



A Focus on Water Resources in the Mediterranean

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Motivation

According to the latest IPCC projections, the Circum-Mediterranean region will be particularly affected by Global and Climate Change (Kundzewicz et al. 2007; Alcamo et al. 2007). These changes include population growth, increases in food, water and energy demands, changes in land use patterns and urbanization/industrialization, while at the same time, the renewable water resources in the region are predicted to decrease by up to 50 % within the next 100 years (EC 2007). However, a profound basis for estimating and predicting the long-term effects of Global Change on the development of the quantity and quality of water resources and on ecosystems is still lacking (Lin et al. 2011). One of the reasons for this is that environmental monitoring, in particular in the Mediterranean region, is strongly disciplinarily oriented, and financing is usually limited to short-term periods. What is needed is an in-depth understanding of the environmental processes and interactions under global change conditions for reliable prognoses of the future development of water resources. This knowledge can then serve as a basis for political and structural decisions for water and environmental management as well as for infrastructure planning.

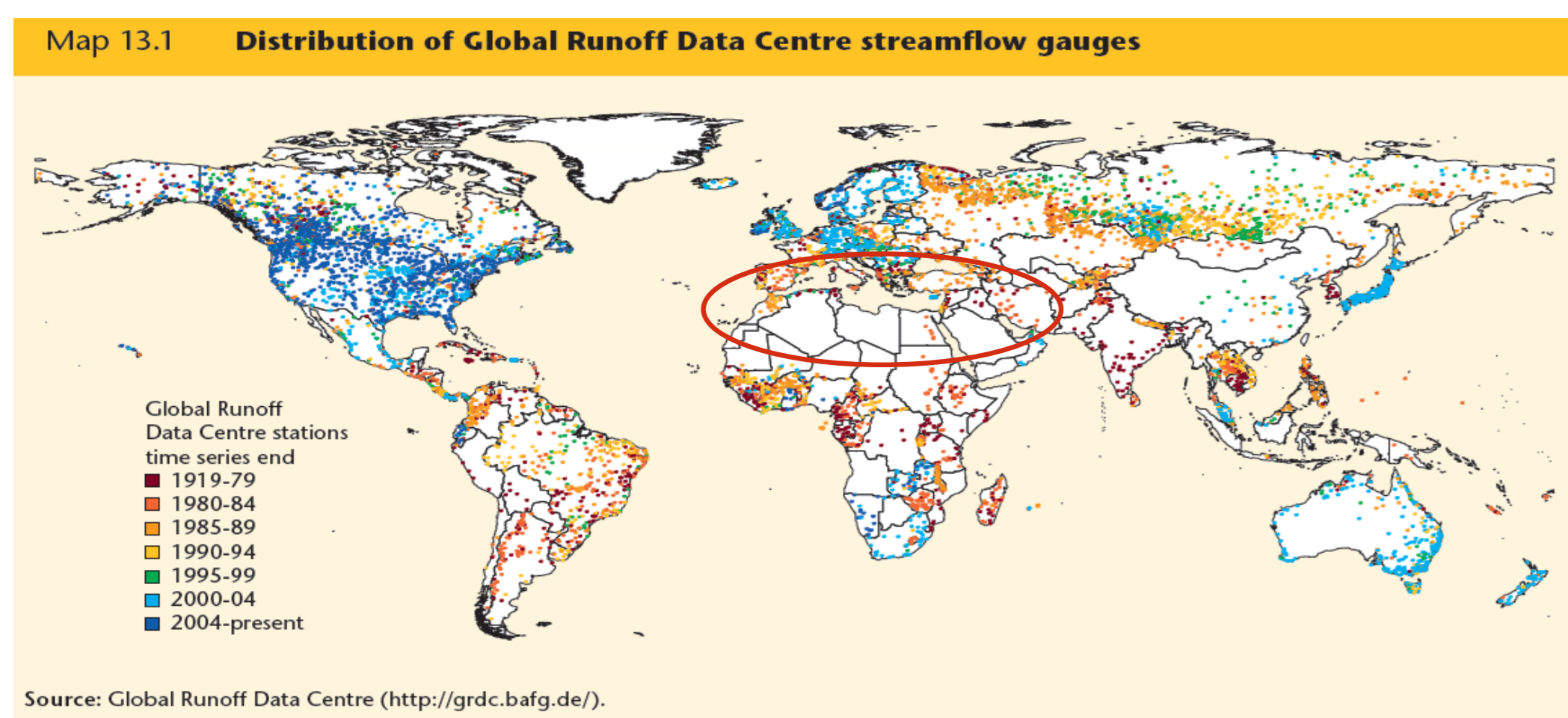


Image: Long-term data series are largely lacking in the Mediterranean region, particularly in Northern Africa. Source: Third World Water Development Report.

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Goals and scientific objectives

Based on the acquired information, TERENO-MED, together with partners across the Mediterranean region will develop model scenarios that may serve as a basis for sustainable political and economical decisions. In order to gain a deep understanding of the most relevant processes and feedbacks, and to deliver reliable future scenarios for the Mediterranean region, the two initiating Helmholtz Centres, UFZ (Helmholtz Centre for Environmental Research) and Forschungszentrum Jülich, are seeking interested German and international partners to conduct joint research within the planned monitoring network. TERENO-MED aims to make a significant contribution to solving pressing water and environmental problems in a region that is of high political and economical importance not least for Europe as a whole.



Image: Potential TERENO-MED partner countries and sites. Associate sites may also profit from exchange of specific data and information.

TERENO-MED's overall goal is to provide a scientific basis for a sustainable water and land management, as well as infrastructure planning. It will therefore serve as support to

- Developing solutions to overcome/adapt to water scarcity
- Improving water quality, supply and sanitation systems
- Improving water efficiency, in particular in agriculture
- Developing „intelligent“ solutions for a sustainable resources management

While these societal goals must be reached through an integrated and anticipatory management, the TERENO-MED initiative will be an infrastructure platform for conducting scientific research on e.g.:

- Precise water resources assessment at catchment scale
- Development of reliable scenarios for resources development over the next 50-100 years
- Development of adequate concepts and tools for an integrated management of water and land resources coupled with renewable energy production and water purification (sustainable regional planning).

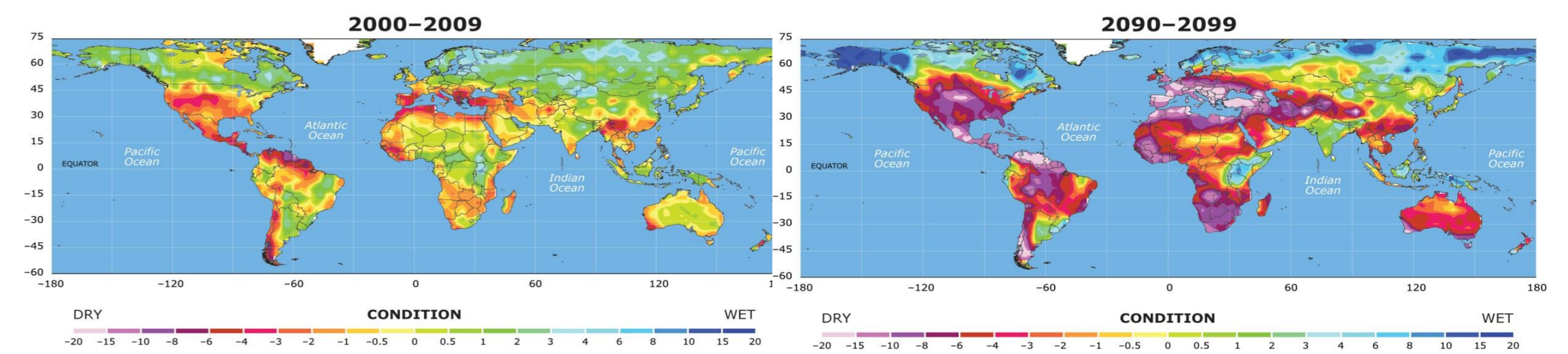


Image (above): Hot Spots of climate change today (left) and by the end of the century (right). The images show the Palmer Drought Severity Index, a measure for aridity using precipitation and temperature information. <-4 = extreme drought. Source: NCAR images, 2010.

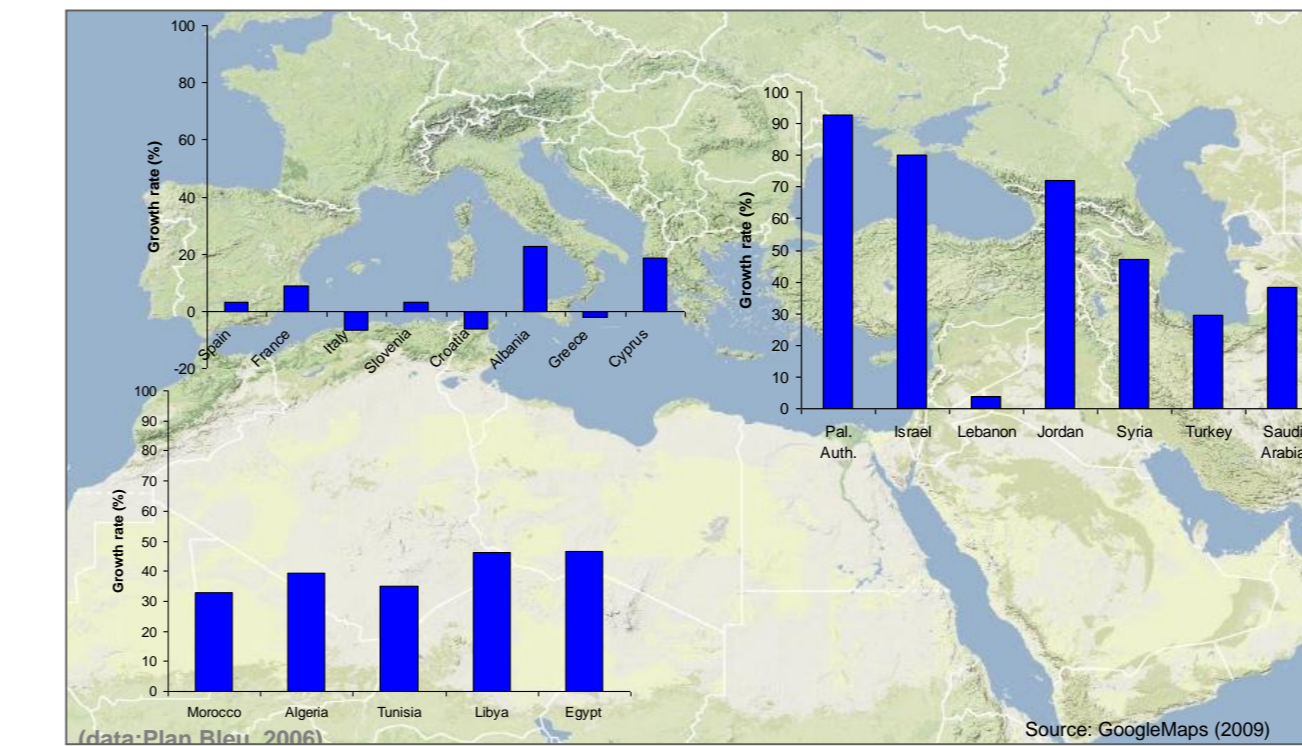


Image: Expected population growth in the Mediterranean by 2050 (against 2001). This growth will lead to a strong increase in food and energy demands, as well as intensified urbanisation and industrialisation. Data source: Plan Bleu, 2009

Description of the planned measure

TERENO-MED (Terrestrial Environmental Observatories in the Mediterranean) is an infrastructure measure, which aims to fill the described gaps. Together with partners in the region, TERENO-MED will establish a Circum-Mediterranean network of Global Change observatories, and will investigate the effects of anthropogenic impacts and of climate change on Mediterranean water resources and ecosystems. Within a set of representative catchments around the Circum-Mediterranean region (Southern Europe, Northern Africa, Near East), observatory sites will be established with state-of-the-art and innovative monitoring equipment, in order to measure hydrological states and fluxes on a long-term basis (minimum 15 years). Monitoring equipment will cover all scales, from the point to the regional scale, using ground-based and remote sensing technologies.

TERENO-MED will be based on the national TERENO concept. The idea of TERENO is to integrate the different terrestrial environmental disciplines, from hydrology and hydrogeology, pedology, ecology/biology, through climatology to the social and economic sciences within specific sites, in order to solve the respective regional or site specific problems. Within the TERENO-MED-sites, water-related processes, feedbacks and interactions between processes and compartments will be related to one another, in order to understand the complex system as a whole.

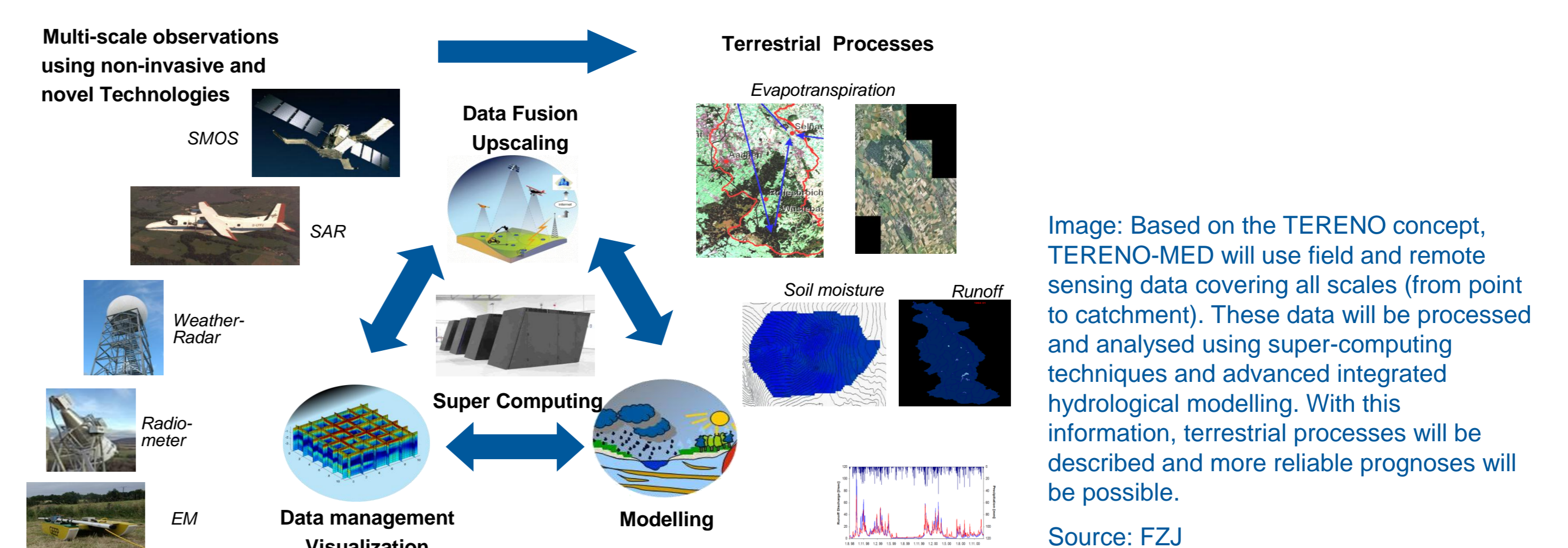


Image: Based on the TERENO concept, TERENO-MED will use field and remote sensing data covering all scales (from point to catchment). These data will be processed and analysed using super-computing techniques and advanced integrated hydrological modelling. With this information, terrestrial processes will be described and more reliable prognoses will be possible. Source: FZJ

Site selection

- Some of the most important criteria for the selection of TERENO-MED sites are
- the interest of local scientific partners to contribute with their knowledge to the TERENO-MED network
 - the relevance of the water-related problem within the watershed to the public
 - a sensitivity/vulnerability to Global Change impacts
 - representativity of the site in the Mediterranean context
 - the availability of long-term technical support

TERENO-MED is currently linking up with existing activities within the area (e.g.: joint TERENO-MED – SICMED sites, LTER Europe, ICOS, etc.). TERENO-MED is currently receiving funding from the participating Helmholtz Centres for infrastructure, only. It is seen as a start-up initiative for a Circum-Mediterranean integrated observation and research initiative (long-term, large-scale, integrated environmental research initiative).

More information will be available shortly at:
www.tereno-med.net

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