Products of the RSMC Tokyo - Typhoon Center

Naoko KOMATSU
Tokyo Typhoon Center
Japan Meteorological Agency (JMA)

JMA Workshop on WIS Implementation
18 – 20 November, 2014
Tropical Cyclones, 1945–2006

RSMC Tokyo Responsibility Area

25.6/year (1981-2010)

4.4/year

3.0/year

16.4/year

10.1/year

Saffir-Simpson Hurricane Scale:

- tropical depression
- tropical storm
- hurricane category 1
- hurricane category 2
- hurricane category 3
- hurricane category 4
- hurricane category 5

from Wikipedia
http://en.wikipedia.org/wiki/Tropical_cyclone
Major Activities of the RSMC Tokyo

● Dissemination of RSMC Products via the GTS
  - RSMC Tropical Cyclone Advisory
  - SAREP
  - RSMC Guidance for Forecast
  - RSMC Prognostic Reasoning
  - RSMC Tropical Cyclone Best Track
  - Tropical Cyclone Advisory for SIGMET (via AFTN)

● Provision of a variety of Products via the Internet
  - SATAID Service (WIS DAR)
  - JMA Numerical Typhoon Prediction Website
  - RSMC Tokyo - Typhoon Center Website

● Training / Publication
RSMC Products – TC Advisory

RSMC TC advisory (WTPQ20-25)

for 3-day forecast

issued within 50 minutes from observation times at 00, 06, 12, 18 UTC

<table>
<thead>
<tr>
<th>Time</th>
<th>Position</th>
<th>Distance</th>
<th>Wind Speed</th>
<th>Direction</th>
<th>Pressure</th>
<th>Max Wind</th>
<th>Gust</th>
</tr>
</thead>
<tbody>
<tr>
<td>180600UTC</td>
<td>28.4N 133.2E</td>
<td>GOOD</td>
<td>14KT</td>
<td>N</td>
<td>945HPA</td>
<td>085KT</td>
<td>120KT</td>
</tr>
<tr>
<td>180600UTC</td>
<td>32.6N 132.8E</td>
<td>85NM</td>
<td>10KT</td>
<td>N</td>
<td>950HPA</td>
<td>080KT</td>
<td>115KT</td>
</tr>
<tr>
<td>180600UTC</td>
<td>33.5N 135.2E</td>
<td>160NM</td>
<td>6KT</td>
<td>ENE</td>
<td>960HPA</td>
<td>075KT</td>
<td>105KT</td>
</tr>
<tr>
<td>180600UTC</td>
<td>33.3N 140.1E</td>
<td>220NM</td>
<td>10KT</td>
<td>E</td>
<td>975HPA</td>
<td>055KT</td>
<td>080KT</td>
</tr>
</tbody>
</table>

WTPQ20 RJTD 180600
RSMC TROPICAL CYCLONE ADVISORY
NAME TY 1106 MA-ON (1106)
ANALYSIS
PSTN 180600UTC 28.4N 133.2E GOOD
MOVE N 14KT
PRES 945HPA
MXWD 085KT
GUST 120KT
50KT 140NM EAST 90NM WEST
30KT 425NM EAST 300NM WEST
FORECAST
24HF 190600UTC 32.6N 132.8E 85NM 70%
MOVE N 10KT
PRES 950HPA
MXWD 080KT
GUST 115KT
48HF 200600UTC 33.5N 135.2E 160NM 70%
MOVE ENE 06KT
PRES 960HPA
MXWD 075KT
GUST 105KT
72HF 210600UTC 33.3N 140.1E 220NM 70%
MOVE E 10KT
PRES 975HPA
MXWD 055KT
GUST 080KT =
RSMC Products – TC Advisory

RSMC TC advisory (WTPQ50-55)

for 5-day track forecast

issued within 90 minutes from observation times at 00, 06, 12, 18 UTC
When a TD is expected to reach TS intensity or higher within 24 hours, a TC advisory is issued.

- 34 kt > Max wind (MW) TD (Tropical Depression)
- 34 kt <= MW < 48 kt TS (Tropical Storm)
- 48 kt <= MW < 64 kt STS (Severe TS)
- 64 kt <= MW TY (Typhoon)

TC advisory for developing TDs
Analysis & Forecast up to 24 hours ahead

Analysis & Forecast up to 24 hours ahead
Other Products

Guidance for Forecast (FXPQ20-25)

NWP model predictions:
up to 84 hours ahead for GSM and 132 hours ahead for TEPS

- GSM predictions:
  issued 3.5 hours after initial analyses at 00, 06, 12, 18 UTC

- TEPS ensemble mean track predictions:
  issued 4.2 hours after initial analyses at 00, 06, 12, 18 UTC
Other Products

SAREP (IUCC10) in BUFR Format

T1103,Sarika,18.9N,117.6E,2,2,3,2,0,2,0,348,15
EDA013,NAMELESS,15.3N,119.4E,4,1.5,1.5,///,///

issued a half to 1 hour after observations at 00, 03, 06, 09, 12, 15, 18, 21 UTC

TEXT Version is available on the NTP Website.

Prognostic Reasoning (WTPQ30-35)

issued at 00 and 06 UTC following the TC advisory

WTPQ30 RJTD 130000
RSMC TROPICAL CYCLONE PROGNOSTIC REASONING
REASONING NO.21 FOR STS 1419 VONGFONG (1419)
1.GENERAL COMMENTS
REASONING OF PROGNOSIS THIS TIME IS SIMILAR TO PREVIOUS ONE.
POSITION FORECAST IS MAINLY BASED ON NWP AND PERSISTENCY.
2.SYNOPTIC SITUATION
NOTHING PARTICULAR TO EXPLAIN.
3.MOTION FORECAST
POSITION ACCURACY AT 130000 UTC IS GOOD.
STS WILL ACCELERATE FOR THE NEXT 24 HOURS THEN DECELERATE.
STS WILL MOVE NORTHEAST FOR THE NEXT 48 HOURS.
4.INTENSITY FORECAST

Dvorak CI-number (reported at 00, 06, 18 UTC)

Result of early stage Dvorak analysis (EDA) is shown.
Other Products

Tropical Cyclone Best Track (AXPQ20)
issued one and a half month after a TC dissipated

<table>
<thead>
<tr>
<th>Date</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Pressure</th>
<th>Wind Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2806</td>
<td>11.0N</td>
<td>157.1E</td>
<td>1004HPA</td>
<td>35KT</td>
</tr>
<tr>
<td>2812</td>
<td>11.6N</td>
<td>155.1E</td>
<td>1004HPA</td>
<td>40KT</td>
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<tr>
<td>2818</td>
<td>12.2N</td>
<td>153.8E</td>
<td>1002HPA</td>
<td>45KT</td>
</tr>
<tr>
<td>2900</td>
<td>12.7N</td>
<td>152.2E</td>
<td>1000HPA</td>
<td>50KT</td>
</tr>
<tr>
<td>2906</td>
<td>13.0N</td>
<td>151.0E</td>
<td>998HPA</td>
<td>55KT</td>
</tr>
<tr>
<td>2912</td>
<td>13.4N</td>
<td>150.3E</td>
<td>994HPA</td>
<td>60KT</td>
</tr>
<tr>
<td>2918</td>
<td>13.9N</td>
<td>149.5E</td>
<td>990HPA</td>
<td>65KT</td>
</tr>
<tr>
<td>3000</td>
<td>15.2N</td>
<td>148.1E</td>
<td>990HPA</td>
<td>70KT</td>
</tr>
<tr>
<td>3006</td>
<td>16.4N</td>
<td>146.9E</td>
<td>990HPA</td>
<td>75KT</td>
</tr>
<tr>
<td>3012</td>
<td>16.8N</td>
<td>145.8E</td>
<td>985HPA</td>
<td>80KT</td>
</tr>
<tr>
<td>3018</td>
<td>17.6N</td>
<td>144.7E</td>
<td>980HPA</td>
<td>85KT</td>
</tr>
<tr>
<td>0100</td>
<td>18.1N</td>
<td>143.8E</td>
<td>970HPA</td>
<td>90KT</td>
</tr>
<tr>
<td>0106</td>
<td>19.3N</td>
<td>142.9E</td>
<td>965HPA</td>
<td>95KT</td>
</tr>
</tbody>
</table>

Tropical Cyclone Advisory for SIGMET (FKPQ30-35)
issued 6 hourly for aviation via the AFTN

<table>
<thead>
<tr>
<th>Date</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Pressure</th>
<th>Wind Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0618</td>
<td>33.30N</td>
<td>145.00E</td>
<td>980HPA</td>
<td>60KT</td>
</tr>
<tr>
<td>0700</td>
<td>36.10N</td>
<td>149.00E</td>
<td>965HPA</td>
<td>65KT</td>
</tr>
<tr>
<td>0706</td>
<td>39.40N</td>
<td>143.80E</td>
<td>970HPA</td>
<td>70KT</td>
</tr>
<tr>
<td>0712</td>
<td>44.10N</td>
<td>142.90E</td>
<td>965HPA</td>
<td>75KT</td>
</tr>
</tbody>
</table>

FKPQ30 RJTD 061800
TC ADVISORY
DTG: 20141106/1800Z
TCAC: TOKYO
TC: NURI
NR: 28
PSN: N3330 E14500
MOV: NE 26KT
C: 980HPA
MAX WIND: 60KT
FCST PSN +6HR: 07/0000Z N3610 E14900
FCST MAX WIND +6HR: 65KT
FCST PSN +12HR: 07/0600Z N3940
FCST MAX WIND +12HR: 70KT
FCST PSN +18HR: 07/1200Z N4410
FCST MAX WIND +18HR: 70KT
FCST PSN +24HR: 07/1800Z N4950
........
JMA SATAID Service has been provided as WIS DAR since December 2011

DAR: Data Discovery, Access and Retrieval

ID and password required (provided to each NMHS)

http://www.wis-jma.go.jp/cms/sataid/
SATAID Service

- SATAID (Satellite Animation and Interactive Diagnosis)
- Originally developed by JMA’s MSC as an application software to display satellite imagery and NWP data for training purposes.
- Provided to NMHSs as a JMA’s contribution to WMO-CGMS Virtual Laboratory for Training in Satellite Meteorology (VL).
- Today, used also as an operational tool for daily weather analysis including tropical cyclone monitoring at JMA’s HQ and local offices.
- Freely available to NMHSs and easy to install.
- Equipped with lots of functions.
SATAID Service

- Display (and overlay) satellite imagery and NWP data (and various observations i.e. SYNOP, SHIP, TEMP, Radar, Wind Profiler, ASCAT etc. if its format prepared)
- Use many functions: vertical cross-sectional chart, time-series chart, digital data output to CSV file......
- Very useful for TC position and intensity analysis!
Imagery dissemination services

Landline dissemination service (SATAID) - Internet (HTTPS) -

This service provides MTSAT's imagery converted for use with SATAID software by registered National Meteorological and Hydrological Services (NMHSs) through the Internet at no cost. Imagery for six areas in all observation channels is available about three minutes after observation.
## Main Characteristics

<table>
<thead>
<tr>
<th>Basic Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissemination method</td>
<td>Internet (HTTPS)</td>
</tr>
<tr>
<td>Disseminated data</td>
<td>Imagery for SATAID software</td>
</tr>
<tr>
<td>Features</td>
<td></td>
</tr>
<tr>
<td>Time resolution</td>
<td>Every 30 minutes for the Northern-hemisphere imagery, and every hour for full-disk</td>
</tr>
<tr>
<td>Type of imagery</td>
<td>Rectangular imagery divided into six areas</td>
</tr>
<tr>
<td>Necessary equipment</td>
<td>PC/workstation, SATAID software and Internet connection</td>
</tr>
</tbody>
</table>

### Conditions

<table>
<thead>
<tr>
<th>Limits on user</th>
<th>NMHSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration</td>
<td>Needed: <a href="#">registration introduction</a></td>
</tr>
<tr>
<td>Charge</td>
<td>Free</td>
</tr>
</tbody>
</table>

## How to use the landline dissemination service (SATAID)

NMHSs wishing to receive imagery for SATAID software through the landline dissemination service (SATAID) need a PC/workstation and a broadband Internet connection. Please [register](#) with JMA.

SATAID Program

To download SATAID application, please click file link below.

- gmslpd_ver20.zip
  (zip format: 9.2Mbytes)

To download SATAID data download tool, please click file link below.

- SATAID_data_download_tool.zip
  (zip format: 14.6Mbytes)

To know how to install and to use SATAID application, please click Manual.

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All MTSAT imagery (VIS, IR, IR2, WV, 3.8μm), NWP and Observation data of the last 3 days are available.
Data for SATAID

Before using these data, please check use conditions of SATAID Service

Area

Data sets of six areas are provided in this service. Please select Area Name from menu bar when you download data.

Definition of areas and information is indicated by right figure and table below.

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Area Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Sum of Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td>North Central</td>
<td>55N-15S</td>
<td>90E-155E</td>
<td>1.7GB/3day</td>
</tr>
<tr>
<td>NW</td>
<td>Northwest</td>
<td>65N-5S</td>
<td>80E-145E</td>
<td>1.6GB/3day</td>
</tr>
<tr>
<td>NE</td>
<td>Northeast</td>
<td>65N-5S</td>
<td>135E-200E</td>
<td>1.5GB/3day</td>
</tr>
<tr>
<td>SC</td>
<td>South Central</td>
<td>15N-55S</td>
<td>107.5E-172.5E</td>
<td>1.2GB/3day</td>
</tr>
<tr>
<td>SW</td>
<td>Southwest</td>
<td>5N-65S</td>
<td>60E-145E</td>
<td>1.1GB/3day</td>
</tr>
<tr>
<td>SE</td>
<td>Southeast</td>
<td>5N-65S</td>
<td>135E-200E</td>
<td>1.0GB/3day</td>
</tr>
</tbody>
</table>
# SATAID Service

## Data Specification

**Specification**

Data of each area includes 1) Satellite Imagery of MTSAT, 2) NWP Products and 3) Observation Data. Specification of these data is shown in table below.

### Satellite Imagery of MTSAT

<table>
<thead>
<tr>
<th>List of the channel</th>
<th>Infrared channel-1 (IR1)</th>
<th>Infrared channel-2 (IR2)</th>
<th>Water Vapor (WV)</th>
<th>Infrared channel-4 (IR4)</th>
<th>Visible Imagery (VIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
<td>half-hourly (North)</td>
<td>hourly (South)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>2-4 MB/file</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### NWP Products

<table>
<thead>
<tr>
<th>Resolution</th>
<th>1.25 x 1.25 deg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast hour</td>
<td>up to 48 hours</td>
</tr>
<tr>
<td>Initial time</td>
<td>00, 06, 12, 18UTC</td>
</tr>
<tr>
<td>Interval</td>
<td>4 times/day (around 04, 10, 16, 22UTC)</td>
</tr>
<tr>
<td>Size</td>
<td>4 MB/file</td>
</tr>
</tbody>
</table>

### Observation

<table>
<thead>
<tr>
<th>Observation</th>
<th>SYNOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
<td>hourly</td>
</tr>
<tr>
<td>Size</td>
<td>100-150KB/file (map time)</td>
</tr>
<tr>
<td></td>
<td>20-60 KB/file (other)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
</tr>
<tr>
<td>Size</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
</tr>
<tr>
<td>Size</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEMP (A, B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
</tr>
<tr>
<td>Size</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASCAT sea-surface wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
</tr>
<tr>
<td>Size</td>
</tr>
</tbody>
</table>

- Data are stored for 3 days.
- Data format is all for SATAID.
SATAID Service Terms of Use

Users agree to abide by the following SATAID Service terms of use:

- Observational data in SATAID format should not be redistributed to any third party. Such data include METAR, SYNOP, SHIP, TEMP and ASCAT sea-surface wind types.
- EUMETSAT copyright credit must be given by displaying the words "copyright (year) EUMETSAT" on each ASCAT sea-surface wind product.
- MTSAT imagery and NWP products provided under the SATAID Service are defined as essential by Resolution 40 of the twelfth Congress of WMO (Cg-XII).

All Rights Reserved, Copyright © 2012 WIS Portal - GISC Tokyo (Japan Meteorological Agency). <Legal Notice>
Welcome to RSMC Tokyo - Typhoon Center

Best Track Data, Annual Report, Technical Review etc. are available!

Operational TC information are available!

Name of Tropical Cyclones
Climatology of Tropical Cyclones
Best Track Data
Annual Report on Activities of the RSMC Tokyo - Typhoon Center
Technical Review
About RSMC Tokyo - Typhoon Center

Notes on RSMC Tropical Cyclone Information

The Regional Specialized Meteorological Center (RSMC) Tokyo – Typhoon Center provides information on tropical cyclones in the western North Pacific and the South China Sea, including present and forecast positions as well as the movement and intensity of tropical cyclones.

Please note that information issued by the RSMC Tokyo – Typhoon Center represents neither official analysis/forecasts nor warnings for the areas concerned. Such official information is issued by the National Meteorological Services of individual countries.
Training on the TC Analysis and Forecast

Attachment Training at RSMC Tokyo

JICA Group Training Course “Reinforcement of Meteorological Services”

1. The Satellite Analysis and SATAID
2. Tropical cyclone analysis (Dvorak)
3. Tropical cyclone forecasting
4. Storm surge
5. Quantitative precipitation estimation (QPE) and quantitative precipitation forecast (QPF) etc
Publication

Annual Report on the Activities of the RSMC Tokyo - Typhoon Center

Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2012

PDF version available on website

RSMC Technical Review

RSMC Tokyo-Typhoon Center

<table>
<thead>
<tr>
<th>Technical Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>The RSMC Tokyo - Typhoon Center publishes the Technical Review to introduce recent improvements in operational meteorological services and research related to tropical cyclones.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>PDF</th>
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<tbody>
<tr>
<td>16</td>
<td>Algorithm and validation of a tropical cyclone central pressure estimation method based on warm core intensity as observed using the Advanced Microwave Sounding Unit-A (AMSU-A)</td>
<td><img src="PDF_0.6MB" alt="PDF" /></td>
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<tr>
<td>15</td>
<td>Development and Verification of a Tropical Cyclone Intensity Estimation Method Reflecting the Variety of TRMM/TMI Brightness Temperature Distribution</td>
<td><img src="PDF_0.6MB" alt="PDF" /></td>
</tr>
<tr>
<td>14</td>
<td>Cloud Grid Information Objective Dverak Analysis (CLOUD) at the RSMC Tokyo - Typhoon Center</td>
<td><img src="PDF_0.6MB" alt="PDF" /></td>
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<tr>
<td>13</td>
<td>The Inactive Typhoon Season of 2010</td>
<td><img src="PDF_1.0MB" alt="PDF" /></td>
</tr>
<tr>
<td>12</td>
<td>JMA’s Storm Surge Prediction for the WMO Storm Surge Watch Scheme (SSWS)</td>
<td><img src="PDF_0.5MB" alt="PDF" /></td>
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<tr>
<td>11</td>
<td>Estimation of Tropical Cyclone Intensity Using AquA/AMS-R-E Data</td>
<td><img src="PDF_0.7MB" alt="PDF" /></td>
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<tr>
<td>10</td>
<td>Quantitative Precipitation Estimation and Quantitative Precipitation Forecasting by the Japan Meteorological Agency</td>
<td><img src="PDF_3.4MB" alt="PDF" /></td>
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<tr>
<td>9</td>
<td>THORPEX - Pacific Asian Regional Campaign (T-PARC) Summary</td>
<td><img src="PDF_5.3MB" alt="PDF" /></td>
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<tr>
<td>8</td>
<td>DLR Falcon Dropsonde Operation in T-PARC and Analysis of the Environment Surrounding Typhoons</td>
<td><img src="PDF_0.1MB" alt="PDF" /></td>
</tr>
</tbody>
</table>

Articles of Technical Review are seen on the RSMC Website:
Thank you
Annual Mean Position Errors of Track Forecasts (1982-2013)

- 120-hour forecast
- 96-hour forecast
- 72-hour forecast
- 48-hour forecast
- 24-hour forecast

Annual means of position errors

Error (km)

- 480km
- 336km
- 215km
- 149km
- 91km