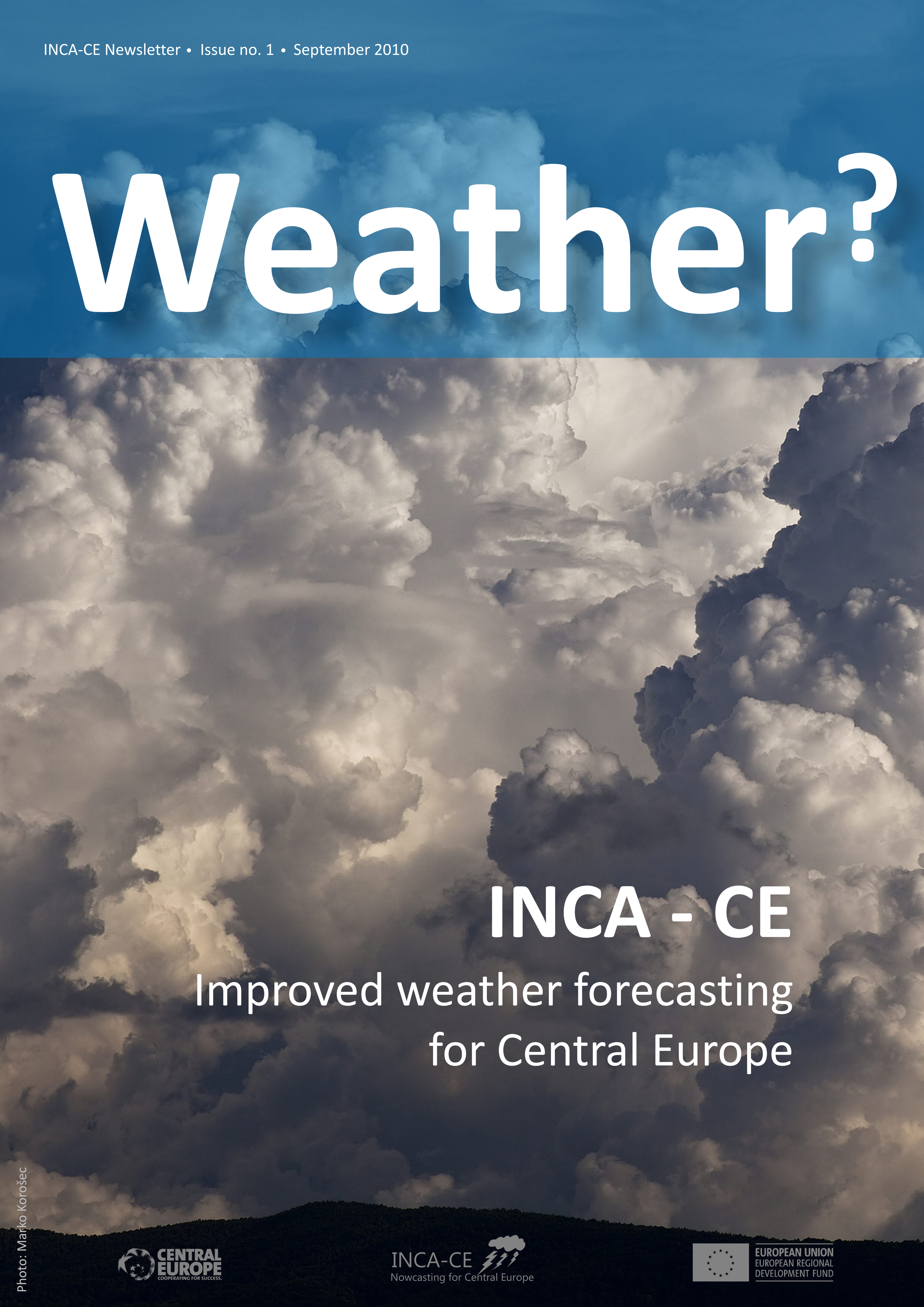
INCA-CE Newsletter • Issue no. 1 • September 2010

Weather?



INCA - CE

Improved weather forecasting for Central Europe

Photo: Marko Korošec

CENTRAL EUROPE
COOPERATING FOR SUCCESS.

INCA-CE
Nowcasting for Central Europe

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

Improved Weather forecasting for Central Europe - Who will benefit from it?

Operational Hydrology

Improved prediction of heavy rainfall and associated flooding risks will help to set up efficient procedures in the management of mitigating actions for the protection of buildings, roads, and other infrastructure. ■

Civil Protection

Civil protection will benefit from a more comprehensive assessment of meteorological threats, and a more detailed and timely forecast, leading to more efficient warning protocols and dissemination strategies. ■

Road Safety

Road safety will be enhanced by a more detailed road weather forecast made available both to the road management authorities as well as to the general public. ■

Dear Reader,

Welcome to the first INCA-CE Newsletter. A continuously growing number of human activities critically depend on meteorological conditions. The importance of real-time, high-resolution weather information has increased immensely during the past decades.

16 project partners from eight European countries are setting up a web-based, transnational weather information system to reduce risks, costs and impacts of severe weather events, allowing improved preventive or early response activities. We identified you and your organization as a potential user of our results. You are kindly invited to follow our project. We would appreciate your feedback.

INCA-CE Team

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INCA-CE Nowcasting for Central Europe

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What is the INCA-CE project all about?

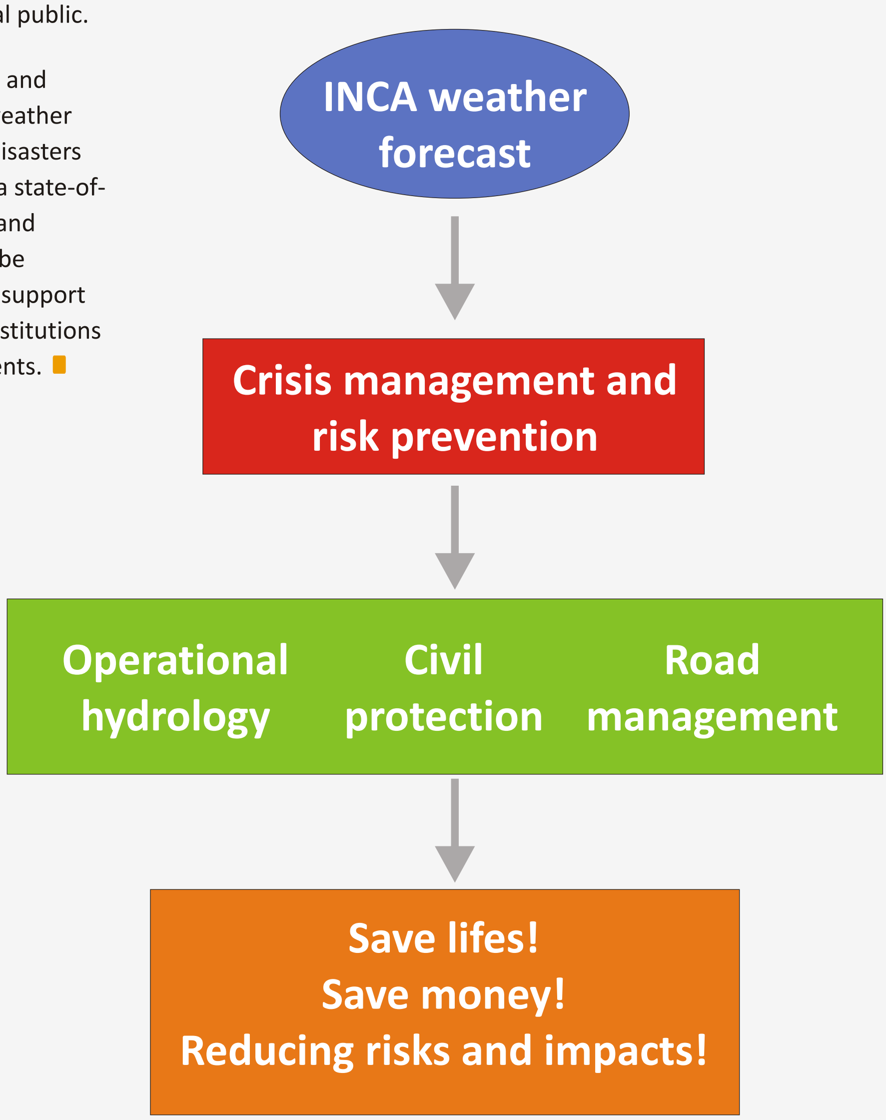
The INCA-CE project aims at reducing adverse effects of weather-related natural disasters (e.g. windstorms, flooding, mudflows, icing, drought) by establishing a state-of-the-art, high-resolution, real-time analysis and forecast system on atmospheric, hydrological, and surface conditions. The main goal is the improvement of risk management standards and methodology in order to enable more detailed assessments and warnings. The project will implement a transnational information system as well as applications for different social and economic sectors to reduce risks of major economic damage and loss of life.

INCA-CE is among the world's most ambitious projects in developing partnerships between meteorological services and immediate users and stakeholders (e.g., operational hydrology, civil protection, road safety and maintenance, air pollution and environmental monitoring, manufacturing, energy, tourism, event management, agriculture and forestry). 16 project partners from eight Central European countries will work together on a more detailed and accurate nowcasting system and optimised strategies for using weather warning. Improved prediction of heavy rainfall and associated flooding risks will help to set up efficient procedures in the management of mitigating actions for the protection of buildings, roads, and other infrastructure. Civil protection will benefit from a more comprehensive assessment of meteorological threats, and a more detailed and timely forecast. Road safety will be enhanced by thorough road weather forecast made available both to the road management authorities as well as to the general public.

While the frequency and strength of critical weather events and natural disasters cannot be reduced, a state-of-the-art information and warning system will be developed to better support public and private institutions in case of severe events.

Project Identity Card

Title: INCA-CE — Integrated Nowcasting System for the Central European Area
Acronym: INCA-CE
Programme: Central Europe
Duration: 1 April 2010 – 30 September 2013 (42 months)
Partnership: 16 partners from 8 Central European countries
Lead Partner: Central Institute for Meteorology and Geodynamics (ZAMG)
Project Manager: Yong Wang
Webpage: http://www.inca-ce.eu/



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Interview

Dr. Yong Wang, INCA-CE Project Manager

Mr. Yong Wang, would you please introduce yourself?

In 1990, I came from China to Austria for PhD studies at the University of Vienna. After I got my PhD in 1994, I began to work at ZAMG as a research scientist. During the last 16 years, I have gained much experience in numerical weather prediction and have been involved and coordinated many international projects. Now I am responsible for the department of forecasting models at ZAMG, which consists of three sections, that is for model development, model application and remote sensing.

How did you get the idea for the INCA-CE project?

The idea of INCA-CE comes from the strong need of the society and economy for an accurate and early warning of severe weather. On the other side, the development of INCA at ZAMG and the widespread use of INCA in different weather related sectors in Austria have encouraged us to launch the INCA-CE project. I have to mention that the traditional and successful cooperation within the CE countries is a very important reason for the INCA-CE project.

What are the expected results?

We expect to set up a web-based, transnational weather information system using the state-of-the-art nowcasting techniques and develop optimised strategies for the use of early weather warning information in operational hydrology, civil protection and road management.

What are the key challenges of the project?

The key challenges of the project are clearly in two aspects:

1. The development of weather forecasting system for a more detailed and accurate weather warning in time and space, based on the nowcasting system, cloud permitting numerical weather prediction model, probabilistic forecasting technique using radar, automatic station observation, satellite data, hydrological observations, etc.

2. Better coordination between weather service and crisis management, hydrological application, etc. and the realization of nowcasting forecast in these application areas.

What are your personal challenges?

The INCA-CE project is not a pure meteorological project which I am familiar with. It is a project crossing different areas from crisis management, highway management and hydrological operations. This is a great challenge for me. We will work very intensively with all the partners, in particular those from non-weather services for developing user-oriented nowcasting products, strategies/guidelines, investigating socio-economic impact and carrying out pilot actions/studies in those sectors.

Yong Wang with his colleagues from ZAMG

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INCA-CE lead partner

Zentralanstalt für Meteorologie und Geodynamik (ZAMG)

The "Zentralanstalt für Meteorologie und Geodynamik" (ZAMG) was founded in 1851 in Vienna, Austria, and is therefore one of the oldest autonomous weather services worldwide. It is an agency affiliated to the Federal Ministry of Science and Research and has about 270 employees.

First continuous meteorological recordings were done at the Benedictine monastery of Kremsmünster already in 1763. In Vienna, continuous meteorological measurements date back to 1775.

ZAMG's legal responsibilities include maintenance of the meteorological measurements network (including two observatories), quality control and archiving of data, providing weather forecasts, delivering warnings of severe weather events, climatological studies, environmental meteorology and official expertise for the federal administration. Furthermore, ZAMG carries out commercial activities in meteorology and geophysics.

Through the cooperation with many international associations and research programmes, ZAMG gained extensive experience in project coordination and management.

The project has started ...

The INCA-CE Kick-Off Meeting took place in Vienna on 5 – 7 May 2010. The main goal was to get to know all project partners (through presentations, at the conference dinner) as well as to present and discuss the project contents (lectures, work package presentations). At the management meeting, the budget, agreements, communication strategy and project management were discussed.

... and now the technical work begins.

The INCA-CE Workshop took place in Vienna on 21 – 23 July 2010. The aim of this scientific and technical workshop was to introduce the INCA system, practical work on PCs (installation, test runs, experiments), and to finalize the project work plan and communication strategy. All participants got familiar with the INCA system and gained knowledge allowing them to work on technical implementation issues and further develop the INCA system.

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Extreme Weather Events in last 6 months

Austria

Torrential rainfalls in Vienna on 13th May 2010

Cumulus clouds started to form over Vienna in the early afternoon of a humid and moderately warm day. A small but pronounced low-pressure system moved right over Austria from the Southwest and provoked the development of widespread showers and thunderstorms whose slow motion resulted in local flooding.

Two hours after this picture was taken, torrential rainfalls in parts of Vienna caused the worst flash flood events in several decades. Many streets and buildings were flooded and 20,000 households were affected by a power outage for several hours. The highest recorded rainfall was 63 mm at the Vienna/City station, of which 56 mm came down in one hour only.

Floods in Blumau on 26th May 2010

During the last week in May 2010 there was continuous thunderstorm in Blumau, which lies in a valley directly at the border with the neighbouring country (Lower Austria). Within a short time, heavy rain (about 80 l/m2) poured down as well as a hail shower containing ping pong ball size hail. The valley was blocked from the Lower Austrian side, a bridge collapsed, streets were swept away and mud avalanches came down.

Fire brigades from the surrounding villages had to work hard to clear the roads, save several damaged cars and pump out cellars filled with muddy water. Because of the continuous downpour in this region, 45 local fire brigades were in action.

Floods in Bad Sauerbrunn on 27th May 2010

A local hail shower with heavy rain caused flood in the whole area of the village of Bad Sauerbrunn, a health-resort in the northern part of Burgenland. The traffic had to be stopped completely because of zero visibleness, the streets were half a metre under water. Nearly 40 cellars were flooded and had to be

pumped out. In this village alone, 60 members of several fire brigades were in action.

Heavy rainshowers in the districts of Horn and Hollabrunn on 8th August 2010

Heavy rainshowers in the districts of Horn and Hollabrunn (precipitation-sums about 100 mm within 24 hours) caused scattered floods (most of them about HQ10 to Hq30). The river Pulkau carried a > HQ100-flood and flooded about 90 objects in

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villages along the riverside. One example is Obritz where large areas and some houses were flooded. The fire-brigade used special pumps with an overall capacity of 5000 m3/h to clean up the flood. The picture shows the sports ground flooded by about 50 cm.

Thunderstorm day in Vienna on Friday, 13th August 2010

Grist to the mill of superstitious people! Friday the 13th was probably the most active thunderstorm day of the summer 2010, fuelled by a very dynamic weather pattern and a warm and extremely moist air mass ahead of a pronounced low pressure system over Western Europe. A line of thunderstorms from Northern Italy crossed Southern and Eastern Austria already in the morning hours, causing minor damage due to strong winds, heavy rain and lightning discharges. This picture shows the remnants of the convective line as it reached Vienna around noon with impressive cloud formations but no severe weather any more.

The calm in its wake was deceptive, as the same evening brought another round of storms that closed in from Croatia and Slovenia and inflicted Eastern Austria, and Vienna in particular, with the most impressive thunderstorms of the season after sunset. The traffic came to a virtual standstill and even public transportation had to be completely cancelled, as many streets were flooded or blocked by broken branches. Most impressive, however, was the continuous lightning activity which set the night-time sky on fire.

Czech Republic

Floods in Liberec Ceska Lipa region in August 2010

Between 7th and 9th August 2010, the meteorological situation over Central Europe was dominated by a trough that was more pronounced in the upper troposphere. A cut-off low in 500 hPa level was moving from Northern Italy to the north-east while exhibiting moderate filling.

The pattern of surface level pressure could be characterized by a rather weak trough reaching Central Europe, especially Poland, from the large but shallow low located over Turkey and the Balkan Peninsula.

Hundreds of people had to be evacuated and many houses were destroyed or severely damaged. Substantially damaged were also roads and several railways. The damage estimate was more than 4 mld. CZK (160 million EUR). The floods also caused five casualties.

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Hungary

Storm in Hungary in May 2010

An extraordinary strong wind storm and long-lasting rain caused extensive damage in Hungary on 15 – 18 May 2010. Peak wind gusts over 120 km/h occurred at several places, above all at the Lake Balaton. A wind gust of 45 m/s at Kab-hegy in the Bakony Mountains was the strongest ever measured wind in Hungary (on 17 May 2010). Heavy precipitation (total sums exceeding 150 mm at certain localities) caused floods (Fig. 1). In the Somogy County, entire roofs of three buildings were replaced and the walls of 12 houses were seriously damaged or broken down due to severe weather. The most affected areas in the Somogy County were: Somogyszentpál Juta, Csököly, Balatonöszöd, Somogyaracs, Somogyacsa, Gerézdpuszta, Németsűrűpuszta, Szentgáloskér. Several damages were registered also at the Siófok city (Fig. 2). The storm affected the rail transport at the Lake Balaton because the wind broke several trees and damaged the poles of electric power lines. High waves occurred at Balaton already on the 15 May 2010 (Fig. 3).

The storm was induced by deep synoptic-scale cyclone, which developed over Italy and the Adriatic Sea and propagated towards north-east (Horváth et al., 2010). On May 16, its centre was situated over Hungary. The strong wind was caused mainly by high pressure gradient at the rear side of the cyclone (Fig. 4). However, strengthening of the wind at the Bakony Mountains and at Balaton could have been a consequence of some lee effects similar to those occurring by downslope windstorms (Fig. 5). This is indicated by certain high resolution forecasts of the WRF non-hydrostatic model, which is run operationally at HMS. Most numerical models (ECMWF, ALADIN, MM5, WRF, AROME) provided a very good forecast of the event, concerning wind and

Fig.2 Damage on the bicycle road between Siófok and Siójut caused by heavy precipitation and landslide (Photo: Ákos Horváth).

Fig.1 Kaposvár, Somogy County: Overflood of river Kapos following the long lasting heavy rainings in Somogy County. Fire Service and Civil Protection experts together with soldiers built sand bag dike along the river to protect hundreds of homes and thousands of inhabitants.

Fig. 3 The beginning of the storm at Lake Balaton on May 15. The wind gusts already reached 90 km/h at that time (Photo: André Simon).

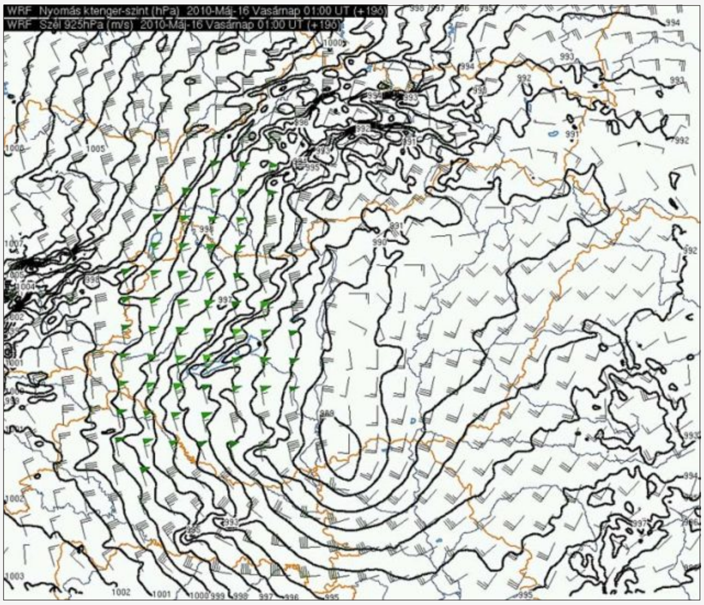

Fig. 4 WRF model forecast of mean sea level pressure and 925 hPa wind based on 15 May 2010 0600 UTC, valid for 16 May 2010 0100 UTC. Note the strong pressure gradient to the north of Lake Balaton.

precipitation distribution. It can be expected that the INCA nowcasting software could further specify some details of the precipitation distribution in mountain areas in the north of Hungary where the forecasts of numerical models were less precise. Very short range forecasts of wind gusts over Balaton and the precipitation at the start of the event could probably also be improved. Thus, further study should concentrate on the tests of wind gust parameterization and comparisons of runs, using inputs from several, high resolution NWP models.

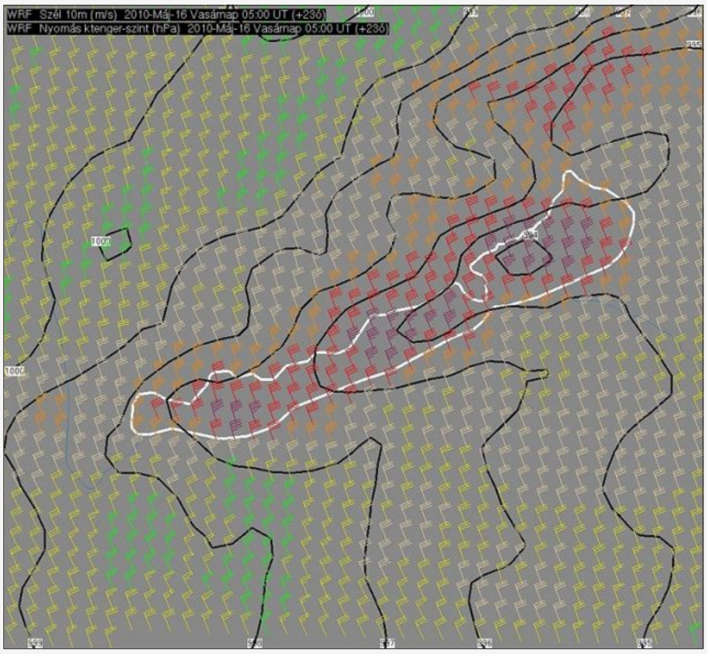

Fig. 5 WRF model forecast of mean sea level pressure and 10 m wind for Balaton area based on 15 May 2010 0600 UTC, valid for 16 May 2010 0500 UTC. The low pressure over the lake can be a result of lee circulation downstream of the Bakony mountains.

Poland

Torrential rain in the District of Żywiec from 31th August to 2nd September 2010

From 31 August to 2 September 2010, an atmospheric front passed over the southern Poland, causing heavy rainfall. The amount of rainfall was over 200 mm. The rain, especially in mountainous areas, caused rapid flooding. The landslide interrupted the road in a distance of 250 m and destroyed three buildings. 15 buildings were cut off from supplies and communication. Despite the cessation of rainfall, the land continued to slide. As is clear from the preliminary surveys, the landslide is permanently damaged.

Slovenia

Murska Sobota flooded on July 13th 2010 (Photo: Štefan Abraham)

Large hail and intense precipitation in Grosuplje on 13th June 2010

On June 17th 2010 at around 16h CEST a supercell thunderstorm evolved in a storm supportive environment south of Ljubljana. The thunderstorm then moved northeastwards and produced large hail, intensive precipitation and strong wind gusts along its path. Most affected region was around Grosuplje, where hail kept falling for around 25 minutes with hail stone sizes up to chicken egg size. In those 25 minutes something more than 50 mm of precipitation had been measured.

Flash floods in the Murska Sobota region on 13th July 2010

In the afternoon of July 13th 2010, thunderstorms in the Murska Sobota region produced some hail, but most of all very intensive precipitation with consequent flash floods. The automatic weather stations near Murska Sobota and Lendava measured around 50 mm of precipitation in 45-60 minutes, but some other measurements show even bigger amounts. The return period of the event was 50 years.

Up to egg size hail stones broke many windows and car windshields in Grosuplje (Photo: Iztok Sinjur)

Historical Village Kostanjevica na Krki (Photo: Borut Podgoršek, MORS)

One of the most affected areas was the capital Ljubljana and its surroundings (Photo: MORS)

Water disaster struck Slovenia in the nights of 18th and 19th September 2010

Heavy rainfall caused flooding nearly throughout the country, so that even the oldest people cannot remember a similar event. Most of the rivers in Slovenia overflew and it took several days for the water to retreat. More than 7,000 rescuers participated in the emergency efforts and disaster relief operations, assisted by the armed forces and humanitarian organisations. Thousands of people have been affected or are threatend by water. The flood caused deaths and damaged over 2,000 buildings. A number of landslides were triggered, cutting off access to some settlements.

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IT'S FANTASTIC!
I CAN FIND OUT THE EXACT WEATHER OUTSIDE THIS EXACT HOUSE AT THIS EXACT MOMENT ALL ON THE INCA-CE INTERNET PORTAL