

**WWW TECHNICAL PROGRESS REPORT ON THE GLOBAL DATA-
PROCESSING AND FORECASTING SYSTEM (GDPFS),
AND THE ANNUAL NUMERICAL WEATHER PREDICTION (NWP)
PROGRESS REPORT FOR THE YEAR 2005**

**Department of Hydrometeorology
Republic of Belarus
Republican Hydrometeorological Centre
Minsk**

1. Summary of highlights

Nowadays meteorological information gathering, processing and distribution in the Department of a Hydrometeorology is realized using firmware complexes developed on the base of servers and personal computers.

The united data-analytic system, protected by firmware means and based on communication facilities and data-processing systems, has been developed. Automation of meteorological offices was performed for the purpose of data delivery through E-mail and using internet technologies.

2. Equipment in use in the Centre

2.1 Operational equipment

| Computer | Operational system | Main memory Ram (Mbytes) | Hard disk (Gbytes) |
|-------------------|-----------------------------|-------------------------------------|-------------------------------|
| Intel P-3Ghz | FAX LINUX | 512 | 120 |
| Intel Xeon 3Ghz | IBM SCO UNIX | 1000 | 3x72 |
| Intel P-3Ghz | UNI LINUX | 512 | 80 |
| Intel P-3Ghz | TWIM Win XP | 512 | 80 |
| Intel Celeron 1.2 | MTS SCO UNIX | 256 | 20 |
| Intel Xeon 3Ghz | Proxy LINUX | 1000 | 2x72 |
| Intel PIII-500 | Clicom Win nt server-4.0 | 160 | 4x2 |
| Intel PIII-450 | Clicom Win nt ws- 4.0 | 64 | 6.8 |
| Intel PIII-450 | Clicom Win nt ws- 4.0 | 64 | 6.8 |
| Intel P-3Ghz | NOAA Win 98 se | 1000 | 300 |

2.2 Communications

- ETHERNET
- Point to point links
- TCP/IP links
- Asynchronous links
- TCP Socket

3. Data and Products from GTS in use

3.1 Every day : / SHIP-2800, TEMP-350, RAOB-96, TAF-2560, METAR-5850, SIGMET, GAMET, AIREP, AIRMET, SPECI

3.2 Product : RUMS, GRIB EGRR, GRIB ECMF, GRIB KWBC, GRIB EDZW

4. Data input system

Automated

5. Quality control system

Communication system used in hydrometeorological service of the Republic of Belarus makes it possible to analyze formats of the messages received, to perform their normalization and format part transformation if necessary, to verify the propriety of generating meteobulletins containing different types of meteorological information and to check replicated messages. System allows checking some types of hydrometeorological information for the propriety of the message body coding.

6. Monitoring of the observing system

At State level

7. Forecasting system

7.1 Forecasting system

Russian-Byelorussian regional forecasting model for predicting baric fields and precipitations has been run since 2003. (Losev V., RHMC, Moscow). This model uses sigma-coordinate system, rectangular grid with 113x93 grid points with step-interval of 75 km, advance time 48 hours. Finite-difference model is realized on Arakawa 'C' grid. The terms of data processing are 00UTC, 12UTC.

Objective analysis of meteoelements obtained from GRIB-messages which are received from the sending centre in Moscow, is taken as initial data for the model. ORACLE database has been developed for GRIB-messages. Forecast results of Global model T85L31 (RHMC) provide boundary conditions for regional model every 12 hours. Relief function is preset.

Meteoelement forecast for 36 hours on the territory of Belarus is based on the prognostic trajectory and advective meteoelements' values calculation using objective analysis of temperature and dew-point deficit obtained in GRIB-code and on baric fields forecast results of the regional model mentioned above.

7.2 Numerical forecast products.

Prognostic values of surface pressure and precipitations are hourly recorded on the disk. For visualization of the data program means SURFER6 is used. Skeleton maps containing prognostic values of temperature, precipitations, wind, fog, thunderstorm in a warm period of the year and values of glaze in cold period, are formed around the territory of Byelorussian Republic. Results of numerical forecasts are used by weather-chart makers during compilation of the final forecast around the territory of Belarus. Surface pressure and precipitations prognostic maps are represented at site of Byelorussian Hydrometeo Centre (pogoda.by).

Tables and skeleton maps, assigned to provide international aeronavigation with meteorological information, are formed on the base of prognostic data for 12 and 18 hours, which are received in the GRIB-code from the sending centre in Exeter.

8. Verification of prognostic products.

The table below represents values of correlation coefficient (R) and mean-square error (σ). Estimate area:

63° N., 5° W. 66° N., 40° E.
44° N., 9° E. 45° N., 33° E.

Annual average estimate of baric fields forecast

| Level hPa | | 1000 | 850 | 700 | 500 | 300 | 200 |
|--------------------------|-------------------------------|------|-----|-----|-----|-----|-----|
| Forecast period, h | Stat. charac- teristics | | | | | | |
| | +24 | R | 84 | 90 | 93 | 95 | 95 |
| | σ | 1.9 | 1.3 | 1.2 | 1.3 | 2.0 | 1.9 |
| +48 | R | 84 | 89 | 93 | 93 | 92 | 93 |
| | σ | 2.6 | 2.1 | 2.2 | 2.5 | 3.7 | 3.6 |

9. Plans for the future

Necessity of improvement of meteorological elements numerical forecast for the territory of Belarus is the most important problem today. One of the solutions of this problem is acquisition of mesoscale model.