

**Country: Russian Federation**

**Centre: RSMC Khabarovsk**

### **1. Summary of highlights**

1.1. A new version of the regional model of the atmosphere (50 km resolution) for the Far Eastern region (developed at the Hydrometcentre of Russia) has been put into the operational practice. The distribution of the products to all the prognostic centers of the Far East has been arranged.

1.3. Two new complexes for receiving and processing satellite data “UNISCAN” and “ALISA” and four new satellite stations VSAT have been put into operation.

### **2. Equipment in use**

2.1. Basic operative technologies remain unchanged since 2005. The approbation and the assumed implementation of new developments (of a new version of the atmosphere regional model and the respective prognostic systems) are performed on the computer XEON-2.

2.2. Two new complexes for receiving and processing satellite data “UNISCAN” and “ALISA” and four new satellite stations VSAT have been put into operation.

2.3. The possibilities of receiving, archiving and processing the products of operative numerical models of the World prognostic centres, as well as the those of the observational data and of objective analyses have been expanded. Two servers and two workstations have been purchased.

### **3. Data and products from GTS in use.**

The total amount of the information being received is 458 MB per day, that of the information being transmitted – 557 MB per day (without taking into account the transit).

Receiving and decoding of the data in codes SATOB (WIND), AEREP, AMDAR, BUYO has begun.

Average number of reports per day

<i>Data type</i>	<i>Number of reports</i>
<i>SATEM</i>	<i>5400</i>
<i>TEMP</i>	<i>1700</i>
<i>SYNOP</i>	<i>5100</i>
<i>TEMP-SHIP</i>	<i>220</i>
<i>KNI5</i>	<i>200</i>
<i>PILOT</i>	<i>0</i>
<i>SATOB (WIND)</i>	<i>The analysis of the data has not been performed</i>
<i>AIREP</i>	
<i>AMDAR</i>	
<i>BUYO</i>	
<i>GRID (Washington)</i>	<i>120</i>
<i>GRIB (Exeter)</i>	<i>816</i>
<i>GRIB (Reading)</i>	<i>40</i>
<i>GRIB (Moscow)</i>	<i>240</i>
<i>T4 (digital facsimile)</i>	<i>312</i>

Products of:

ECMWF, Reading (GRIB 2.5x2.5°, digital facsimile), Exeter (GRIB 2.5x2.5°), Washington (GRID 5°x5°), Tokyo (digital facsimile).

#### **4. Forecasting System**

Prognostic system consists of the following blocks:

A – initial control, information dissemination, regional objective analysis

B – regional model of the atmosphere

C – system for interpretation of hydrodynamic forecasts.

##### **4.1. System run schedule and forecast ranges.**

Basic initial times of the forecasting system are 00 and 12 UTC. The maximum period of forecast is 48 h (Regional model output products, technology “Region – Far East”) and 120 h (statistical interpretation system products).

##### **4.2. Medium-range forecasting system**

A system of statistical interpretation of the modeling results with period of forecast 120 h is in the operational practice.

###### **4.2.4. Operational techniques for application of NWP products: medium range forecasts**

###### **4.2.4.1. In operation.**

The system of statistical interpretation of the results of medium range hydrodynamic modeling (MOS) for 48 points of the Far Eastern region provides forecast values of extreme temperature, semi-diurnal precipitation totals with period of forecast up to 5 days.

##### **4.3. Short-range forecasting system**

An integrated automated technology “Region – Far East” is in operational practice, enabling to calculate analyses and forecasts with the period of forecast up to 48 h (namely, the fields of the geopotential heights, of horizontal components of the wind velocity, temperature and humidity on standard isobaric surfaces, sea surface pressure, precipitation; semi-diurnal precipitation totals for 170 points of the Russian Far-Eastern region.

The calculations are performed twice a day; for pressure and precipitation fields the forecast interval is 1 h; for remaining meteorological values – 3 h.

The products are disseminated among the prognostic centers of the Far-Eastern region by e-mail and as charts-slides.

###### **4.3.1. Data assimilation, objective analysis and initialization**

###### **4.3.1.1. In operation**

Objective analysis for the Far-Eastern region using RSMC Exeter’s forecasts as the first guess fields.

###### **4.3.1.2. Research performed in this field**

Implementation of objective analysis for the Northern Hemisphere on the basis of the algorithms and the software of the Hydrometcentre of Russia.

#### **4.3.2. Model**

##### **4.3.2.1. In operation**

The Regional atmosphere model (50 km resolution, joint development of the Hydrometcentre of Russia and RSMC Khabarovsk) adapted to the Far-Eastern region.

The version of the model for the main part of the region 6000x5400 km (Yakutia, Transbaikalie (Zabaikalie), the Khabarovsk Region, the Amur District, Primorski Region, the island of Sakhalin) is in the operation practice.

##### **4.3.2.2. Research performed in this field**

The implementation of the model version adapted for the north-eastern part of the region (6000x5400 km) (Kamchatka, Chukotka, adjacent water areas).

#### **4.3.3. Operationally available NWP products**

Forecasts of fields with period of forecast of 48 hour based on regional model:

- geopotential heights, horizontal components of wind velocity; temperature and humidity on standard isobaric surfaces, mean sea level pressure, precipitation.

Levels: 100,150,200,250,300,400,500,700,850,925,1000 hPa.

- semi-diurnal precipitation totals for 240 points of the Far Eastern region of Russia.

Forecasts of fields of 1 h precipitation totals, wind surface and wind water surface values, mean sea level pressure are produced with forecast interval 1 and 3 hours. Forecasts are entered into the data bases and are sent to the users in the form of sequential images.

#### **4.3.4. Operational techniques for the application of NWP products: short-range forecast**

##### **4.3.4.1. In operation**

The system of statistical interpretation of the results of hydrodynamic modeling (MOS) for 48 points of the Far Eastern region provides forecast values of extreme temperature, semi-diurnal precipitation totals with period of forecast up to 2 days.

#### **4.5. Specialized numerical predictions (on sea waves, sea ice, tropical cyclones, pollution transport and dispersion, solar ultraviolet (UV) radiation, air quality forecasting, smoke, sand and dust)**

##### **4.5.2.2. Research performed in this field**

Development of the storm surges forecast model for the Amurskiy estuary.

#### **4.6. Extended Range Forecasts (10 days to 30 days) (Models, Ensemble, Methodology)**

Forecasts with 1-month lead time for the Far-Eastern region are developed jointly with the Hydrometcentre of Russia.

### **5. Verification of prognostic products**

#### **5.1.1. 500-h Pa height**

Forecast Ranges	RMSE (m)	KT	S1
12	12.1	0.94	20
24	19.4	0.95	25
36	24.7	0.94	31
48	33.3	0.92	35

### **5.1.2. 250 hPa height**

Forecast Ranges	RMSE (m)	KT	S1
12	13.6	94.5	16
24	28.1	94.8	20
36	35.6	0.93	25
48	48.4	0.91	29

Abbreviations:

RMSE – root – mean - square error of forecast;

RMSEV – root mean – square error of wind velocity vector;

KA – anomaly correlation coefficient;

KT – tendency correlation coefficient;

S1 – skill score of the gradient forecast.

## **6. Plans for the future (2008 – 2011)**

### **6.1. Development of the GDPFS**

#### **6.1.1. Major changes in the operational DPFS which are expected in 2008**

Introduction of a new objective analysis version for the Northern Hemisphere.

Performing calculations in the operational mode and providing the results of modeling for the north-eastern part of the region.

### **6.2. Planned research activities in NWP, Nowcasting and Long-range Forecasting**

#### **6.2.1. Planned Research Activities in NWP**

– Work on the improvement of the method for 12 h. precipitation totals forecast within the MOS systems for the points of the Far Eastern region.

– Developing and incorporating applied components of the atmosphere regional model for forecasting weather elements and weather phenomena in the Far-Eastern region.

– Running the storm surges forecast model for the Amurskiy estuary with the output data of the atmosphere regional model.

– Installation and putting into operation of new computing facilities.