

HYMEX MEETING, CRETA, JUIN 2009

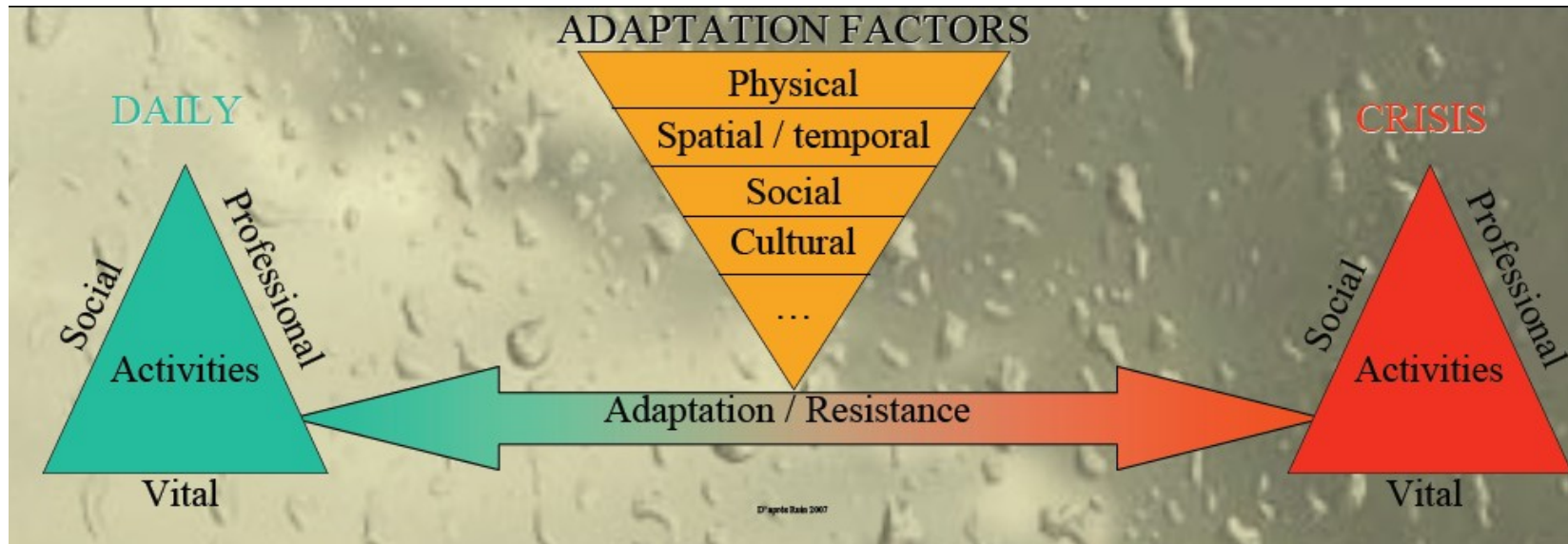
HyMeX

HYdrological cycle in Mediterranean EXperiment

WP5 : Social vulnerability and adaptive capacity

Implementation plan
M.C. Llasat, C. Lutoff, I. Ruin

- Introduction: the problem
- Points to be considered
- Key issues and scientific questions
- Difficulties
- Implementation Plan: SOP, EOP, LOP

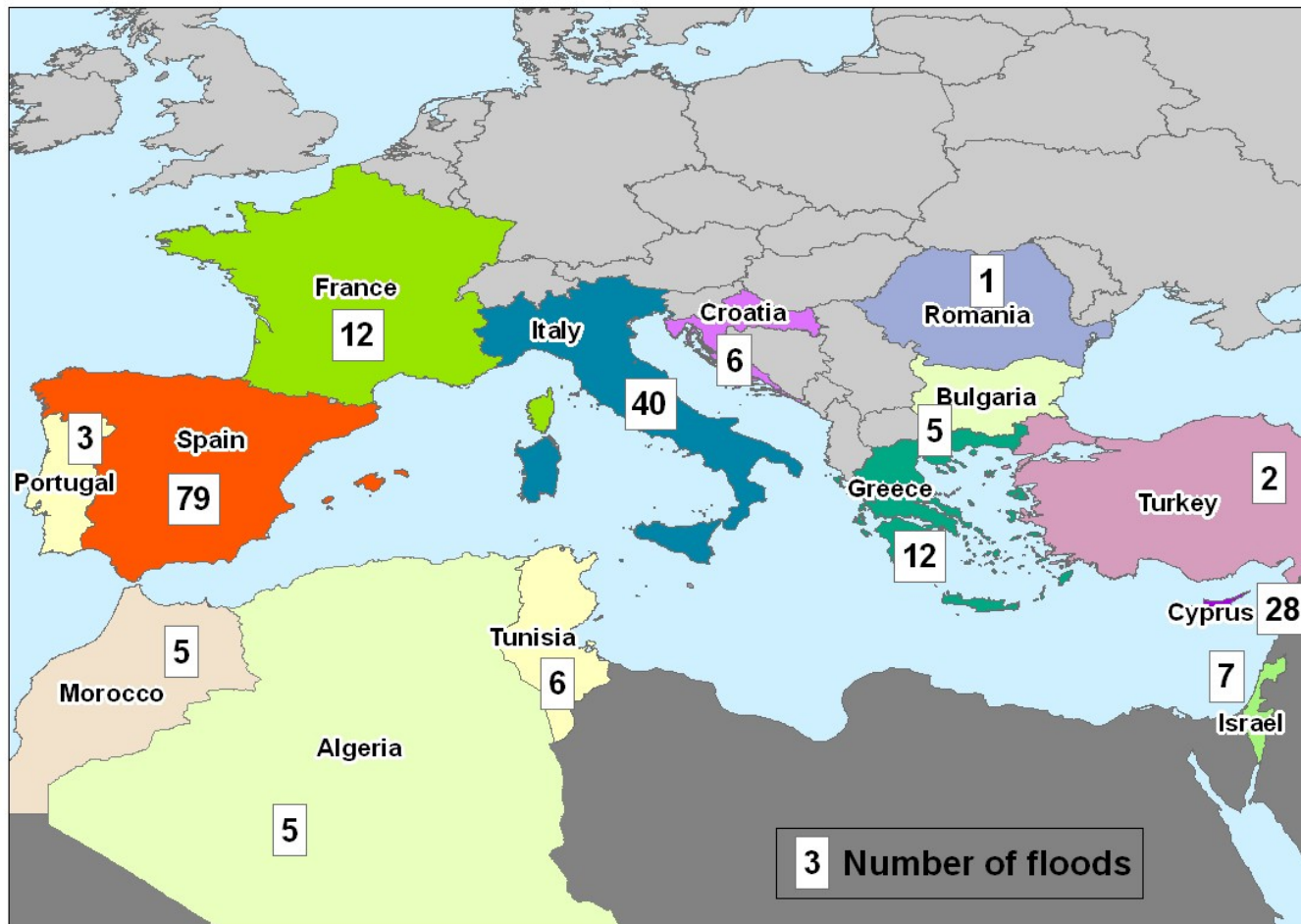


Although some people have an “optimistic” answer in front of floods...



Floods are the first natural risk in some Mediterranean countries

Crowds panic as flooding threatens Ireland...



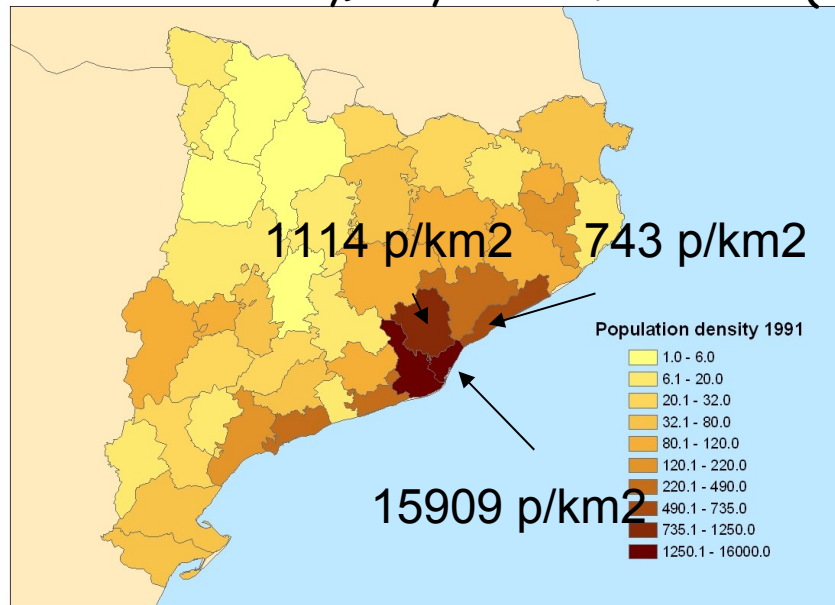
Between 1990 and
2006:
175 flood events

Over 29,140
millions euros in
material damages
mainly in Italy,
France, Romania,
Turkey and Spain

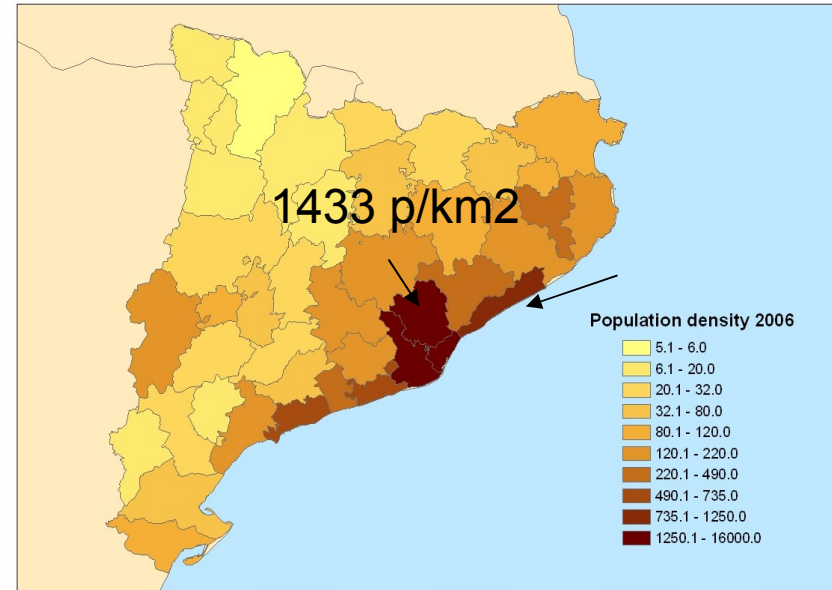
4,500 casualties
mainly in Algeria,
Morocco, Egypt and
Italy

*A preliminar distribution of flood cases between 1990 and
2006 (Llasat et al, 2008). Heterogeneous data base*

Catalonia: 5,956,414 inhabitants (1981) → 7,134,697 inhabitants (2006)



1991



2006

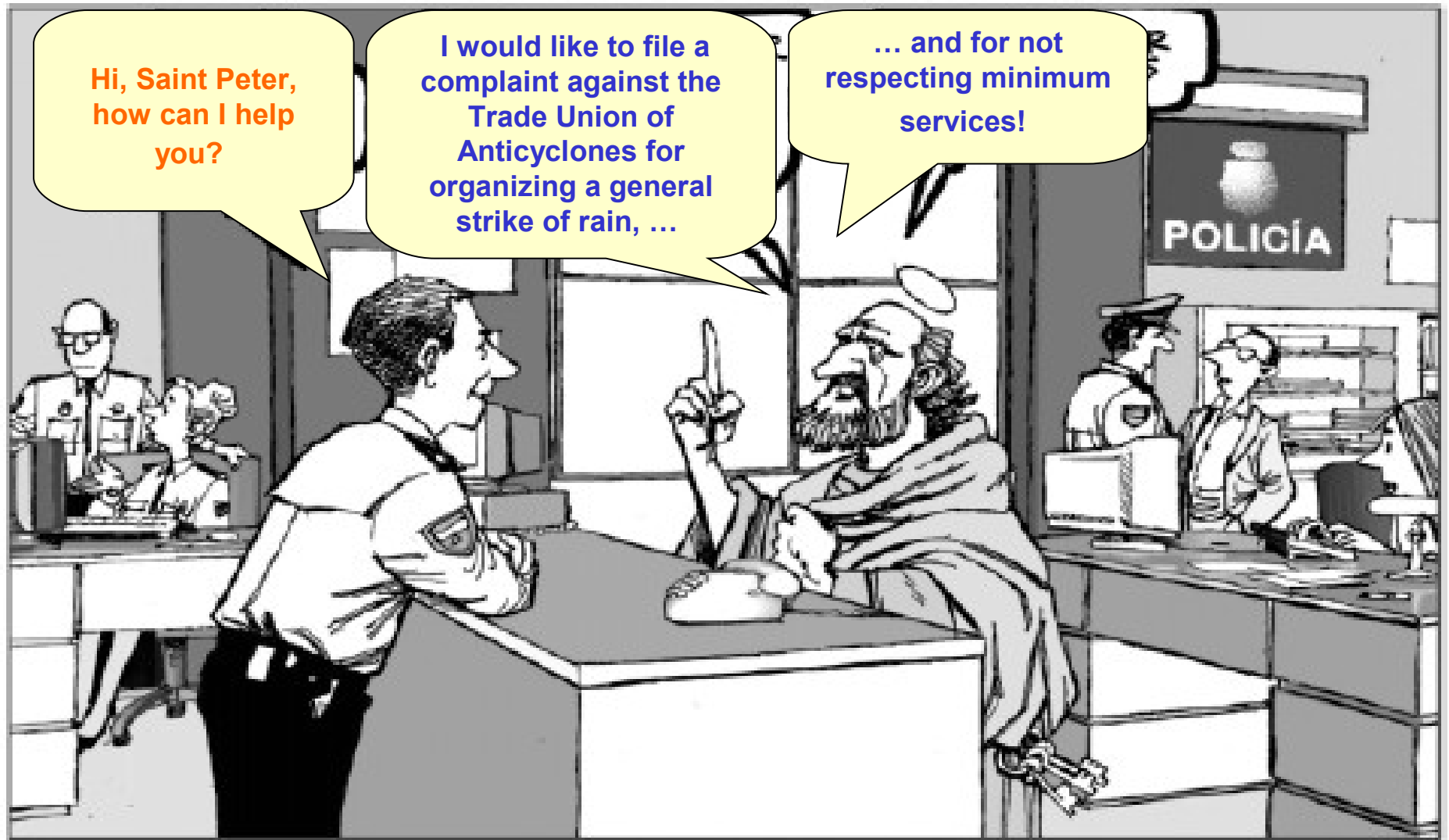
Increasing urban population and urban sprawl, especially on coastal areas:
 development in flood prone areas
 inappropriateness of infrastructures and urban planning regulation
 increase of mobility and flow dependent economies



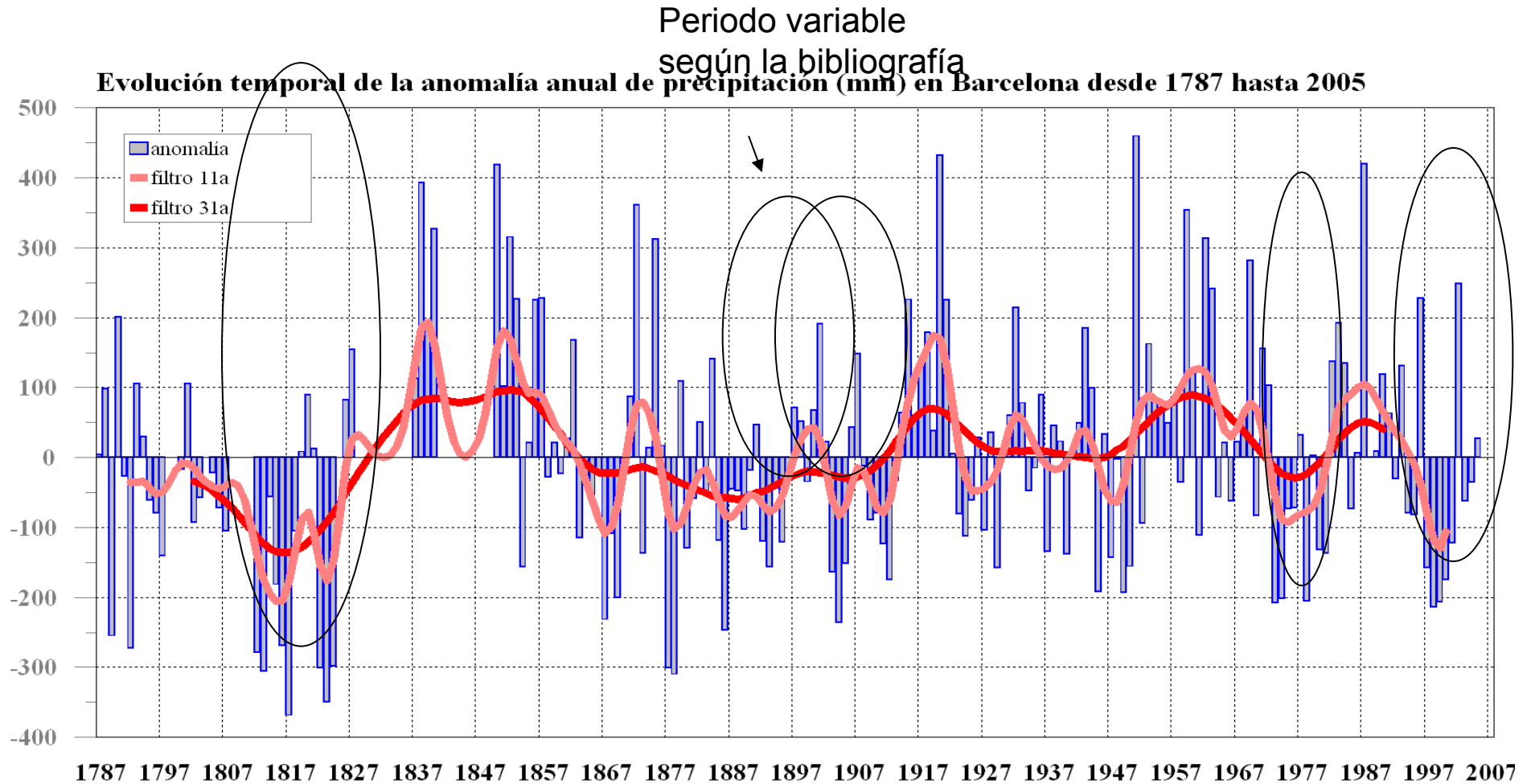
2 August 2005, Catalonia (56 mm/1h) 1d

FLASH project

Ventura & Coromina



Drought periods: a typical Mediterranean feature



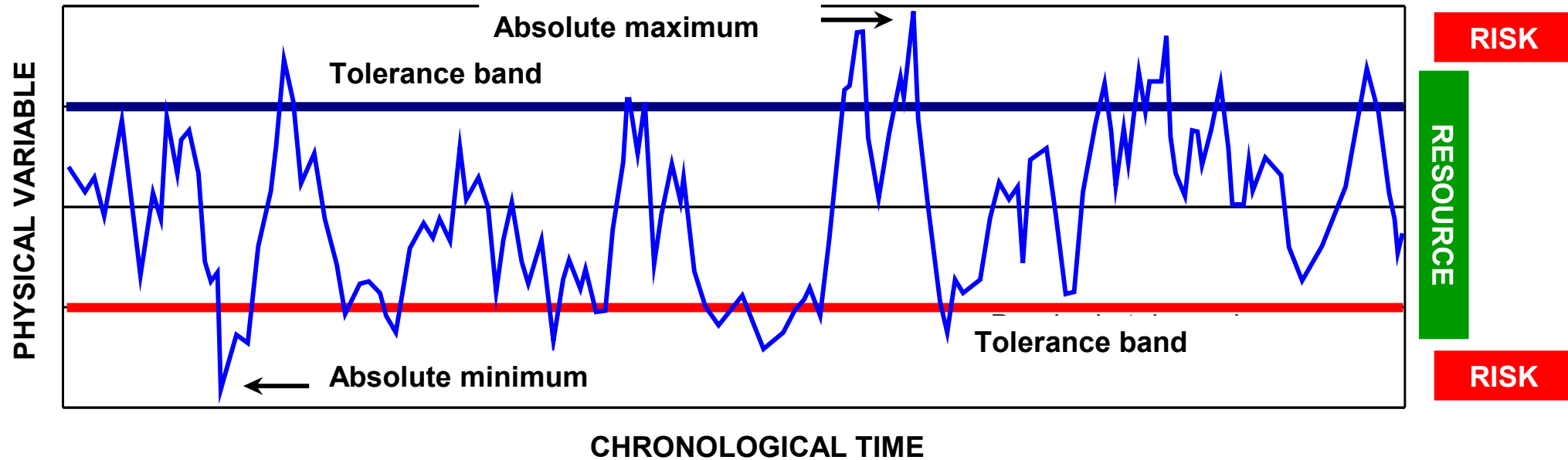
Water scarcity: a serious problem in our society



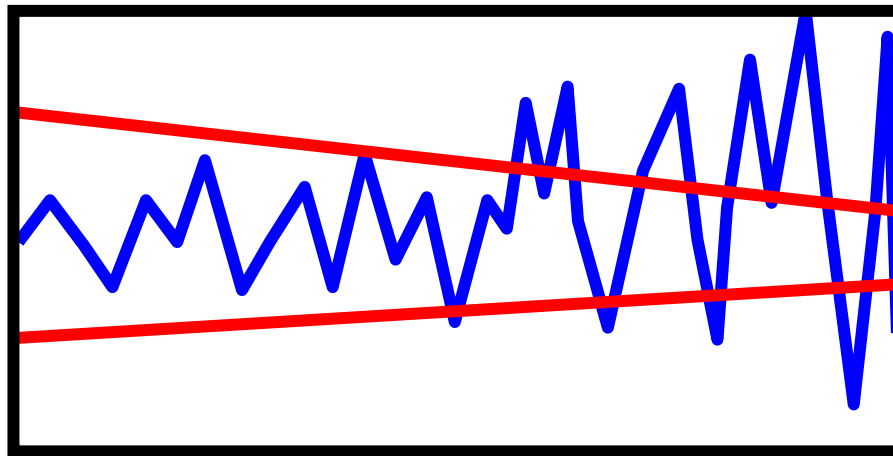
May 2008: Sau dam (Ter river)

Climate change and impacts on hydrometeorological risks

Risk= hazard x vulnerability



Water is a vital resource but outside the acceptable thresholds it is a risk



The last IPCC points to an increase of extremes

The band of tolerance seems to decrease

Major hazard and major vulnerability

Expressed needs



- Focus on water scarcity and heavy precipitations triggering floods, the 2 most dangerous meteorological hazard affecting Mediterranean countries

Social and socio-economic aspects

- **Damages:** monetary/non-monetary terms; direct/indirect effects
- **Vulnerability:** element-at-risk indicators (affected units and their value); exposure indicators (exp. Charact and severity of flood/drought); susceptibility indicators (preparedness, resilience, recovery,...)
- **Risk perception:** individuals; community; socio-cultural approach; psychometric paradigm

Needs & expectations

- Observation of perception of risks
- Demographic evolution : land ownership, residential strategies
- Tourism and travelling
- Rules and public policies facing extremes
- Protection tools : building protection, insurance, ...
- Meteorological/hydrological data

HYMEX: Key scientific questions

- What methods, indicators and sensors may be used to **evaluate social impact and monitor short-term and long-term adaptation strategies** at various space scales and for different cultural contexts?
- What **lessons can be learned** from different societies' and individuals' experiences to better cope with **climate change and hydrometeorological extreme events** around the Mediterranean Sea?
- How can we make these lessons beneficial and relevant for all **Mediterranean communities**?
- How to **reduce extreme events and climate change impacts** in Mediterranean area ?

Global scientific strategy

- To address these questions, we need to focus our efforts on the following steps:
- **Select pilot sites** around the Mediterranean sea based on:
 - Preexistence of local research initiatives and/or innovative community experience in terms of adaptation strategies
 - The availability of basic social, climate and hydro-meteorological data allowing spacio-temporal analysis and comparison
 - The feasibility of collecting and monitoring indicators by developing social sensor network in the long-term
 - The pilot sites selected by the other WP

- **Identify and build existing or potential sensing and monitoring systems, methods and indicators** that can be used to observe behavioral and perceptual adaptation to extreme event and long-term impacts of climate change
- **Collect, store and analyze qualitative and quantitative data** on social adaptation, vulnerability and resilience
- **Focus campaigns** in relationship with those developed by the other WG
- **Benefit from the synergy** with other projects: MedCLIVAR, MedFRIEND, MEDEX, FLASH, FLOODSITE, HYDRATE,....DELUGE...

Needs and existing limitation

- Lack of human resources especially on the water scarcity topic
- Difficulties on interdisciplinary research
- Selection of specific observation sites and data heterogeneity
- How to integrate studies with other HyMeX groups ?
- Insurance data not always available; different regulations by countries

Present situation

Start focusing on floods (mainly flash floods)

"Take benefit" of the synergy with other projects

Collaboration Earth Sciences experts with social sciences experts

Strong collaboration with the other HYMEX WG, mainly WG3

Other important issues: Climate change

- Droughts evolution and related impact
- Evolution of the impacts produced by heavy Mediterranean cyclones and their potential changes
- Evolution of the resilience/adaptation measures
- More collaboration is required



PROPOSALS

Proposals

To have a future **good database** of flood events and their associated impact

To **discriminate all the factors** involved in the evolution of the social impact of floods

To analyse the **social perception and vulnerability** factors

To analyse the **social ability** to cope with hydrometeo extremes

To relate **social impact indicators** with “physical” aspects

To improve knowledge about **costs/benefits** in the framework of predictability

Implementation plan

- Long-term Observation Period: LOP 2010-19
 - ↳ Monitor vulnerability factors in space and time; data collection
- Enhanced Observation Period: EOP 2010-13
 - ↳ Learn from post-event investigation
- Special Observation Period: SOP 2012-13
 - ↳ Focus on warning systems and communication processes

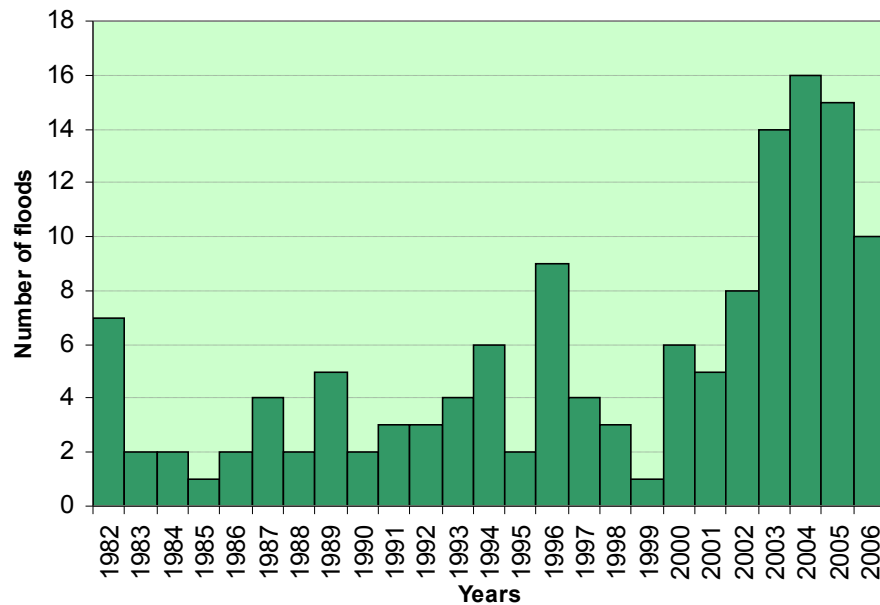
Implementation plan : LOP

- Perception of risk evolution
 - Systematic questionnaire surveys and cognitive mapping
 - Press coverage
- Social organisation evolution
 - Crisis management
 - Warning process
 - Rules, actors and practices
- Spatio-temporal practices evolution
 - Evolution in daily travel patterns and factor of adaptation
 - Migration and tourism
- Interactions
 - Hydrological, meteorological and human impacts data collection
 - Radio, video records, ... collection
 - Re-insurance and Insurances data

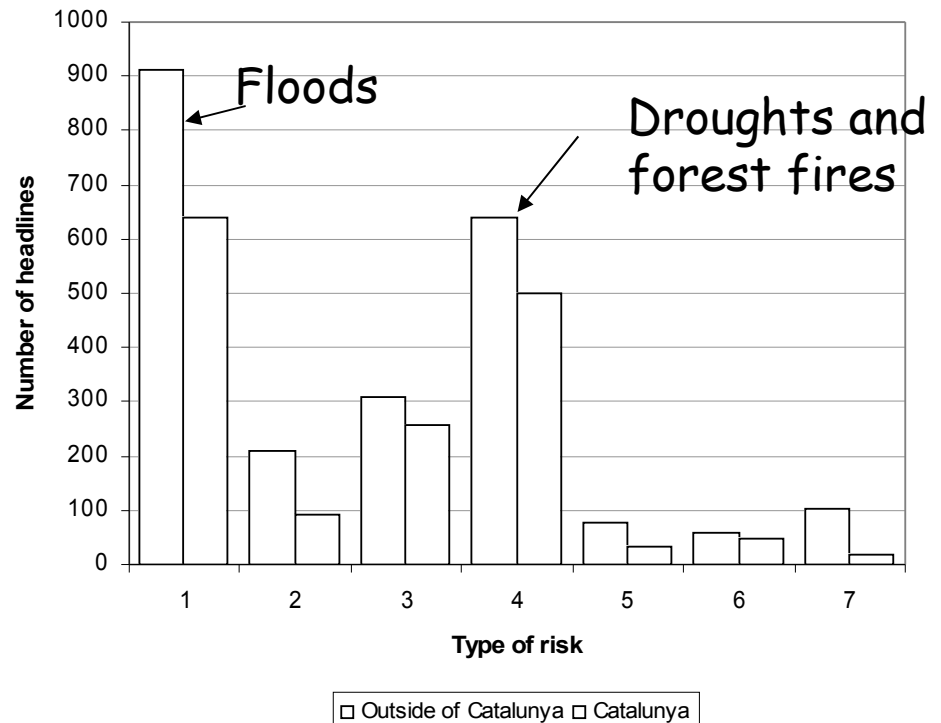
Implementation plan : LOP

Post event analysis after major events

Analysis of the Press coverage evolution (1982-2009/FLASH+2010-2019/HYMEX):



Distribution of flood events in Press database 1982-2006)



Number of articles classified by type of risk from 1982 to 2005. (Llasat et al, 2007)

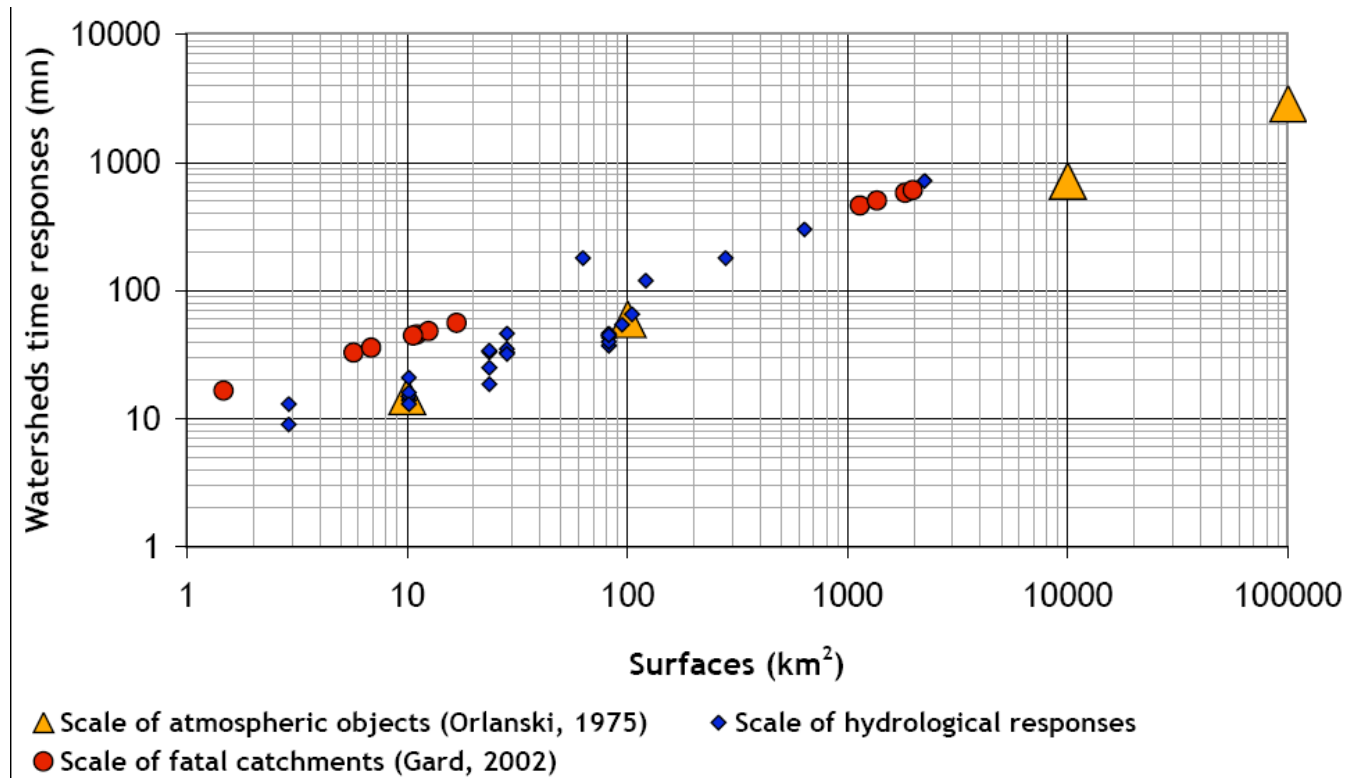
Implementation Plan : EOP, learn from post-event investigation

- Focus on post-event field studies for floods to maximize interactions between social scientists, hydrologists and meteorologists
- New guidelines on post-event investigations for use by integrated teams of physical scientists, social scientists, and practitioners.
- Improving warning systems

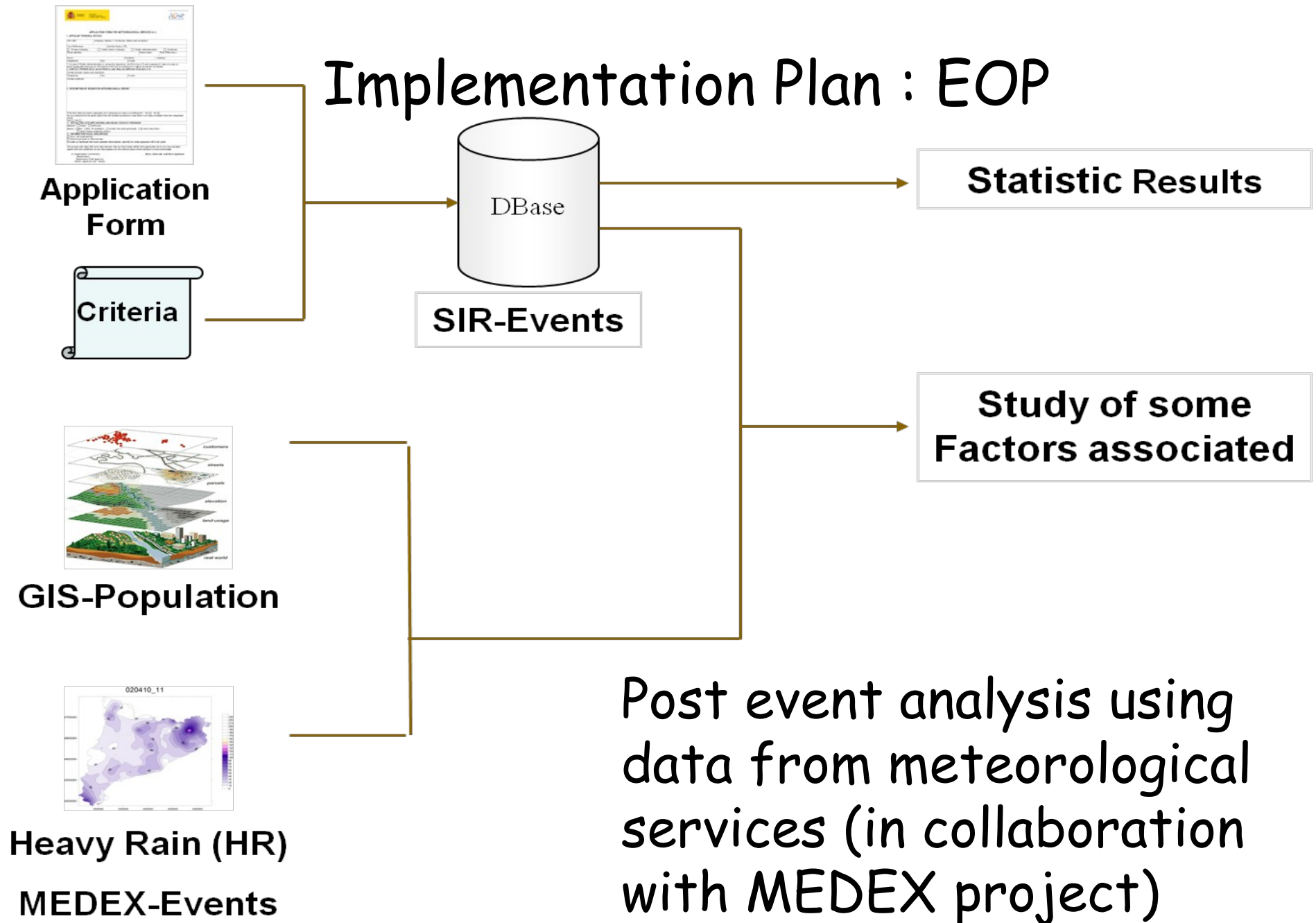
Continual Improvement Plan : EOP, learn from post-event investigation

Post event analysis

- Deluge : interdisciplinary research strategy
- Coupled physical and social post-event investigations



Implementation Plan : EOP



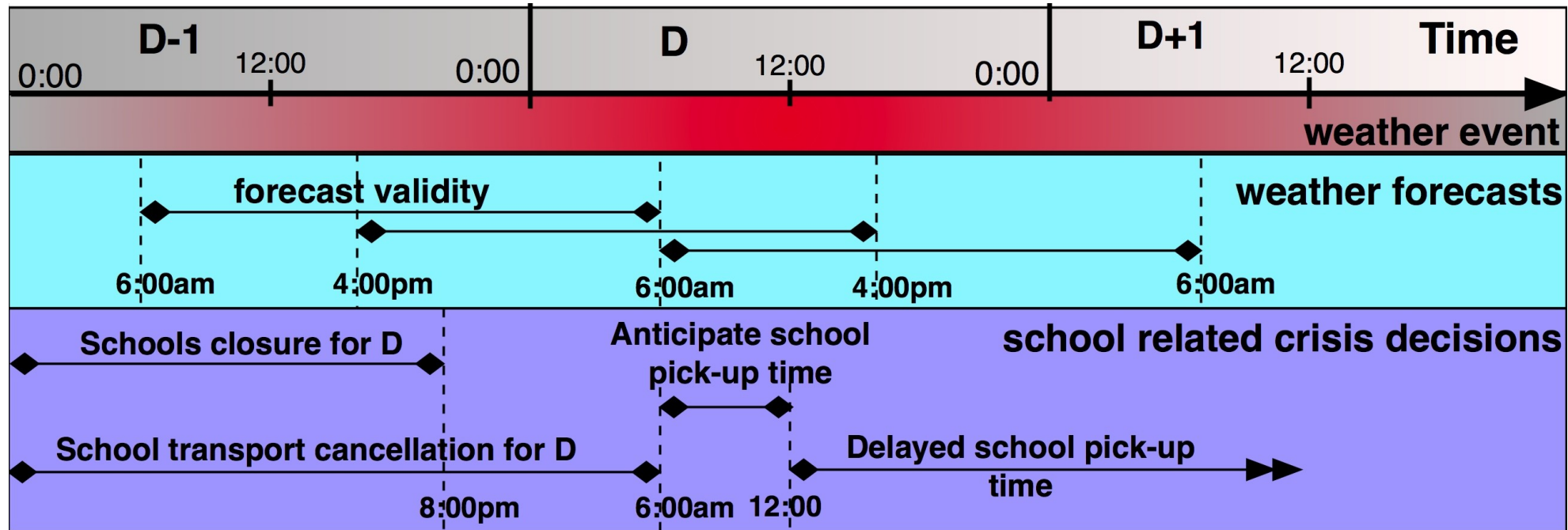
Implementation plan : SOP

- Observe drivers' behavior on flooded roads
- Communication chain time analysis
- Operational services practices / process : in situ observation
- Perception of the population
- Damages (direct/indirect) evaluation, costs/benefits
- Collaboration with WG3 in vulnerability analysis

SOP: Focus on warning systems and communication processes

HyMeX

HYdrological cycle in Mediterranean EXperiment



Pilote sites

- Cevennes, Gard, South East of France
- Catalonia, Balearic Island, Spain
- Fella River, Nord East of Italy
- Other target areas WG3
- A general Mediterranean vision (major events)



**Barcelona: 7-11
September 2009**

**MedCLIVAR-
HYMEX-MedFRIEND
meeting**

**+ MEDEX + FLASH +
HYDRATE**

**Topic 1: Societal
Impacts, Risk
Management,
Responses, and
Education**



Thank you!

... Questions?