



# Changing Hydro-meteorological Risks – as Analyzed by a New Generation of European Scientists

A Marie Curie Initial Training Network  
January 2011 to December 2014

[WWW.ITC.NL/CHANGES](http://WWW.ITC.NL/CHANGES)



**ITC** UNIVERSITY OF TWENTE.



The analysis of changes in hydro-meteorological risk requires not only accurate spatial information and models but also well-trained experts who can provide this information.



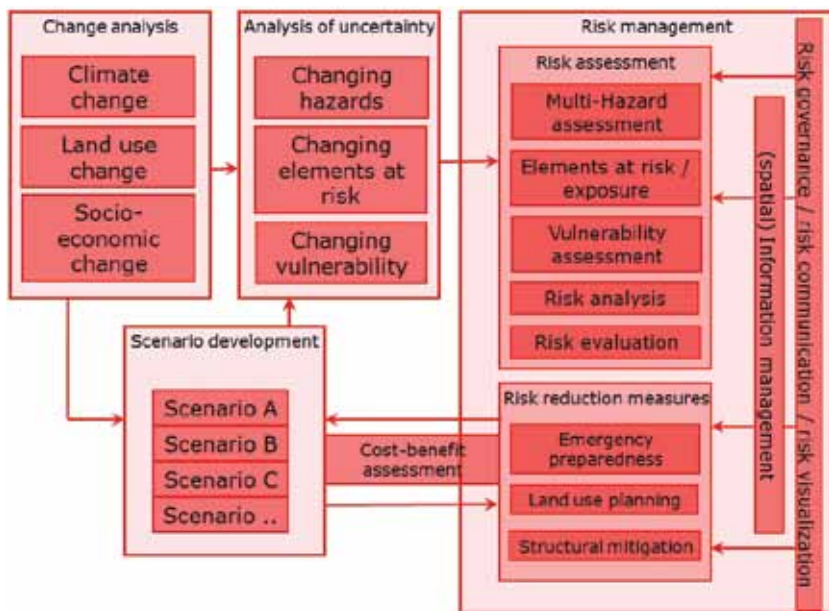
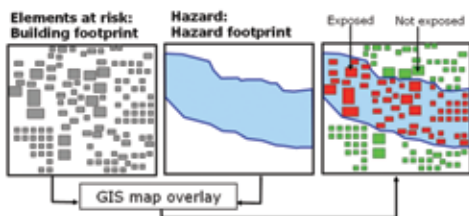
## CHANGES

### Initial Training Network

The CHANGES network hopes to contribute to Topical Action nos. 2 and 3 of the UN-ISDR Hyogo Framework for Action: risk assessment and management, combined with innovation and education, are considered essential in confronting the impacts of future environmental changes.

The CHANGES network will develop an advanced understanding of:

- how global changes related to environmental, socio-economic and climate change, will affect the temporal and spatial patterns of hydro-meteorological hazards and associated risks in Europe;
- how these changes can be assessed, modelled and incorporated in sustainable risk management strategies, focusing on spatial planning, emergency preparedness and risk communication.





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## Research objectives

To analyse the changes in the frequency, magnitude and extent of hydro-meteorological hazards as a result of environmental changes.

To analyse the changes in exposed elements at risk and their vulnerabilities.

To combine probabilistic hazard scenarios with scenarios of exposure data and their vulnerabilities in order to assess the risk in a probabilistic manner.

To combine hazard, vulnerability and risk assessment models into a web-based platform based on open source software.

To use risk scenarios as a starting point for risk management strategies that will concentrate on spatial planning and emergency preparedness.

5. Consiglio Nazionale delle Ricerche (CNR), Italy
6. Paris-Lodron Universität Salzburg (PLUS), Austria
7. Technische Universität Dortmund (TUDO), Germany
8. Technische Universiteit Delft (TUD), Netherlands
9. Institutul de Geografie (IGRAC), Romania
10. Instytut Rozwoju Miast (IRM), Poland
11. IIASA. International Institute for Applied Systems Analysis (IIASA), Austria

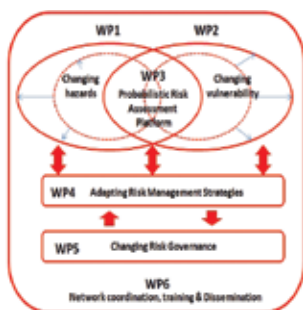
**11 partner institutions and  
6 associated partners**

## Partners

1. Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, Netherlands
2. Centre National de la Recherche Scientifique (CNRS), France
3. University of Vienna (UNIVIE), Austria
4. University of Lausanne (UNIL), Switzerland

## Associated partners

1. Risques & Développement (R&D), France
2. Geomer GmbH, Germany
3. Alert Solutions (AS), Netherlands
4. Estudios de Riesgos Naturales (ERN), CIMNE, Spain
5. Climate Change Risk Management (CCRM), United Kingdom
6. Protezione Civile della Regione Friuli-Venezia-Giulia (PC-FVG), Italy



### Early stage researchers

ESR-01	Translation of the results of climate change models into expected changes in triggering conditions of hydro-meteorological hazards	ITC
ESR-02	Development and application of probabilistic models for flood hazard assessment at regional and local scales	PLUS
ESR-03	Development and application of probabilistic models for mass movement hazard assessment at regional and local scales	CNRS
ESR-04	Analysis of expected changes in ecosystems and land use patterns in relation to climate change and future economic development	IIASA
ESR-05	Expressing uncertainties in vulnerability and value of infrastructure, buildings and land use in terms of hydro-meteorological hazards	UNIVIE
ESR-06	Design of a tool for probabilistic risk assessment of hydro-meteorological hazards	CNR
ESR-07	Development of a method for constructing risk scenarios and risk maps with associated uncertainties	IGRAC
ESR-08	Use of risk information in Strategic Environmental Assessment and spatial planning	IRM
ESR-09	Development of an internet-based Decision Support System for the use of risk information in risk reduction	UNIL
ESR-10	Emergency preparedness and early warning scenarios based on the outcomes of the probabilistic risk assessment	CNR
ESR-11	Comparing risk governance strategies for different EU countries	TUDO
ESR-12	Risk communication with a focus on risk visualization tools	TUD

### Experienced researchers

ER-1	Development of web-based tool for probabilistic risk assessment	PLUS
ER-2	Development of web-based decision support tool for risk management	ITC
ER-3	Development of web-based risk communication and visualization tool	TUDO

Within the CHANGES project, positions are planned for Early Stage Researchers (ESRs) and Experienced Researchers (ERs). The ESRs will be hired at the beginning of the project (applications to be received no later than 1 April 2011) and are likely to take up their positions by September 2011. The three ER positions are expected to be open from August 2012 onwards.

### Case study areas

The research methods and the methodology will be applied and tested in four study areas where some risk manage-

ment procedures have already been implemented. The study areas are located in the French Alps, North-eastern Italy, Romania and Poland.







## Training courses

Courses will be held in different locations, including at each of the study areas. PhD and MSc researchers from outside the CHANGES network are also welcome to join these intensive courses. Furthermore, local stakeholders, administration officers and civil protection representatives will be invited to participate. The following courses are scheduled:

### Professional skills

- Research work plan development and scientific writing: September 2011, Poland;
- Research ethics: September 2011, Poland;
- Valorisation of scientific results: June 2012, Italy;
- Dissemination of scientific results to the public: June 2013, France;
- Writing research grant proposals: September 2012, Romania;
- Project management: September 2014, Switzerland.

### Technical skills

- Technical skills related to the research theme: September 2011, Poland;
- Monitoring and prediction of environmental changes: September 2012, Romania;
- Web-GIS and Spatial Data Infrastructure: December 2012, France;
- Tools for risk management: April 2013, Austria;
- Use of risk information in spatial planning: September 2013: Italy.

## Workshops

During workshops, the ESRs/ERs and all partners will present their results and discuss the relationships between the different project components. The following workshops are planned:

- Risk governance implications of changing risks: June 2012, Italy;
- Environmental changes: June 2013, France;
- Modelling changes in hazard and risk: December 2012, France;
- Changes in risk management: September 2013, Italy;
- Web-based platform: September 2014, Switzerland.

**The extensive training programme is also open to researchers from outside the network**

## Scientific output

Project results will be published in ISI journals. ESR/ER co-authorship will be encouraged. Intermediate results will be presented in international conferences. At the end of the project an international conference will be organized to disseminate the results.

The software tools developed will be distributed as open source software through a web-based platform.

CHANGES seeks active collaboration with other relevant EU FP7 research projects in the field of hazard and risk assessment.



## Impact

The CHANGES project aims to:

- develop the careers of young researchers as experts in the field of natural risk assessment, management and mitigation;
- increase the inter-sectoral mobility between academia and industry;
- strengthen research capacity in multi-hazard risk assessment;
- provide an e-learning package;
- provide open source tools for loss estimation;
- increase international cooperation.

## Coordination

ITC was established in 1950 by the Dutch government to enhance the capacity of organizations in developing countries in surveying, mapping and spatial analysis ([www.itc.nl](http://www.itc.nl)).

- Project coordinator:  
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