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Climate induced changes on the hydrology of Mediterranean basins – assessing uncertainties and quantifying risks

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According to current climate projections, the Mediterranean area is at high risk for severe changes in the hydrological budget and extremes. With innovative scientific measures, integrated hydrological modeling and novel field geophysical field monitoring techniques, the FP7 project CLIMB (Climate Induced Changes on the Hydrology of Mediterranean Basins; GA: 244151) assessed the impacts of climate change on the hydrology in seven basins in the Mediterranean area, in Italy, France, Turkey, Tunisia, Egypt and the Gaza Strip, and quantified uncertainties and risks for the main stakeholders of each test site.

Intensive climate model auditing selected four regional climate models, whose data was bias corrected and downscaled to serve as climate forcing for a set of hydrological models in each site. The results of the multi-model hydro-climatic ensemble and socio-economic factor analysis were applied to develop a risk model building upon spatial vulnerability and risk assessment. Findings generally reveal an increasing risk for water resources management in the test sites, yet at different rates and severity in the investigated sectors, with highest impacts likely to occur in the transition months.

Most important elements of this research include the following aspects:
• Climate change contributes, yet in strong regional variation, to water scarcity in the Mediterranean; other factors, e.g. pollution or poor management practices, are regionally still dominant pressures on water resources.
• Rain-fed agriculture needs to adapt to seasonal changes; stable or increasing productivity likely depends on additional irrigation.
• Tourism could benefit in shoulder seasons, but may expect income losses in the summer peak season due to increasing heat stress.
• Local & regional water managers and water users, lack, as yet, awareness of climate change induced risks; emerging focus areas are supplies of domestic drinking water, irrigation, hydropower and livestock.
• Data and knowledge gaps in climate change impact and risk assessment are still widespread and ask for extended and coordinated monitoring programs.

In order to discover, visualize and provide access the results of the project, the CLIMB-Portal has been established, serving as a platform for dissemination of project results, including communication and planning for local and regional stakeholders.