JMA Contribution to SWFDDP in RAV

Numerical Prediction Division
Japan Meteorological Agency

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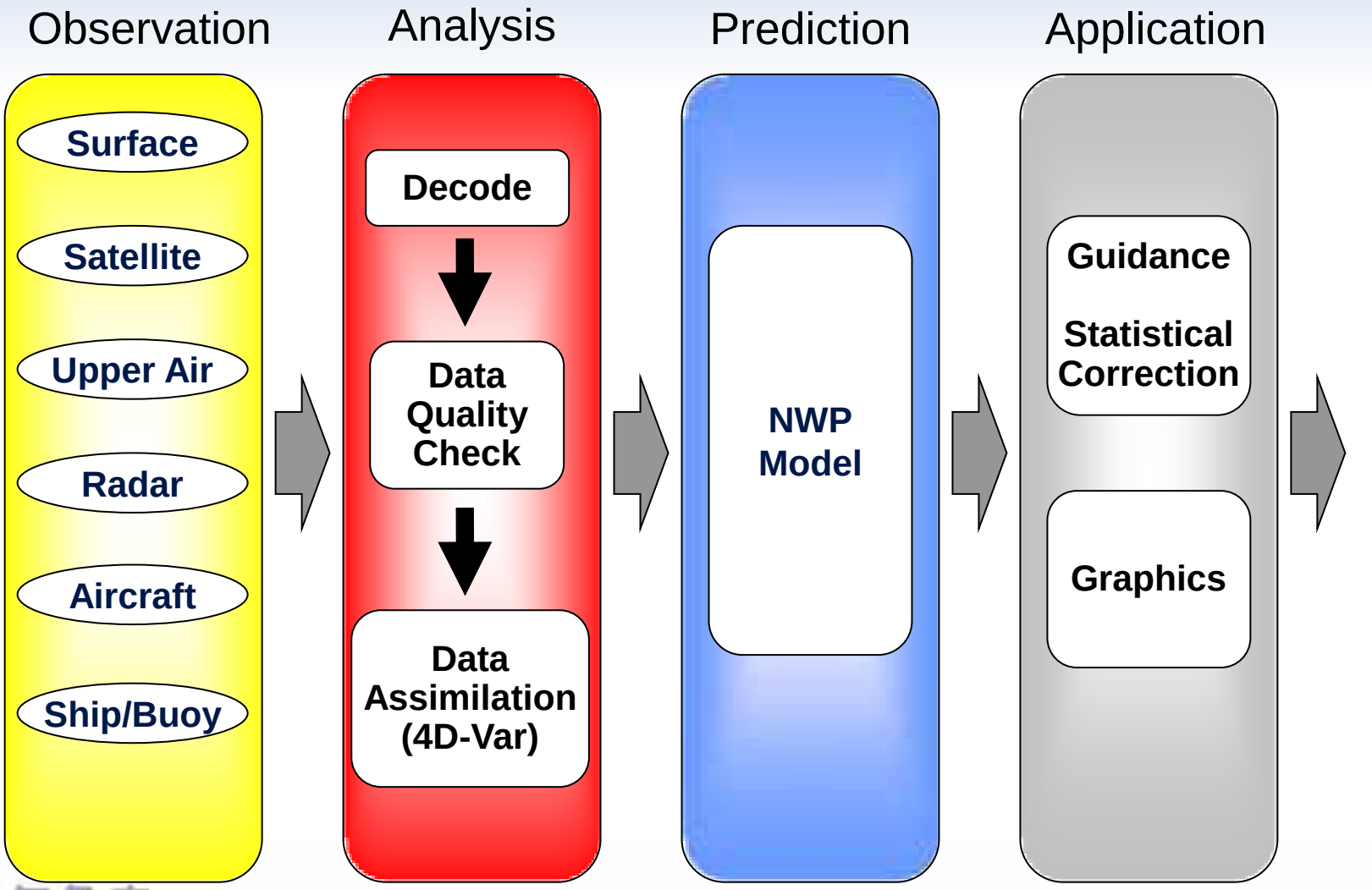
OUTLINE OF GLOBAL NWP SUITE

Operational NWP System at JMA

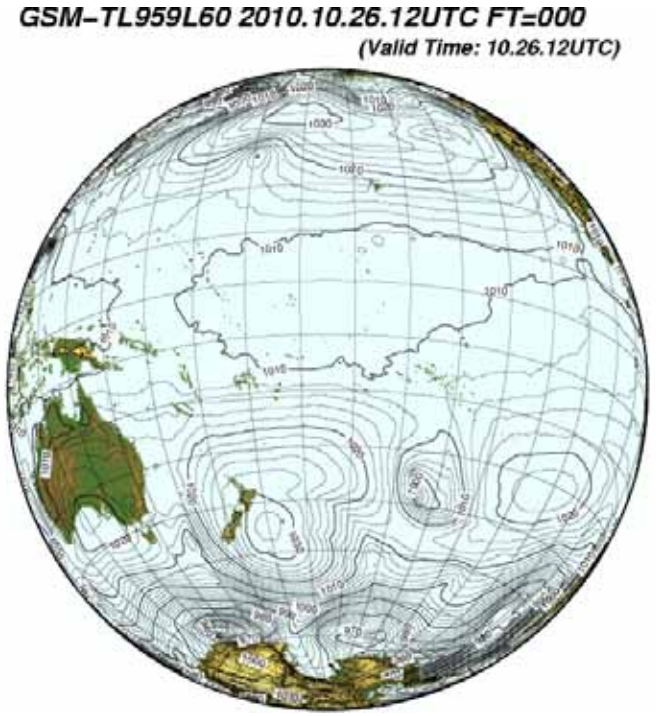


Current NWP suite of NPD/JMA

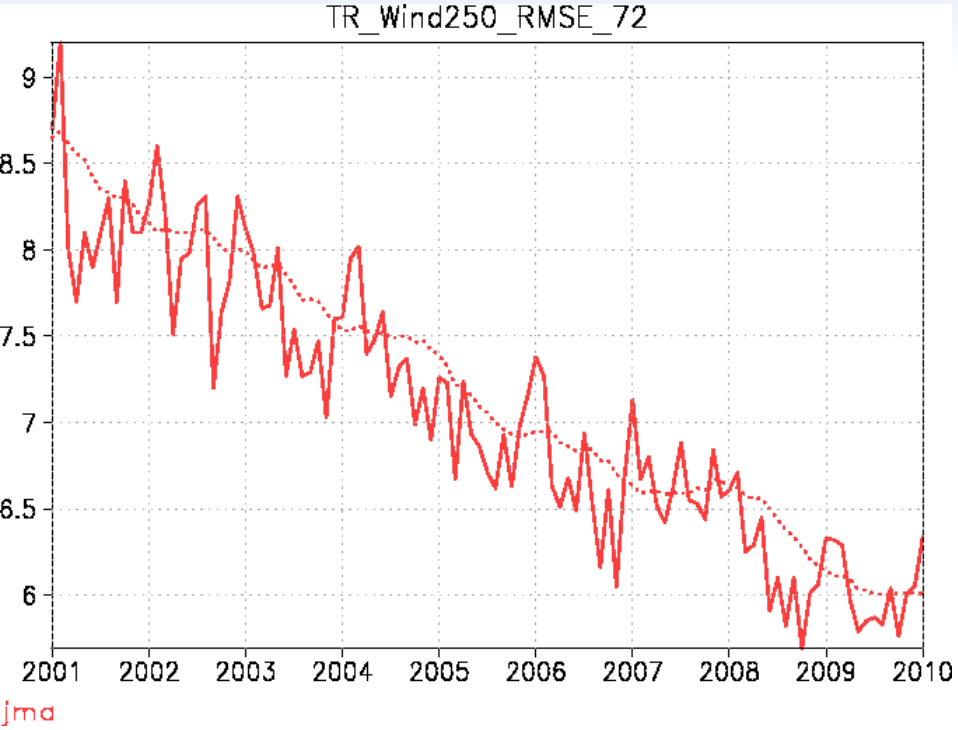
	Global Spectral Model (GSM)	MesoScale Model (MSM)	Local Forecast Model (LFM)	One-week Ensemble (WEPS)	Typhoon Ensemble (TEPS)
Objectives	Short- and Medium-range forecast	Disaster reduction, Short-range forecast	Disaster preventing Aviation forecast	One-week forecast	Typhoon forecast
Forecast domain	Global	Japan and its surroundings (3600km x 2880km)	Japan center regions (1600km x 1200km)	Global	
Horizontal resolution	T_L959(0.1875 deg)	5km	2km	T_L319(0.625 deg)	
Vertical levels / Top	60 0.1 hPa	50 21800 m	60	60 0.1 hPa	
Forecast Hours (Initial time)	84 hours (00, 06, 18 UTC) 216 hours (12 UTC)	15 hours (00, 06, 12, 18 UTC) 33 hours (03, 09, 15, 21 UTC)	9 hours	216 hours (12 UTC) 51 members	132 hours (00, 06, 12, 18 UTC) 11 members
Initial Condition	Global Analysis (4D-Var)	Mesoscale Analysis (4D-Var)	Local Analysis (3D-Var)	Global Analysis with ensemble perturbations Perturbations are produced by SV-method	

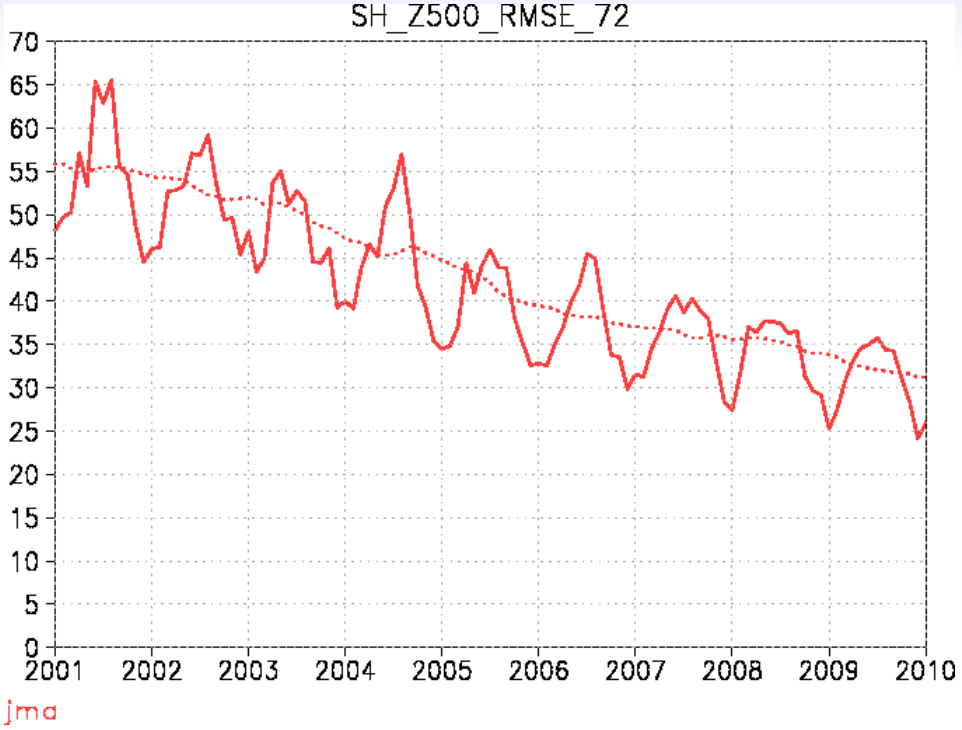
Global Spectral Model (GSM)

- Resolution: TL959L60
  - Horizontal ~20km
  - Vertical 60 layers up to 0.1 hPa
- Forecast frequency: Four times a day
  - 84 hours from 00, 06 and 18 UTC initials
  - 216 hours from 12 UTC initial
- Purpose
  - Weather forecast (up to one week)
  - Typhoon forecast
  - Lateral boundary for Meso-Scale Model



Evolution with time of the GSM forecast performance





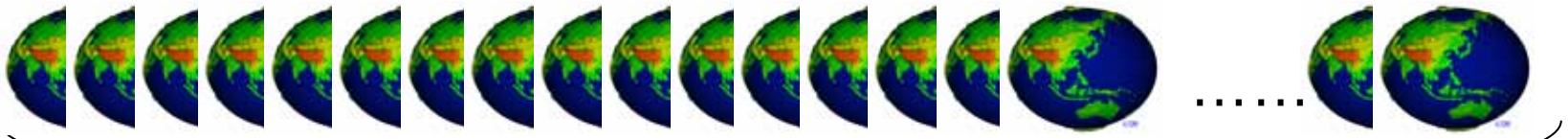
RMSE of 3-day forecast for the 250hPa wind for tropics (left) and the 500 hPa geopotential height for the southern hemisphere extratropics (right)

JMA One-week Ensemble Prediction System

- One-week Ensemble Prediction System

(outline)

  - 51 members forecast run.
  - 216 hour forecast (only 12 UTC initial) is operated everyday.
  - Horizontal resolution is 0.5625 deg
  - Perturbation is limited in the northern hemisphere and tropics(90N-20S)



50 + 1 = 51 global predictions for one ensemble forecast starting at one initial time.

Specifications of JMA One-week EPS

		JMA One-week EPS		
Horizontal resolution (grid size)		T_L319(0.5625 deg.)		
Vertical resolution (Model top)		60 (surface - 0.1hPa)		
Forecast domain		Global		
Forecast range (Initial Time)		216 hours (12 UTC)		
Ensemble size		50 perturbed run + 1 control (unperturbed) run		
Perturbation by Singular Vectors Method (SVs)	Inner model resolution (grid size)	T63L40 (1.875 deg.)		
	Targeted area	Northern Hemisphere (30N - 90N)	Tropics (20S - 30N)	Southern Hemisphere (20S – 90S)
	Physical Process	* simplified-physics	** full-physics	**No perturbation (Will be introduced before March 2011)**
	Optimization time	48 hours	24 hours	
	Evolved SV	Used	Used	
	Perturbed member	25	25	

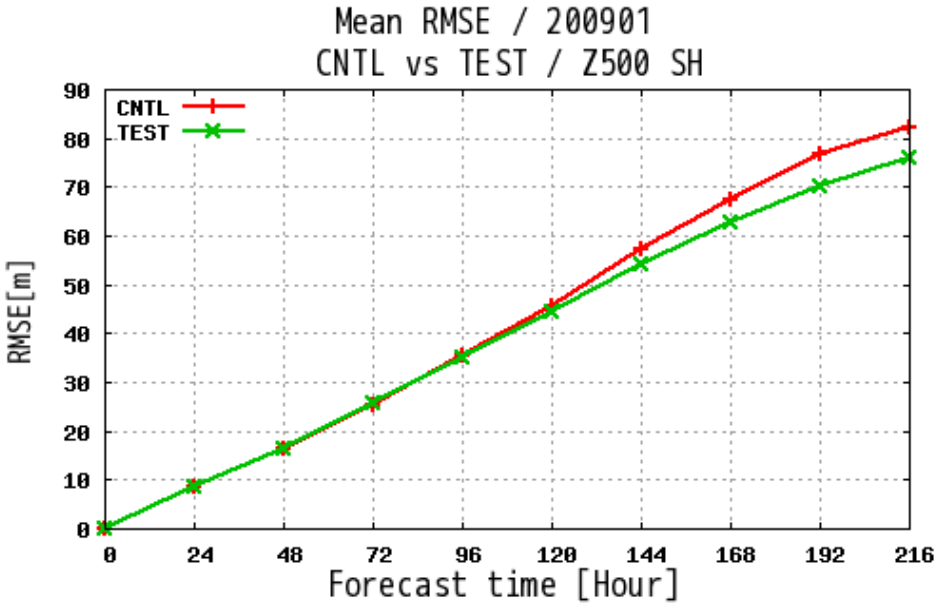
* simplified-physics: Initialization, horizontal diffusion, surface turbulent diffusion and vertical turbulent diffusion.

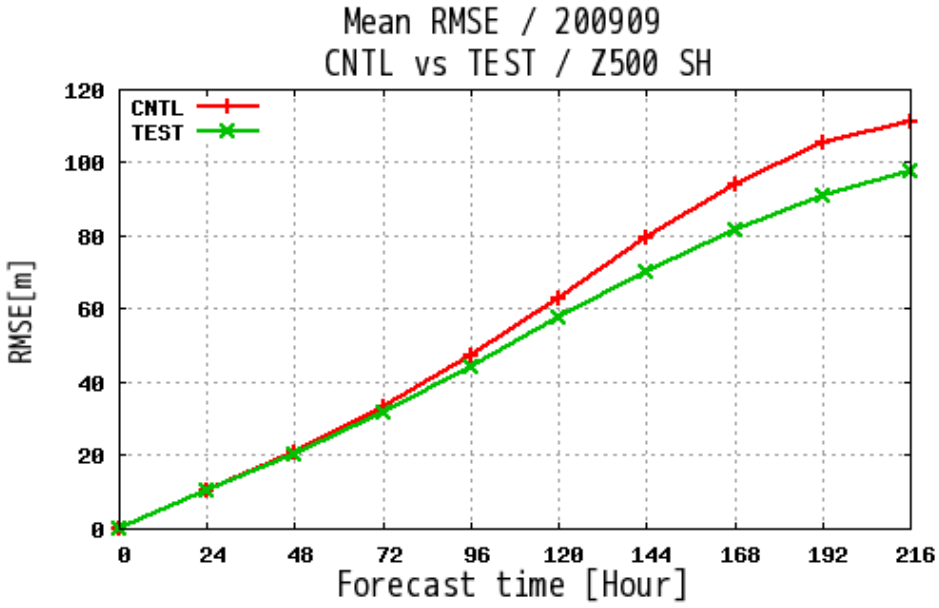
** full-physics: In addition to the simplified-physics processes, gravity wave drag, long-wave radiation, clouds and large scale convection and cumulus convection.

Experimental Results
Introduction of the southern hemisphere perturbation

RMSE of the ensemble mean forecast as a function of the forecast time for the 500 hPa geopotential height over the southern hemisphere extratropics in January (left) and September (right) of 2009

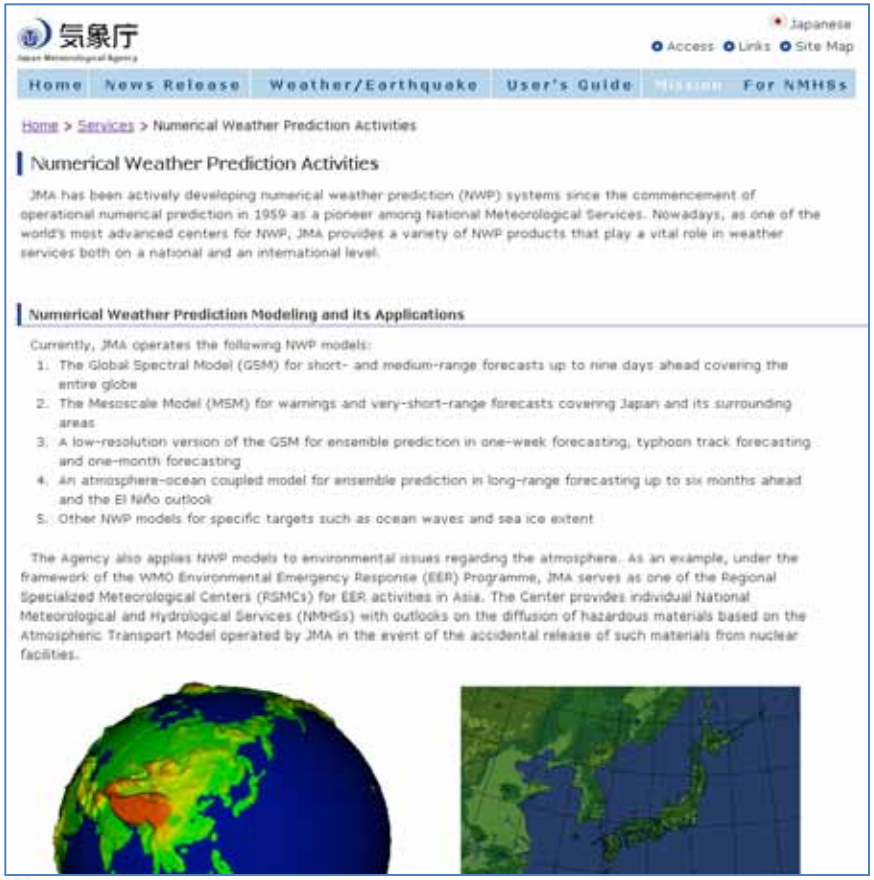
Perturbed area of experimental ensemble forecast : RED(20S-90N) , Green (90S-90N)

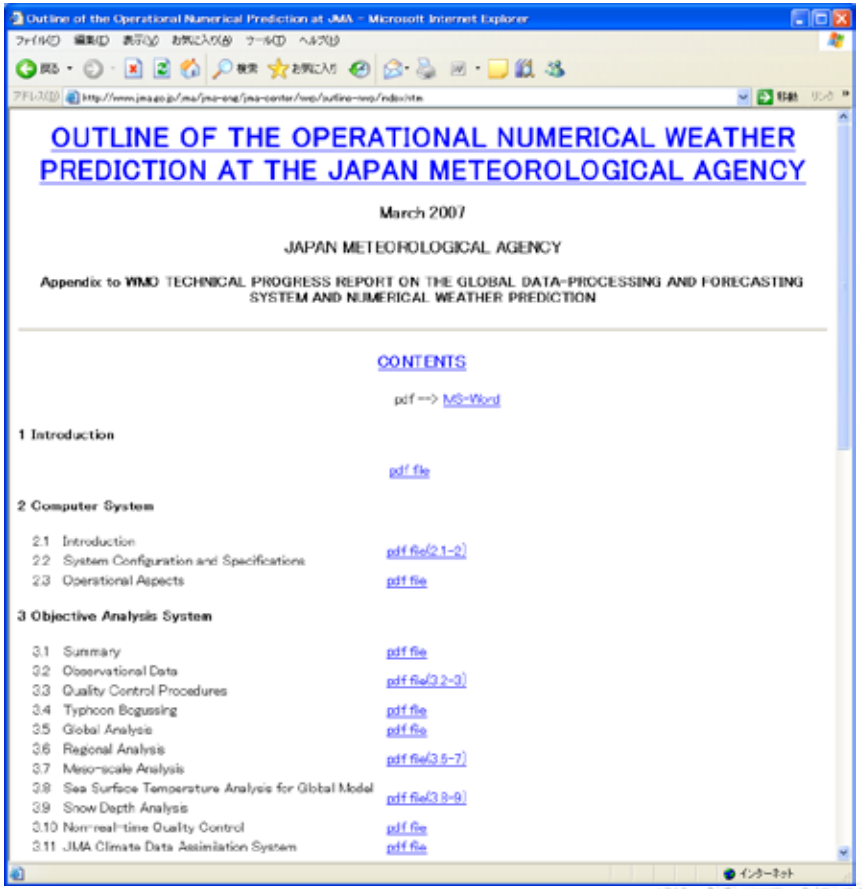




Resource of JMA NWP Systems

http://www.jma.go.jp/jma/en/Activities/nwp.html





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http://www.jma.go.jp/jma/jma-eng/jma-center/nwp/outline-nwp/index.htm

JMA'S SWFDDP WEBPAGE

JMA Specialized Webpage for SWFDDP in RA V

- JMA will open a new specialized webpage to support SWFDDP in RA V.
- This webpage is accessible without password.

JMA WEBPAGE FOR SWFDP

– Think Global, Act Regional –

RAII: Southeast Asia | RA V: South Pacific Islands | Information & Links

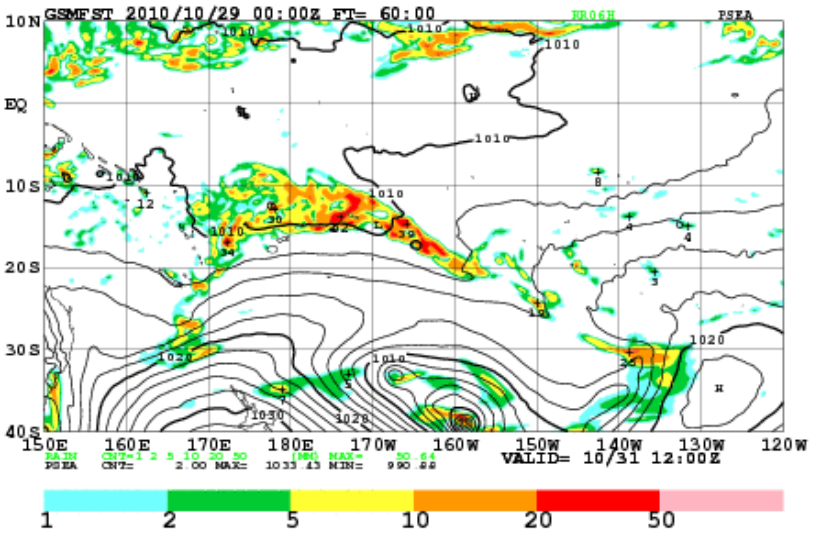
Deterministic Forecasts | Ensemble Forecasts

Initial Time : Day 29 Month 10 Year 2010 Hour(UTC) 00 (latest)

Forecast Time 60 / Element precipitation-6hr / Level SURF

(If you click a map below, its high-resolution map will be displayed in a new window.)

2010/10/29/00ini precipitation since last 6 hours [mm], PSEA

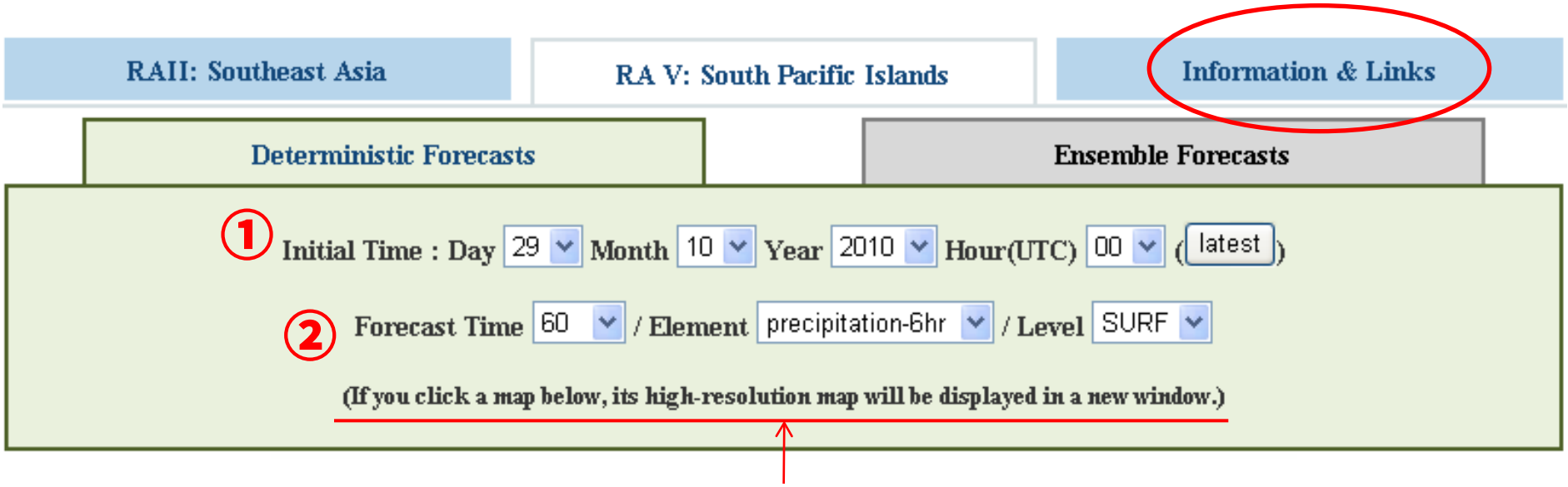


How to Use JMA Webpage

① Select Initial Time

② Select Forecast Time, Element and Level

③ Automatically, a selected image is displayed.



HIGH resolution map is also available.

Available Products
- Deterministic Forecast -

6-hourly out to 72 hours, then 12-hourly up to 144 hours	JMA
Parameters: wind (streamlines and speed/direction), temperature, geopotential height, humidity Levels: sfc, 925mb, 850mb, 700mb, 500mb, 300mb, 200mb	YES
Parameter: vorticity Level: 500mb, 300mb	YES
Parameter: vertical velocity Level: 850mb, 700mb, 300mb	YES
Parameter: 850mb wet bulb potential temperature Level: 850mb	NO
Parameters: instantaneous and accumulated precipitation, minimum temperature, maximum temperature, sea level pressure, relative humidity Level: sfc	YES except instantaneous precipitation
Parameter: 1000-500mb thickness Level: partial atmospheric column	YES
Parameter: precipitable water Level: atmospheric column	YES
Parameter: convective available potential energy (), Theta-E Level: atmospheric column	YES(Theta-E)
Parameter: lifted index, K index, total totals index Level: stability index Purpose:	YES
Parameter: convective inhibition (CIN) Level: stability index	NO
Parameters: significant wave height, mean wave direction and mean wave period	NO
Parameters: swell wave height and period, wind sea wave height and period, spectral decomposition of wave energy by range of periods	NO

EPS Products

- The initial perturbation in the southern hemisphere is not considered yet in WEPS.
- It will be introduced before March 2011.
- EPS products will be provided to the SWFDDP as soon as possible after their quality is ensured.

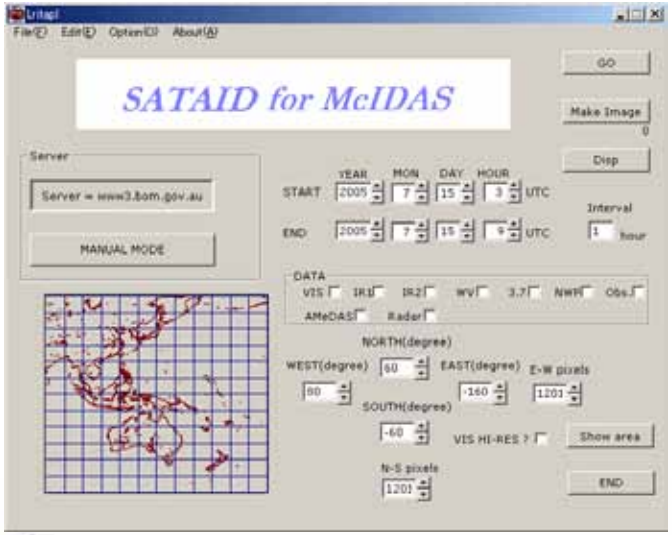
OTHER INTERNATIONAL SERVICES FOR ADVANCED USE

May useful information
only for NMHSs with wide bandwidth of internet

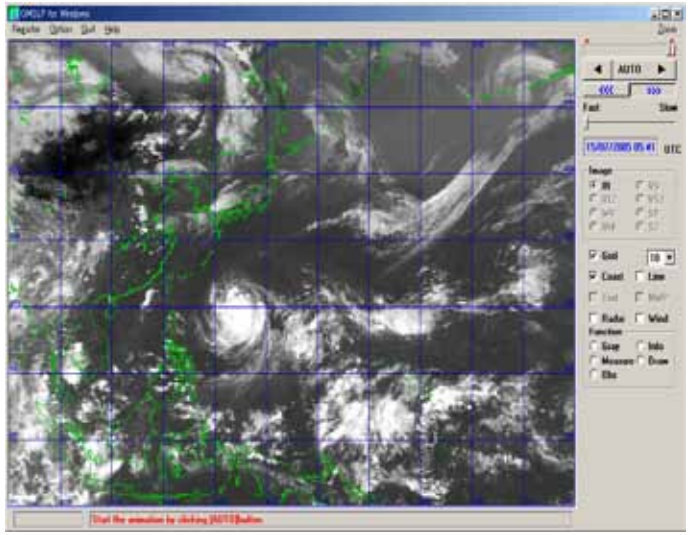
SATAID

Satellite Animation and Interactive Diagnosis

- Software to display satellite imagery and NWP data
- WMO-CGMS Virtual Laboratory for Training in Satellite Meteorology (VLab)
  - http://mscweb.kishou.go.jp/VRL/



Menu Interface(LRITAPL)



Viewer (GMSLPD etc)

WIS Prototype Service

JMA's WIS Prototype Server

A package of VB Scripts (automatically check, get, display and update SATATD data) is also available.

Get_WIS.vbs

Check every 5 min and get new data

sataid_data_or

Data are stored at local PC

Just click this program!!

AutoLoop.hta

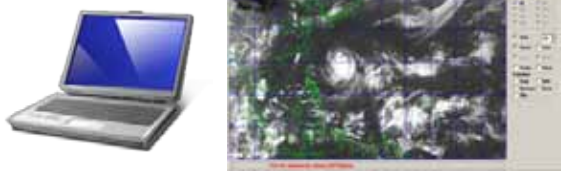
sataid_cut.vbs

Cat data according to your area of interest

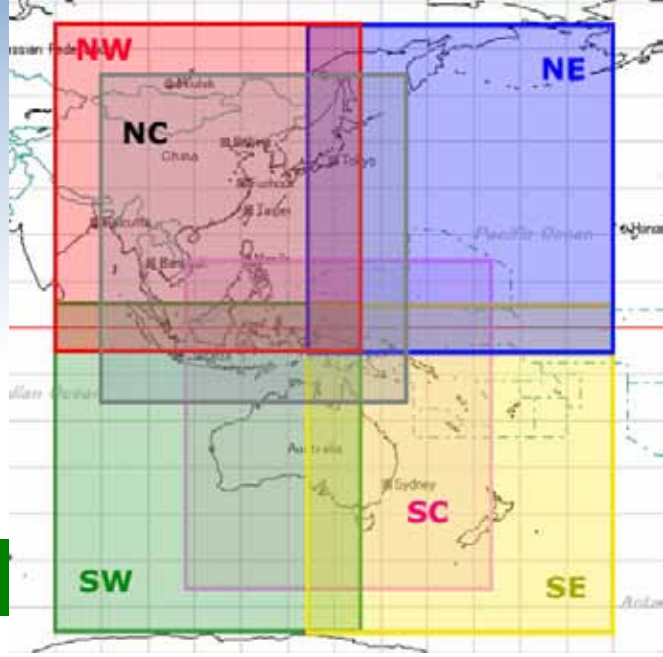
sataid_data_cut

sataid.vbs

Run viewer program, GMSLPD



GMSLPD



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Satellite imagery and NWP will be displayed and automatically updated twice an hour!!

JMA

JMA High-resolution GSM Data

- Provision of the JMA High-resolution GSM Data
  - The JMA started this service in December 2008.
  - This service is provided to RA-II members as one of JMA activities as WMO RSMC.
  - The data are provided through the internet.
    URL: http://ds.data.jma.go.jp/tl959/
- Data format : GRIB2
  - Domain : Global / RA-II region
  - Resolution
    - 0.25 deg at the surface
    - 0.50 deg at the upper (1000~10hPa)
- User ID and Password are required to download.
  - No charge, of course!

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Home | Tutorial | ID / Password | Application | Product Info. | Model Info. | Download

JMA High-Resolution GSM Data (as RSMC Service)

- Tutorial
- Password Management
- Application
- Product Information
- Model Information (JMA web site)

- Download Products

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Home | Tutorial | ID / Password | Application | Product Info. | Model Info. | Download

Tutorial - JMA High-Resolution GSM Data

The way to obtain Account ID/Password

You should apply for ID/Password to JMA.

If you'd like to obtain ID/Password, see "Application" page.

The way to download JMA High-Resolution GSM Data

You have 2 choices to download products.

1. Interactive download from web site

You can download data by interactive operation.

[Download Procedure]

1. Access "Download" web page.
   You are required authentication.
   - Enter your account ID to "User Name:" text box, and your password to "Password:" text box.
2. Click and search products that you'd like to download.
3. When you clicked ".bin.gz" file, registration window would be shown. If you enter ID/Password, you'd be able to download it.

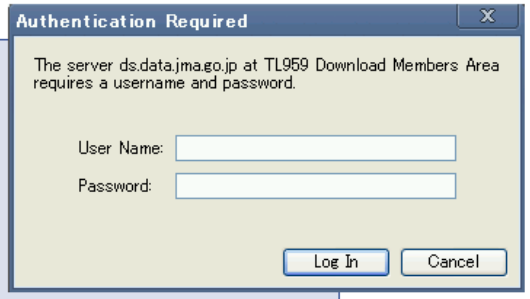

Fig1: Authentication Dialog

2. Using FTP client

If you can use FTP client software on your PC, you can obtain products easier than "interactive download".

- Server Name: ds.data.jma.go.jp

The way to process / visualize data

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Global Wave Model

- JMA operates a global wave model (GWM) once a day (12 UTC initial)
  - Grid interval: 0.5 degree
  - Elements: significant wave height, prevailing wave period, prevailing wave direction
  - Forecast time: 0 – 84 hours (6 hourly), 96 – 192 (12 hourly)
  - Initial times: 00, 06, 12, 18 UTC
- Data are disseminated on GTS (since Jun. 2010)
  - Data are also available from RSMC Data Server

WE WISH
THE SUCCESS OF THE PROJECT!

JMA mascot “Hare-run”