
EARLY WARNING SYSTEM AND THE ROLE OF METEOROLOGICAL AND HYDROLOGICAL SERVICE

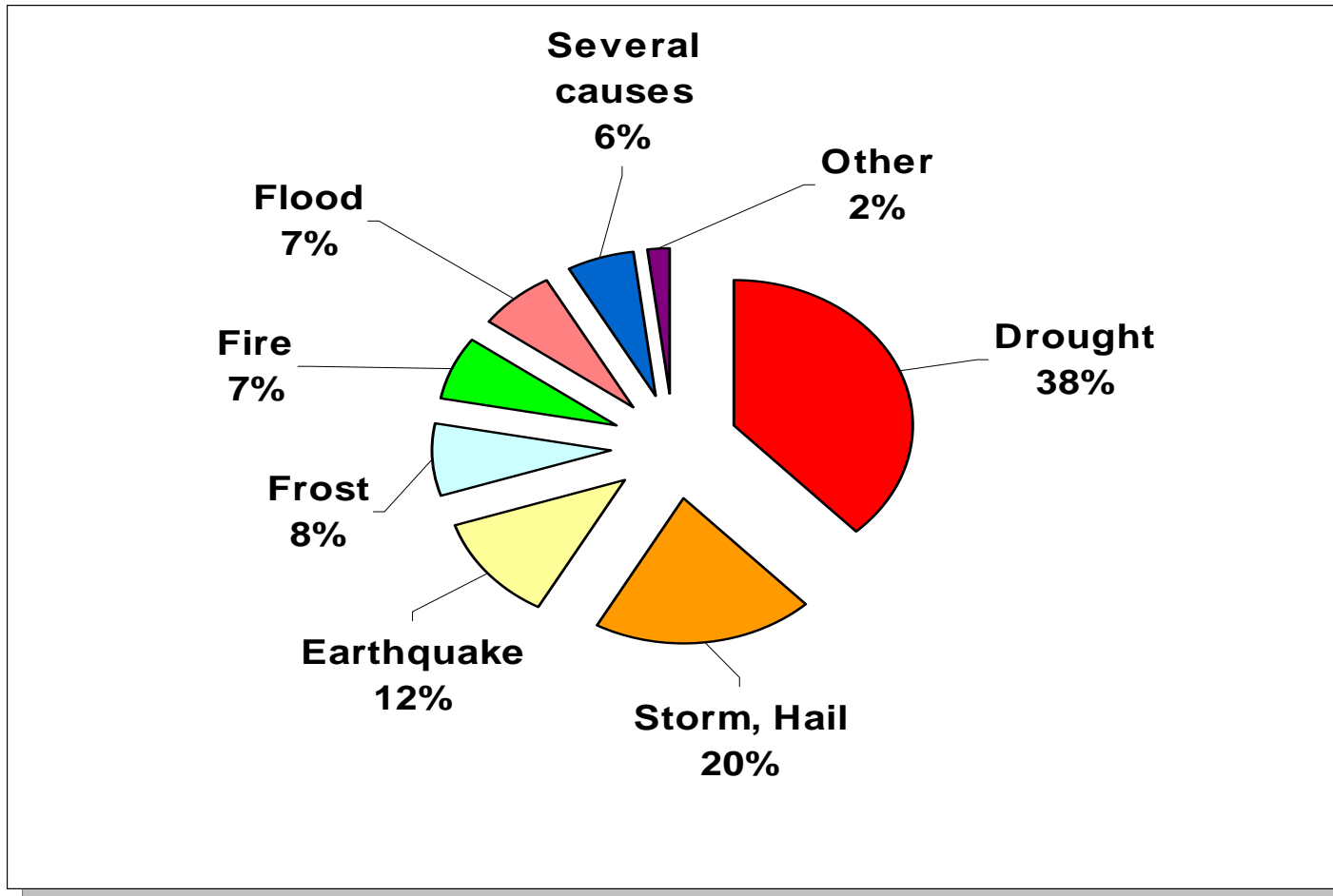
CROATIA

**Meteorological and Hydrological Service
National Protection and Rescue Directorate**

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V. Stajčić*



Economic losses (%) caused by different natural hazards in Croatia, 1980 - 2002



National Protection and Rescue Directorate



is an independent, professional and administrative organisation, tasked with preparing plans and managing operational forces as well as co-ordinating the activities of all participants in the protection and rescue system



the basic tasks are stipulated by the Law on protection and rescue came into force on December 18, 2004 (the most important tasks are risk and vulnerability assessment, drafting measures aimed at preventing crises and accidents, ensuring that these measures are implemented, and effective emergency management in case of major disasters)

Goals of the National Protection and Rescue Directorate:

- **Establishment of coordinated system of participants in protection and rescue**
- **Introduction of 112 single emergency number system**
- **Establishment of single national disaster response system**
- **Cost-effective disaster response system**
- **Compatibility of equipment and procedures with those of EU and NATO**

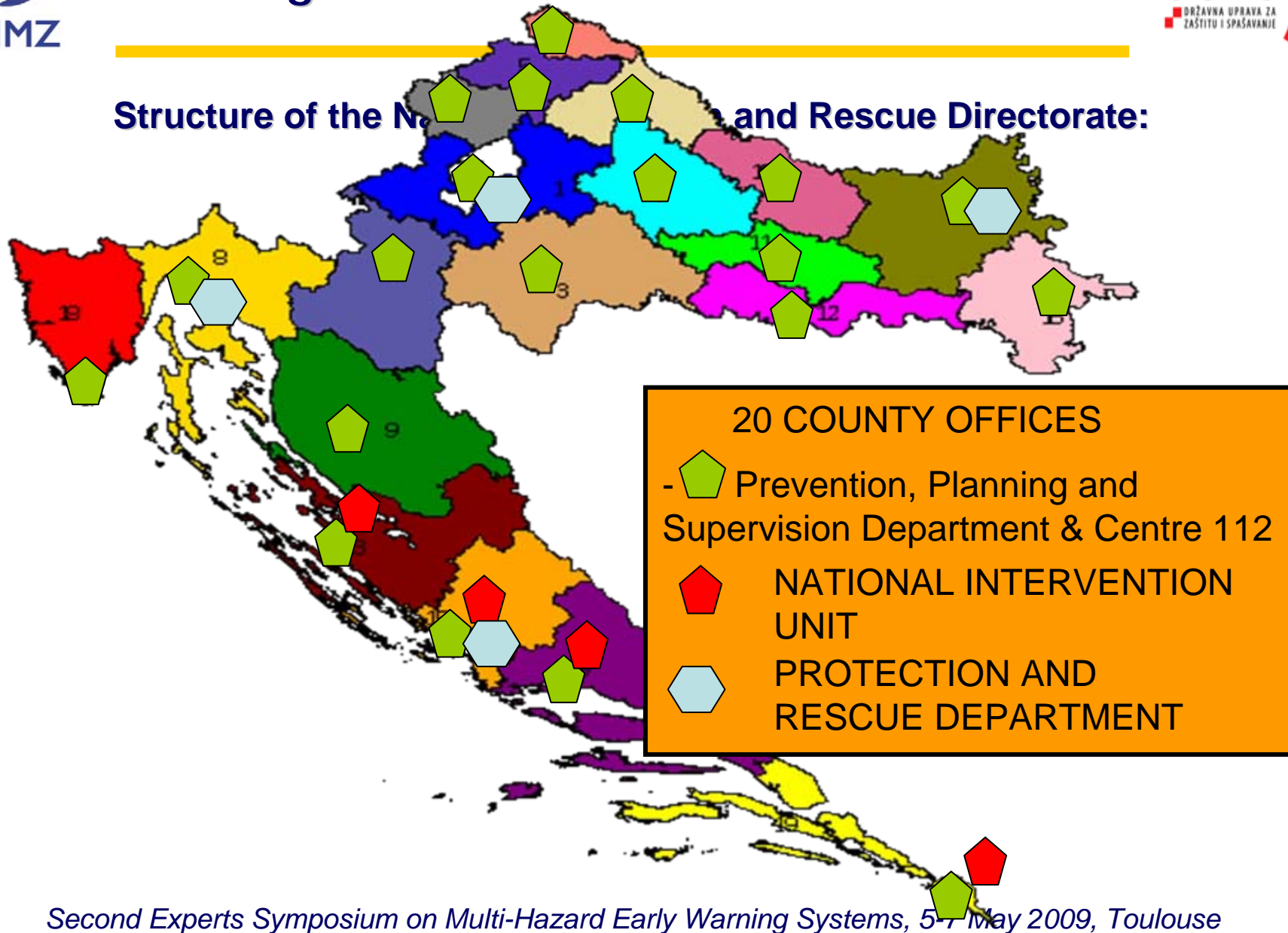
Structure of the National Protection and Rescue Directorate:

- **Alarm 112 Sector**
- **Civil Protection Sector**
- **Fire fighting Sector**
- **Fire fighting, Protection and Rescue School**
- **Personnel, Legal and Finance Sector**

Structure of the National Protection and Rescue Directorate:

- **20 County Offices** in the whole territory of the Republic of Croatia
- **Established at County Offices:**
 - Prevention, Planning and Supervision Department
 - County 112 centre
 - At 4 County Offices, established national intervention units (Split, Zadar, Šibenik and Dubrovnik)
 - At 4 County Offices, established Protection and Rescue Department (Split, Zagreb, Rijeka and Osijek)

Structure of the National and Rescue Directorate:



Meteorological and Hydrological Service



is a national centre of excellence based on high standards of scientific, professional and technical resources for the production, collection and dissemination of high-quality meteorological and hydrological information



the basic tasks are stipulated by the Law on meteorological and hydrological activities in Croatia (to provide support to economic development, environment protection, to act towards the preservation of life and material goods from natural hazards and disasters and to mitigate their consequences)

Meteorological and Hydrological Service

Membership in International Organisations:

- WMO
- ECMWF
- EUMETNET
- EUMETSAT
- ALADIN/RC LACE
- GEO
- ECOMET

International Projects:

- MAP – D PHASE
- EMEP
- EU FP 6/7, COST
- MEDEX
- EUMETSAT/CEI projects (SATREP, EUMeTrain, Nowcasting....)
- WB/ISDR/WMO Sava project

National Protection and Rescue Directorate & Meteorological and Hydrological Service

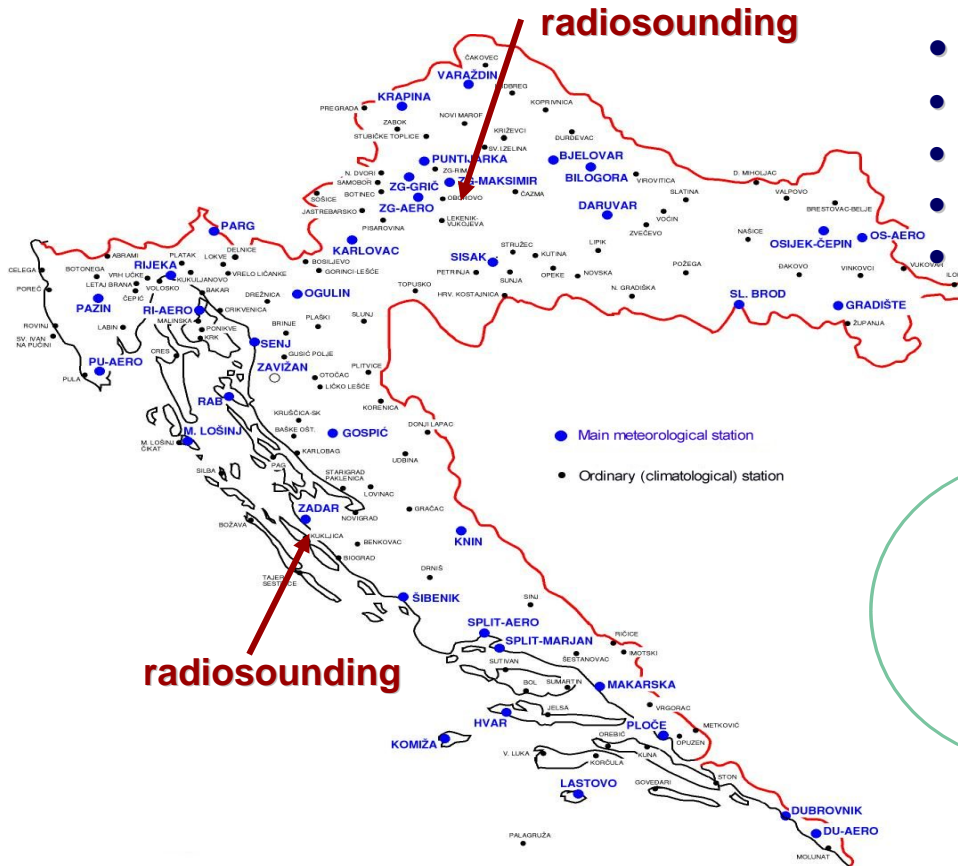
common goals and mutual interest:

- **improving natural disaster prevention, prediction, early warning, response and recovery**
- **risk assessment, as outcome of the interaction between a hazard phenomena and vulnerability**

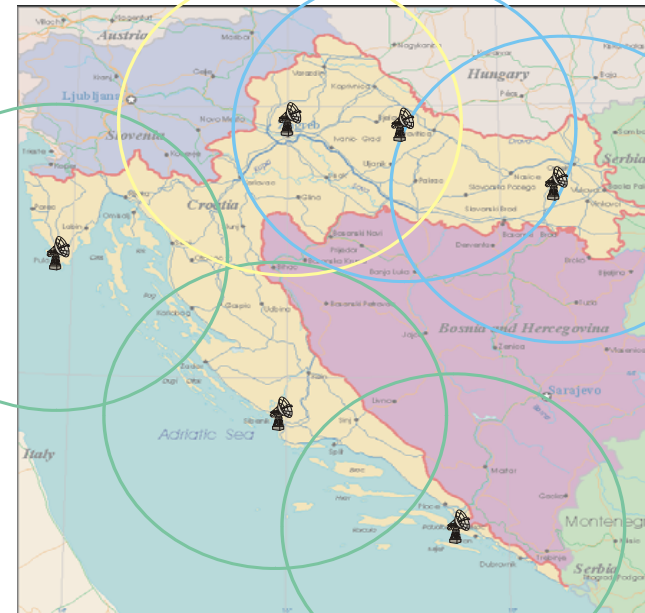
achievements:

- **June 23th, 2006 come into force “Standard Operator’s Procedure on weather forecast information”**
- **document deals with mutual rights and obligations in weather forecast information – dissemination for the purpose of prevention**

Meteorological and hydrological observations



- surface meteorological observations
- hydrological observations
- 2 upper air radiosounding system
- radar network
- state network of the transboundary air pollution transport monitoring

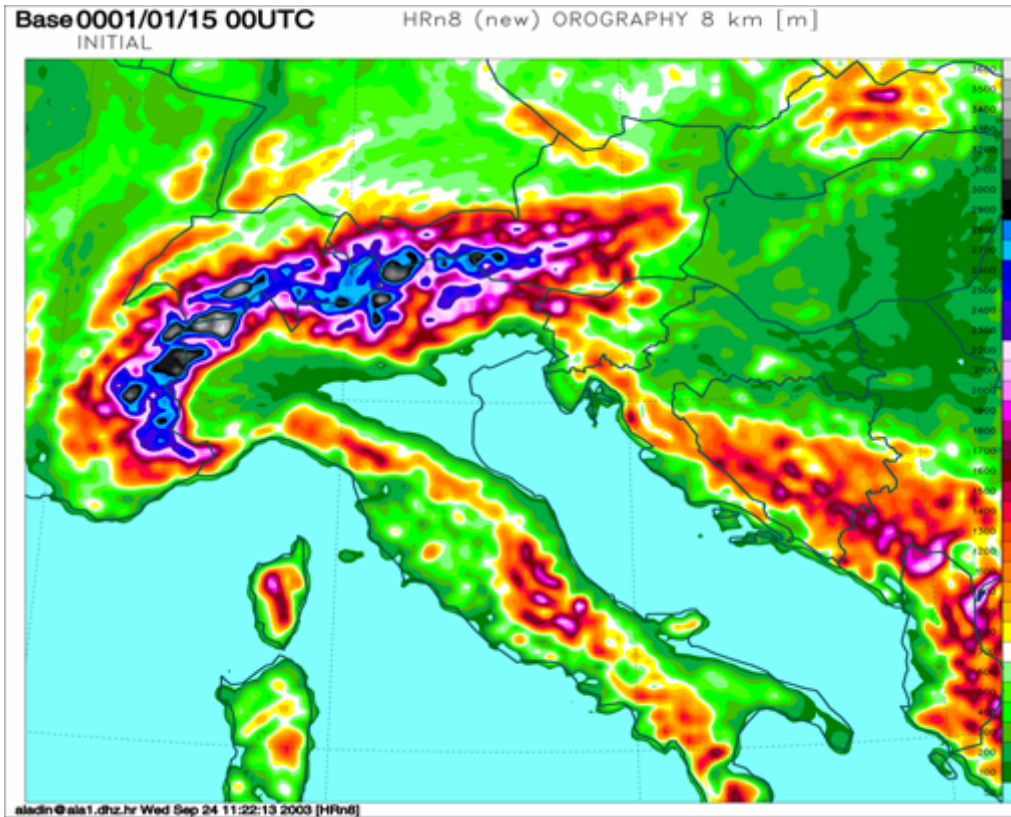


1992 MAGELLAN Geographic/SMSaint Barbara, CA (800) 929-4637

NWP capabilities

- **Nowcasting - (0 – 3 hours)**
- **LAM (ALADIN) – (up to 72 hours)**
- **Air pollution models – (up to 72 hours)**
- **Medium range forecasts – (up to 10 days)**
- **Long-range Ensemble Prediction – (up to 6 months)**
- **Regional climate modeling – (up to 100 years)**

ALADIN/HR mesoscale numerical model



Horizontal resolution: 8 km

Coupling model: ARPEGE

Coupling frequency: 3 hours

Forecast range: 72 hours

Output every: 1 hour

Run: 00 and 12 UTC

Meteorological and Hydrological Service

WARNINGS

**National Protection
and Rescue Directorate**

State Office for Nuclear Safety

**Ministry of Environmental Protection,
Physical Planning and Construction**

Ministry of Sea, Transport and Infrastructure

Others (Media, Health organizations,

112 Centar



Advanced IT solution



Standard Operator's Procedure



Digital charts



Integrated Communication Network



PMR



Port Authorities, CZ, HGSS, MORH, MRCC

Ambulance

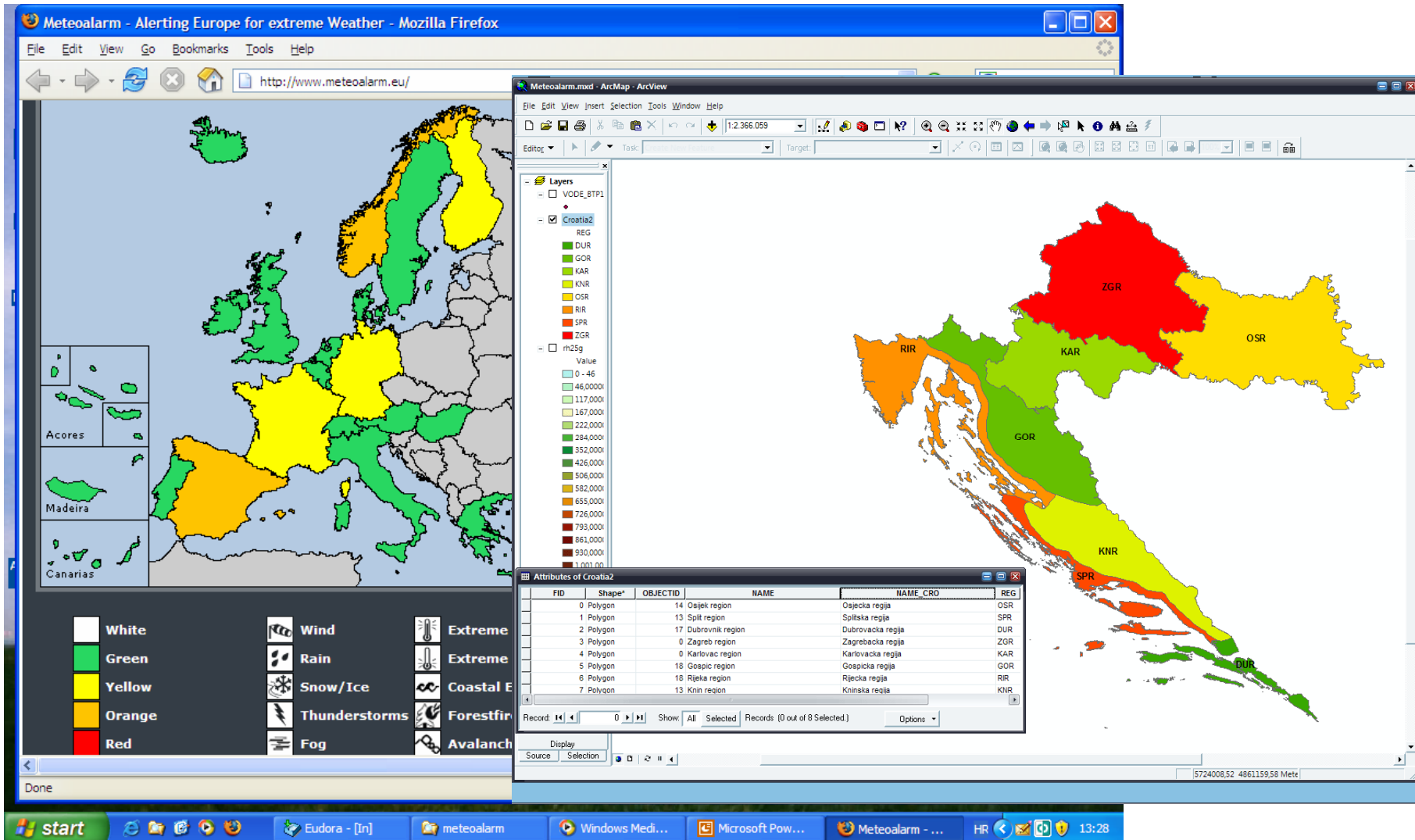
Police

Fire Brigades



DHMZ, DZNS, Ministries,





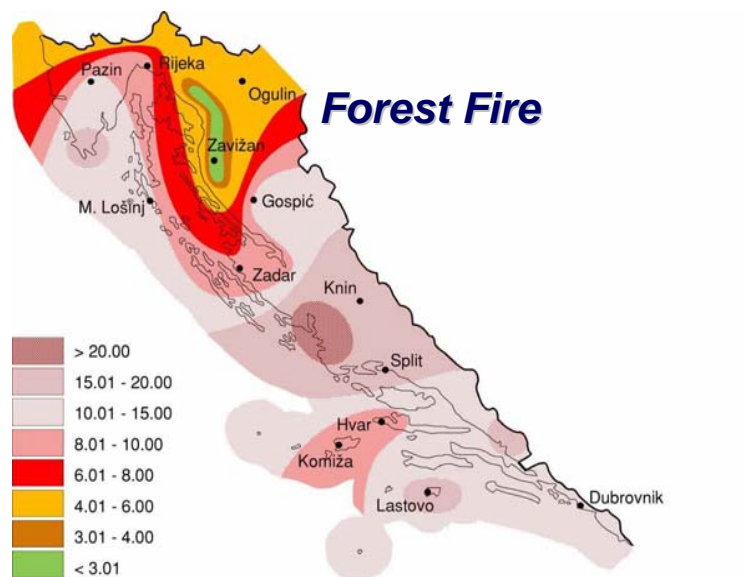
The screenshot displays the METEOALARM web application in Mozilla Firefox and the ArcMap software. The main map shows Europe with color-coded regions. A detailed view of Croatia is shown on the right, with regions labeled: RIR, ZGR, KAR, OSR, GOR, KNR, and DUR. A legend in the bottom left identifies colors: White, Green, Yellow, Orange, Red, Wind, Rain, Snow/Ice, Thunderstorms, Fog, Extreme, Coastal E, Forestfir, and Avalanch. An attribute table for Croatia is open, showing the following data:

FID	Shape*	OBJECTID	NAME	NAME_CRO	REG
0	Polygon	14	Osijek region	Osječka regija	OSR
1	Polygon	13	Split region	Splitska regija	SPR
2	Polygon	17	Dubrovnik region	Dubrovačka regija	DUR
3	Polygon	0	Zagreb region	Zagrebačka regija	ZGR
4	Polygon	0	Karlovac region	Karlovačka regija	KAR
5	Polygon	18	Gospic region	Gospićka regija	GOR
6	Polygon	18	Rijeka region	Rječka regija	RIR
7	Polygon	13	Knin region	Kninska regija	KNR

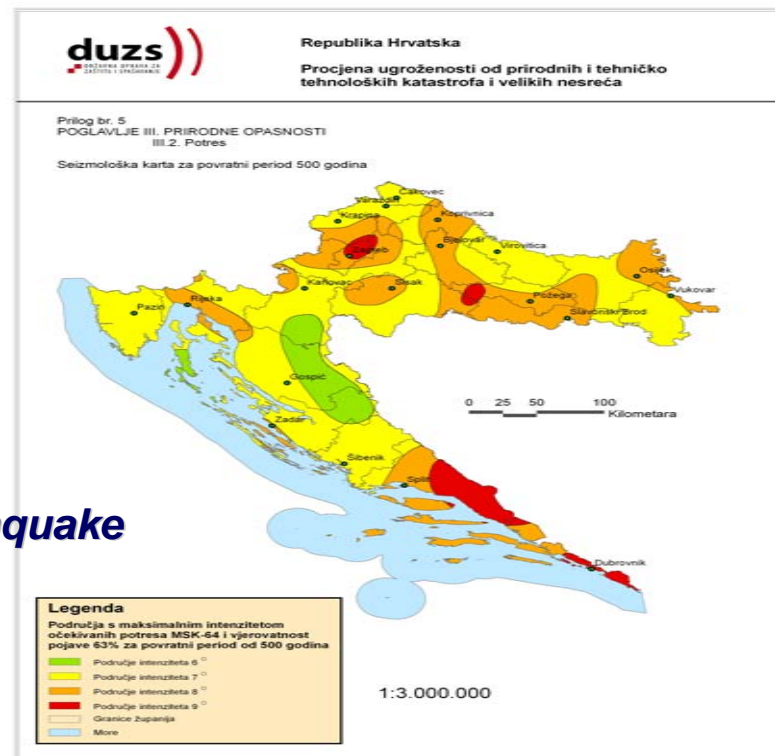
Disaster Risk Reduction national Platform in Croatia – preparation phase

enhance the cooperation at the national level between NMHS and the relevant institutions and end-users to further enhance national system for preventing and mitigating the impact of extreme weather and climate events

Risk = Hazards x Vulnerability



Earthquake



Disaster Risk Mitigation and Adaptation Project (DRMAP) – World Bank

Project Objective:

enhance preparedness and response to disasters and emergencies, as well as to strengthen monitoring and forecasting of weather-related hazards in order to reduce disaster risk

Component A: Disaster Preparedness and Emergency Response

A.1 Enhancement of 112 Emergency call system

A.2 Enhancement of National and Regional Fire Fighting

A.3 Enhancement of Public Awareness and Emergency

Component B: Strengthening Severe Weather Forecasting

B.1 Integrated Nowcasting System

B.2 Designing DHMZ facility

- 1. Strengthening the capacity to deliver severe weather forecast (observational network, forecasting tools,.....)**
- 2. Analyzing and providing hazard information for risk assessment**
- 3. Delivery of timely and understandable warnings and specialized forecasts**
- 4. Integration of NMHS products and services in disaster risk reduction**
- 5. Strengthening cooperation and partnerships at national to international level with disaster risk reduction organizations**
- 6. Public outreach campaigns**

Thank you!