INCA-CE: Integrating Nowcasting with crisis management and risk prevention in a transnational framework

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ZAMG, Austria

And with contribution from all INCA-CE partners

This project is implemented through the CENTRAL EUROPE Programme co-financed by the ERDF
The Challenge of Severe Weather Warnings

- More detailed and accurate weather warning in time and space
- Better coordination between weather service and crisis management
- Optimised strategies of using weather warning information
INCA-CE Approach: multidisciplinary collaboration

Nowcasting

Weather service

Warning

Public authority

Integrating nowcasting with crisis management and risk prevention
INCA-CE approach: transnational framework
INCA-CE approach: common R&D on nowcasting

A state-of-the-art, very high-resolution in time and space, application-oriented, real-time analysis and nowcasting system INCA

Operational implementation at each partner

Common efforts on research and maintainence
INCA-CE: WMO/WWRP/FDP

A Forecast Demonstration Project of World Meteorological Organization (WMO), World Weather Research Programme (WWRP)
INCA-CE: implementation over Central Europe

A Nowcasting Initiative for Severe Weather Warnings and Improved Communication Strategies on a trans-national Level

The INCA-CE project is funded by

- Project budget: 3.3 million € (4.7 million US$)
- Project Lead: ZAMG
- Project period: 2010-2013
- www.inca-ce.eu
### WWRP/WMO FDP partnership and management

#### Scientific Advisory Board
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#### Project Coordinator
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#### Project Management and Secretariat
- **Ingo Meirold-Mautner**

#### Work Package Leaders
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#### Project Partners

#### Transregional Working Groups
- **Hydrology**: Lucie Brezıkova
- **Civil Protection**: Johann Dantinger
- **Road Safety**: Michael Steininger

#### Steering Group
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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, leading to more efficient warning protocols and dissemination strategies.

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.

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.
INCA-CE concept

Building bridge between nowcasting and crisis management

Feedback

Communication Development → Optimisation Translation → Implementation Integration → Evaluation Training

Weather Services → Public Authorities
INCA-CE Project: working packages

Transregional strategy development
• Establishment of transregional working groups on hydrology, civil protection and road safety
• Evaluate current implementations
• Provide solutions strategies for similar regions

Adaption and refinement of nowcasting system
• Algorithmic improvements in meteorological and hydrological nowcasting
• Precipitation nowcasting through merging of different data sources
• Incorporating topographic effects for wind nowcasting
• Realistic simulation of flash-floods and mudslide hazards

Pilot implementations
• Implementation of the developed warning system
• Assessment of the added value from new developments

Feedback/evaluation
• Quantitative and qualitative description of improvements achieved from outcomes of this project
• Compile recommendations for use of this system outside the CE area
• Strengths and limits of the system in view of hydrology, civil protection and road safety
INCA: Integrated Nowcasting through Comprehensive Analysis

INCA
Data QC, Integration, optimisation

Analyses and Nowcasting

- NWP forecasts
- Surface observations
- Radiosonde
- Satellite observations
- Radar observations
- Geoinformation data
Domain size
600 x 350 km

Elevation range
100 - 4000 m

Resolution
Horizontal: 1 km
Vertical: 150 m
Time: 15 min – 1h

Update frequency
5 min – 1h

Availability
+ 20 min … +30 min
INCA–CE results in numbers

**INCA operational at 13 NMC‘s:** Austria, Belgium, China (Anhui, Hainan, Hebei), Croatia, Czech Republic, Hungary, Israel, Italy (FVG), Poland, Slovakia, Slovenia, Switzerland, Turkey

**24 institutions** from meteorology, hydrology, crisis management, road safety, fire brigade, ministries

**1 nowcasting system (INCA),** ~20+ parameters

**3 applications,** civil protection, hydrology, road safety

**10 pilot implementations,** ~15+ case studies
Results: common operational INCA System
Results: INCA applications

INCA forecast

Crisis management and risk prevention

Operational hydrology  Civil protection  Road management
Civil protection: transnational strategy

Recommendations

- **INCA-SWING (Severe Weather INterpretation Guide)**
  Basic meteorological terms explained to the general public and Civil Protection authorities -> *increased meteorological understanding*

- **INCA-MCPEX (Meteorological Civil Protection EXercise)**
  Organization of practical exercises and trainings -> *information chain and communication tested*

- **INCA-ISW (Impact of Severe Weather)**
  Cross-border, real-time exchange of information about weather related damages to improve the preparedness and forecasting, predominantly in the bordering regions -> *Increased forecasting time of fast developing weather phenomena; more accurate specification of mesoscale aspects of large scale events*
INCA development and optimization

- Wind gust nowcasting
- Convective nowcasting
- Surface temperature
- Code optimization/parallelisation
- Output format (Grib)
- Data exchange
- Data Quality Control
- Visualisation
Road safety: pilot implementation
Hydrology: pilot implementations

Recommendations:
- Very high update frequency of RR (5min)
- Uncertainty information

Improved output (flash flood forecasting)
In frame of INCA-CE project 24 international institutions, not only from weather services, but also from hydrological services, public authorities of crisis management, civil protection and road management, have worked together on:

• more detailed and accurate nowcasting system
• optimised strategies for using weather warning information by decision-maker of various social and economic sectors
• coordinated warning of severe weather

Save Life!  Save Cost!  Reduce Risks!
Thanks! It's fantastic! I can find out the exact weather outside this exact house at this exact moment—all on the internet!