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Session: Anticipatory Engineering: more than business as usual?

Title: “Anticipating the impact of climatic changes on future availability of water resources and hydro-geological risks: an overview from the project CLIMAWARE”

The project CLIMAWARE (CLIMatic change impacts on future Availability of Water REsources and hydro-geological risks) focuses on the complex interactions between climate change and human activities related to water, with a holistic view embracing physical, social and economic processes. The project adopts a highly interdisciplinary approach, involving researchers from a wide range of investigation fields: climatology, hydrology, environmental engineering, sustainable development and planning, information technology, social sciences, economics, political economics and law among others.

CLIMAWARE deals with the future influences of climate change on water cycle components and water resources, their uncertainty and their implications in contiguous sectors. In particular, impacts related to climate extremes are investigated, adopting the mountainous territory of the Autonomous Province of Trento as case study. The phenomena of interest include floods and land instabilities triggered by extreme precipitations, such as debris-flows and snow avalanches, but also different stress factors threatening the integrity of freshwater services, with adverse effects on agriculture, tourism, and energy production. Because of the challenges that climate change imposes, there is a need to increase social awareness of climate-related risks, and to find ways to mitigate the future impacts on economic activities, as well as to adapt to new scenarios. For mitigation and adaptation strategies to be effective, knowledge of the physical aspects of the water cycle should be combined and complemented with knowledge of social and economic processes that crucially affect the use and management of freshwater. Furthermore, it should be considered that national governments, on the one hand, and the European Union, on the other, have started to enact laws aimed at tackling the effects of climate change. However, the implementation of these measures and their harmonization with existing laws require the interaction of law with environmental sciences, engineering, and economic and social sciences, in order to bring about effective results.

In the framework of the CLIMAWARE project new paradigms, approaches and tools are presently being developed in order to cope with the complexity and the uncertainty of water cycle processes under climate change, and to study the entanglement between physical processes and human activities. This contribution offers a description of the project’s aims and structure, as well as an overview of the preliminary results obtained during its initial stages.