gravity wave forcing scheme

6. Further information

Operational contact point:

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System documentation URLs:

<http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/nwp-top.htm>

http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/report/2015_Japan.pdf

Product list URLs:

http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/report/2015_Japan.pdf