

Lithuanian Hydrometeorological Service under the Ministry of Environment

Research and systematic observation in Lithuania

In order to provide our society, state institutions and economic entities with reliable hydrological, meteorological and climatic information, and implementing WMO (GCOS) and EU guidelines for the data exchange, the following activities have been carried out:

Strengths

Lithuania can be proud of its long-time series of observations, otherwise indispensable in analysing the climate variability.

Lithuanian Hydrometeorological Service has prepared a programme for modernization of its hydrometeorological observation network for 2008 – 2010.

In 2007, upon implementation of the project “Strengthening of Lithuanian institutional capacities in ambient air quality modelling and forecasting” funded from EU Transition Facility 2004, the first 5 meteorological stations were upgraded: automated equipment was installed at Biržai, Kaunas, Šiauliai and Mažeikiai stations while a present weather and a visibility range sensors were installed at Klaipėda seaport facility in order to obtain additional data necessary for improving the quality of weather forecasts and thus the safety of navigation and lading operations.

In 2008, the ongoing project “Modernization of meteorological observation network in Lithuania (phase I) (in compliance with 2007-2013 Cohesion Incentive Actions Plan’s measure “Strengthening of institutional capacities in the environmental quality management” which, upon conclusion of the project administration and funding contract, will be funded from both EU funds for 2007-2013 and State Budget of the Republic of Lithuania) will result in partial automation of all meteorological stations and two climatological stations by spring 2009.

Until the end of 2009, it is planned to implement phase II of this project, resulting among other in complete automation of the entire network of meteorological and climatological stations (the project will also be funded from 2007-2013 and State Budget of the Republic of Lithuania).

A project “Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region (ASTRA)“ has been carried out in order to determine the impact of climate change on the Baltic Sea region and to prepare adaptive policy and strategies.

Over the last three years, 13 new water-gauging stations (WGS) have been established and 5 existing WGSs modernized. All WGSs were equipped with automatic water-gauging devices that enable receiving hydrological information in real time. In 2007-2008, 7 new WGS were established and 2 WGSs modernized to serve the flood forecasting purposes.

Weaknesses

Despite all observations and activities, Lithuania has no meteoradars that would be helpful in monitoring such processes as precipitations, thunderstorms and hailstorms.

Also, agrometeorological observations network has not been restored, neither phenological observations.

As Lithuania has gained access to EUMETSAT services since the end of 2005 only, not all its data features are fully employed to date, lack of skilled specialist.

We also encounter some problems with utilization of projects otherwise enabling to allocate the funds received to the development of climatological observations as well as to modernization of the observational network. There are still many bureaucratic obstacles hampering project utilization of the projects.

There is a need for state-of-the-art data management, checking and processing software. There is a shortage of training courses for the staff in familiarization with new operational techniques.

Opportunities

Implementation of the project “Modernization of meteorological and hydrological observations network in Lithuania” will result in:

- upgraded meteorological observations network with up-to-date measurement equipment ensuring accurate and continuous meteorological measurements;
 - preconditions for increasingly accurate forecasting of weather conditions including droughts, origination of specialized forecasts and timely public information and institutions about extreme meteorological phenomena;
 - upgraded meteorological data information system;
- preconditions for the implementation of Government Resolution No. 130 of 7 February 2005 “On adoption of state environmental monitoring programme for 2005–2010” (Official Gazette No. 19–608, 2005), Government Resolution No. 241 of 9 March 2006 “On adoption of

criteria for extreme events” (Official Gazette No. 29–1004, 2006), Government Resolution No. 120 of 6 February 2006 “On adoption of measure plan for implementation of ecological security assurance programme for 2006-2010” Official Gazette No. 16–552, 2006).

Implementation of modern data management and forecasting methods will create preconditions for better and faster management of hydrological data and diversified offer of hydrological products for customers.

The project is implemented in 2008–2010 using ES structural funds.

Implementing the ASTRA project, scientific research was carried out in Klaipėda and on the Curonian Spit.

It provided an opportunity to present recommendations on adaptation to climate change that had been prepared during the project, and to discuss measures for dealing with the climate change and their implementation in Lithuanian seacoast.

Observational data were utilized in preparing the following publications:

“Climate Change: adaptation to its impact in Lithuanian seashore;

“Climate of Lithuania” monograph;

“Natural Environment of Lithuania: its state, processes and development“.

Threats

It is planned that WGSs network will expand up to 103 stations by 2010 and, given the present technological and staff qualification level of our Hydrology Division, it will be difficult to ensure timeliness and quality of hydrological data management and delivery of quality products to customers.

Table 1a. National contributions to the surface-based atmospheric essential climate variables

Contributing networks specified in the GCOS implementation plan	ECVs ^a	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
GCOS Surface Network (GSN)	Air temperature	5	5	5	5	5
	Precipitation	5	5	5	5	5
Full World Weather Watch/Global Observing System (WWW/GOS) surface network	Air temperature, air pressure, wind speed and direction	20	20	24	7	7
	water vapour	1	1	1		
	Precipitation	20	20	24	7	7
Baseline Surface Radiation Network (BSRN)	Surface radiation	–	–	–	–	–
Solar radiation and radiation balance data	Surface Radiation	2	–	2	–	–
Ocean drifting buoys	Air temperature, air pressure	–	–	–	–	–
Moored buoys	Air temperature, air pressure	–	–	–	–	–
Voluntary Observing Ship Climate Project (VOSclim)	Air temperature, air pressure, wind speed and direction, water vapour	–	–	–	–	–
Ocean Reference Mooring Network and sites on small isolated islands	Air temperature, wind speed and direction, air pressure	–	–	–	–	–
	Precipitation	–	–	–	–	–

Table 1b. National contributions to the upper-air atmospheric essential climate variables

Contributing networks specified in the GCOS implementation plan	ECVs ^a	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
GCOS Upper Air Network (GUAN)	Upper-air temperature, upper-air wind speed and direction, upper-air water vapour	1		1	1	1

Table 1b (continued)

Contributing networks specified in the GCOS implementation plan	ECVs ^a	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
Full WWW/GOS Upper Air Network	Upper-airtemperature, upper-air wind speed and direction, upper-air water vapour	1		1	1	1

Table 1c. National contributions to the atmospheric composition

Contributing networks specified in the GCOS implementation plan	ECVs ^a	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
World Meteorological Organization/ Global Atmosphere Watch (WMO/GAW) Global Atmospheric CO₂ & CH₄ Monitoring Network	Carbon dioxide					
	Methane					
	Other greenhouse gases					
WMO/GAW ozone sonde network^a	Ozone					
WMO/GAW column ozone network^b	Ozone	1		1	1	1
WMO/GAW Aerosol Network^c	Aerosol optical depth					
	Other aerosol properties					

Table 5. National contributions to the terrestrial domain essential climate variables

Contributing networks specified in the GCOS implementation plan	ECVs^a	Number of stations or platforms currently operating	Number of stations or platforms operating in accordance with the GCMPs	Number of stations or platforms expected to be operating in 2010	Number of stations or platforms providing data to the international data centres	Number of stations or platforms with complete historical record available in international data centres
GCOS baseline river discharge network (GTN-R)	River discharge	57	57	58	8	0
GCOS Baseline Lake Level/Area/Temperature Network (GTN-L)	Lake level/area/temperature	2	2	10	0	0
WWW/GOS synoptic network	Snow cover	18	18	18	7	7
GCOS glacier monitoring network (GTN-G)	Glaciers mass balance and length, also ice sheet mass balance					
GCOS permafrost monitoring network (GTN-P)	Permafrost borehole temperatures and active layer thickness					

Table 6. Global products requiring satellite observations – terrestrial

ECVs/ Global products requiring satellite observations	Fundamental climate data records required for product generation (from past, current and future missions)
Lakes Maps of lakes, lake levels, surface temperatures of lakes in the Global Terrestrial Network for Lakes	VIS/NIR imagery and radar imagery, altimetry, high-resolution IR imagery
Glaciers and ice caps Maps of the areas covered by glaciers other than ice sheets, ice sheet elevation changes for mass balance determination	High-resolution VIS/NIR/SWIR optical imagery, altimetry
Snow cover Snow areal extent	Moderate-resolution VIS/NIR/IR and passive microwave imagery
Albedo Directional hemispherical (black sky) albedo	Multispectral and broadband imagery
Land cover Moderate-resolution maps of land-cover type, high-resolution maps of land-cover type, for the detection of land-cover change	Moderate-resolution multispectral VIS/NIR imagery, high-resolution multispectral VIS/NIR imagery
fAPAR Maps of fAPAR	VIS/NIR imagery
LAI Maps of LAI	VIS/NIR imagery
Biomass Research towards global, above ground forest biomass and forest biomass change	L band/P band SAR, Laser altimetry
Fire disturbance Burnt area, supplemented by active fire maps and fire radiated power	VIS/NIR/SWIR/TIR moderate-resolution multispectral imagery, Terra satellite MODIS data, SWIR
Soil moisture_a Research towards global near-surface soil moisture map (up to 10 cm soil depth)	Active and passive microwave