

**JOINT WMO TECHNICAL PROGRESS REPORT ON THE GLOBAL DATA PROCESSING AND
FORECASTING SYSTEM AND NUMERICAL WEATHER PREDICTION RESEARCH ACTIVITIES
FOR 2016**

LITHUANIAN HYDROMETEOROLOGICAL SERVICE

1. Summary of highlights

No significant changes in data processing and forecasting system during the year 2016.

2. Equipment in use

Supercomputer SGI ALTIX ICE X (128 CPU cores; Infiniband DDR; 384 GB DDR3 RAM) for NWP is in use since the year 2010. Purchase process of new supercomputer is in progress.

3. Data and Products from GTS in use

- SYNOP-6500
- BUFR-6600
- TEMP-170.....
- METAR-6700
- TAF- 1150
- SIGMET-80.....

4. Forecasting system

Lithuanian Hydrometeorological Service is a member of an international HIRLAM consortium and participate in HIRLAM-C Programme. The operational Limited Area Model is HIRLAM with 4 km horizontal resolution. Nonhydrostatic LAM HARMONIE with 2,5 km horizontal resolution for operational needs was used occasionally, due to technical problems and limits of supercomputer. LHMS runs the HIRLAM NWP model for national needs 4 times a day, forecasts range up to +60 hours.

LHMS is a cooperating member of European Centre for Medium Range Weather Forecasts (ECMWF). Model output and products are available from ECMWF dissemination system twice a day; products from the BC(Boundary Condition)-project to provide horizontal boundaries for NWP – 4 times a day.

4.1 System run schedule and forecast ranges

LHMS for its operational needs runs HIRLAM and HARMONIE short-range NWP models:

- HIRLAM NWP model's horizontal resolution is 4 km, 60 vertical levels, forecasts length is +60 hours. Lateral boundaries come from the ECMWF BC project. LHMS runs the HIRLAM 4 times a day.
- HARMONIE with AROME physics has a horizontal resolution of 2.5 km, 65 vertical levels. forecasts length is +54 hours. Lateral boundaries come from the ECMWF BC project. Run of this model was irregular due to limited abilities of supercomputer.

4.2 Medium range forecasting system (4-10 days)

For medium range forecasts products from ECMWF are used. There aren't local models for medium range forecasts at LHMS.

4.3 Short-range forecasting system (0-72 hrs)

4.3.1 Data assimilation, objective analysis and initialization

4.3.1.1 The HIRLAM analysis and forecast systems are described in HIRLAM-C scientific documentation.

4.3.1.2 No research performed in this field

4.3.2 Model

4.3.2.1 See chapter 4.1

4.3.2.2 No research performed in this field.

4.3.3 Operationally available NWP products

Standard output fields – temperature, relative humidity (surface, 2 m height and standard pressure levels), dew point temperature (surface, 2 m), cloud cover (low, medium, high, total), wind speed (10 m and standard pressure levels), pressure (surface and mean sea level), geopotential (standard pressure levels), vertical motion (standard pressure levels), accumulated precipitation (rain and snow fractions – surface), precipitation type, cloud water, cloud ice, visibility, pseudo-satellite cloud, wind gust at 10 m, CAPE, LCL.

4.3.4 Operational techniques for application of NWP products

4.3.4.1 Workstations MESSIR-VISION from Corobor and VISUAL WEATHER from IBL are used for NWP output visualisation.

4.3.4.2 No research performed in this field.

4.3.5 Ensemble Prediction System

4.3.5.1 There is no EPS in operation.

4.3.5.2 No research performed in this field.

4.3.5.3 ECMWF EPS output is used for official duty.

4.4 Nowcasting and Very Short-range Forecasting Systems (0-12 hrs)

4.4.1 Nowcasting system

4.4.1.1 See chapter 4.1

4.4.1.2 No research performed in this field.

4.4.2 Models for Very Short-range Forecasting Systems

4.4.2.1 See chapter 4.1

4.4.2.2 No research performed in this field.

4.5 Specialized numerical predictions

4.5.1 Assimilation of specific data, analysis and initialization (where applicable)

4.5.1.1 Not applicable.

4.5.1.2 No research performed in this field.

4.5.2 Specific Models (as appropriate related to 4.5)

4.5.2.1 Not applicable.

4.5.2.2 No research performed in this field.

4.5.3 Specific products operationally available

No specific products operationally available.

4.5.4 Operational techniques for application of specialized numerical prediction products (*MOS, PPM, KF, Expert Systems, etc.*) (as appropriate related to 4.5)

4.5.4.1 Not applicable.

4.5.4.2 No research performed in this field.

4.5.5 Probabilistic predictions (where applicable)

4.5.5.1 Not applicable.

4.5.5.2 No research performed in this field.

4.5.5.3 There is no probabilistic prediction products operationally available.

4.6 Extended range forecasts (ERF) (10 days to 30 days)

4.6.1 There is no ERF in operation.

4.6.2 No research performed in this field.

4.6.3 There isn't operationally available NWP model and EPS ERF products.

4.7 Long range forecasts (LRF) (30 days up to two years)

4.7.1 There is no LRF in operation

4.7.2 No research performed in this field.

4.7.3 There is no operationally available EPS LRF products

5. Verification of prognostic products

5.1 Annual verification summary isn't available.

5.2 No research performed in this field.

6. Plans for the future (next 4 years)

6.1 Development of the GDPFS

6.1.1 LHMS expect in the next year to purchase a new supercomputer for NWP and move from HIRLAM to HARMONIE as to basic operational NWP model.

6.1.2 Operational NWP LAM with 1,5 km horizontal resolution is envisaged within next 4 years.

6.2 Planned research Activities in NWP, Nowcasting, Long-range Forecasting and Specialized Numerical Predictions

6.2.1 Research activity in the frame of HIRLAM-C project.

6.2.2 Research activity in the frame of HIRLAM-C project.

6.2.3 No planned Research Activities in Long-range Forecasting

6.2.4 Research activity in the frame of HIRLAM-C project.

7. Consortium

HIRLAM-C

8. References

<http://www.hirlam.org>
