

JOINT WMO TECHNICAL PROGRESS REPORT ON THE GLOBAL DATA PROCESSING AND FORECASTING SYSTEM AND NUMERICAL WEATHER PREDICTION RESEARCH ACTIVITIES FOR 2006

Republic of Armenia, Yerevan Armenian State Hydrometeorological and Monitoring Service (ARMSTATEHYDROMET)

1. Summary of highlights

There is no NWP model applied in Armstatehydromet. Weather forecast is based on some Global and Regional prognostic centers product received through MESSIR-COMM, TV-INFORM-METEO and charts freely available in the internet. The SYNOP encoding software has been developed.

2. Equipment in use

MESSIR-COMM - GTS Message Switching and Meteorological Telecommunication system, (OS SCO Unix), 2 servers P 200 MHz

MESSIR-VISION – Forecaster’s Workstation,(OS Windows NT)

RETIM 2000 receiver - The Satellite meteorological data broadcasting system from METEO-FRANCE

MITRA – Meteorological data receiving system from Moscow, OLDI Celeron - 950

UNIMAS – meteorological telecommunication system, PC P IV 3 GHz ASUS (OS Mandrake Linux 9.2 Preload)

TECHNAVIA SKYCEIVER VIEW – workstation for displaying satellite images, PC Intel Pentium 75 MHz

3. Data and Products from GTS in use

The daily statistic raw information: Automated

SYNOP:	00/06/12/18	UTC
	03/09/15/21	UTC
TEMP:	00/12	UTC
	06/18	UTC
GRIB (EGRR):	00	UTC
FAX (T4 charts)	00/06/12/18	UTC

4. Forecasting system

There is no NWP model in operational use at Armstatehydromet. The products from following forecast producing centers are used for short-range and medium range forecasts:

METEO-FRANCE, WAFC-London, ECMWF model products (up to 168h twice per day and up to 48h once per day) and NWP model T85L31 products from the Hydrometeorological Centre of Russia (up to 48h ahead twice per day)

Limited number of products from DWD (up to 168h ahead twice per day)

4.1 System run schedule and forecast ranges

"[general structure of a prognostic system, models in operational use, run schedule, forecast ranges]"

4.2 Medium range forecasting system (4-10 days)

4.2.1 Data assimilation, objective analysis and initialization

4.2.1.1 In operation

"[information on Data assimilation, objective analysis and initialization]"

4.2.1.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.2.2 Model

4.2.2.1 In operation

"[Model in operational use, (*resolution, number of levels, time range, hydrostatic?, physics used*)] "

4.2.2.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.2.3 Operationally available Numerical Weather Prediction Products

"[brief description of variables which are outputs from the model integration]"

4.2.4 Operational techniques for application of NWP products (*MOS, PPM, KF, Expert Systems, etc.*)

4.2.4.1 In operation

"[brief description of automated (formalized) procedures in use for interpretation of NWP output]"

4.2.4.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.2.5 Ensemble Prediction System (EPS)

4.2.5.1 In operation

"[Number of runs, initial state perturbation method, perturbation of physics?]" (*Describe also: time range, number of members and number of models used: their resolution, number of levels, main physics used*)

4.2.5.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.2.5.3 Operationally available EPS Products

"[brief description of variables which are outputs from the EPS]"

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

4.3.1 Data assimilation, objective analysis and initialization

4.3.1.1 In operation

"[information on Data assimilation (*if any*), objective analysis and initialization,]" (*Indicate boundary conditions used*)

4.3.1.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.3.2 Model

4.3.2.1 In operation

"[Model in operational use, (*domain, resolution, number levels, range, hydrostatic?, physics used*)] "

4.3.2.2 Research performed in this field
"[Summary of research and development efforts in the area]"

4.3.3 Operationally available NWP products

"[brief description of variables which are outputs from the model integration]"

4.3.4 Operational techniques for application of NWP products

4.3.4.1 In operation

"[brief description of automated (formalized) procedures in use for interpretation of NWP output]"
(MOS, PPM, KF, Expert Systems, etc..)

4.3.4.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.3.5 Ensemble Prediction System

4.3.5.1 In operation

"[Number of runs, initial state perturbation method, perturbation of physics?]" *(Describe also: time range, number of members and number of models used: their domain, resolution, number of levels, main physics used)*

4.3.5.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.3.5.3 Operationally available EPS Products

"[brief description of variables which are outputs from the EPS]"

4.4 Nowcasting and Very Short-range Forecasting Systems (0-6 hrs)

4.4.1 Nowcasting system

4.4.1.1 In operation

"[information on processes in operational use, as appropriate related to 4.4]"

4.4.1.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.4.2 Models for Very Short-range Forecasting Systems

4.4.2.1 In operation

"[information on models in operational use, as appropriate related to 4.4]"

4.4.2.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.5 Specialized numerical predictions

[Specialized NP on sea waves, sea ice, tropical cyclones, pollution transport and dispersion, solar ultraviolet (UV) radiation and air quality forecasting etc.]

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

4.5.1.1 In operation

"[information on the major data processing steps, where applicable]"

4.5.1.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.5.2 Specific Models

4.5.2.1 In operation

"[information on models in operational use, as appropriate related to 4.5]"

4.5.2.2 Research performed in this field
"[Summary of research and development efforts in the area]"

4.5.3 Specific products operationally available

"[brief description of variables which are outputs from the model integration]"

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

4.6.1 Models

4.6.1.1 In operation

"[information on Models and Ensemble System in operational use, as appropriate related to 4.6]"

4.6.1.2 Research performed in this field

"[Summary of research and development efforts in the area]"

4.6.2 Operationally available NWP model and EPS ERF products

"[brief description of variables which are outputs from the model integration]"

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

4.7.1 In operation

"[Describe: Models, Coupled? (1 tier, 2 tiers), Ensemble Systems, Methodology and Products]"

4.7.2 Research performed in this field

During last few years an empiric-statistical model has been developed for monthly, seasonal and interannual temperature predictions. The model is based on the theory of complex Markov's chain and uses observation time series 1935-2005 over the region. At present some test runs are being carried out for several sites in Armenia and Georgia and results have been verified, showing quite good skill.

4.7.2 Operationally available EPS LRF products

"[brief description of variables which are outputs from the model integration]"

5. Verification of prognostic products

5.1 "[annual verification summary to be inserted here]"

5.2 Research performed in this field

"[Summary of research and development efforts in the area]"

6. Plans for the future (next 4 years)

6.1 Development of the GDPFS

6.1.1 "[major changes in the Operational DPFS which are expected in the next year]"

6.1.2 "[major changes in the Operational DPFS which are envisaged within the next 4 years]"

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

6.2.1 Planned Research Activities in NWP

It is planned to apply HRM and LM in Armstatehydromet in collaboration with DWD

6.2.2 Planned Research Activities in Nowcasting

6.2.3 Planned Research Activities in Long-range Forecasting

- It is planned to continue research activities of the empiric-statistical model (see in 4.7.2) development for prediction of precipitation and further improvement of temperature prediction skill.
- It is planned that global dynamic models predictions will be collected from other global producing centers (GPCs). Multi-model Ensemble Prediction and Regional Downscaling using Regional Climate Models (RCMs) will be carried out for the Caucasus region. A horizontal resolution of 20 km for the Regional model will be sufficient to represent the topography and land surface characteristics of the region. Observational data analysis (NCEP, ECMWF Reanalysis, and other data) will be examined to understand the mechanism of climate variability in the region and to identify sources of predictability. Findings of this research will go a long way in improving the long range forecasting techniques for the region.

7. References

"[information on where more detailed descriptions of different components of the DPFS can be found]"
(Indicate related Internet Web sites also)