Water is essential to life. Scarcity of water and drought affect almost one third of the population worldwide, and the EU is not spared. While drought means a temporary reduction in available water, usually because of a lack of rain, water scarcity means that demand for water exceeds the availability of resources that can be sustainably exploited. Droughts can have an impact on the way we live, affecting industry, agriculture, energy, transport and tourism. Over the past thirty years, droughts have increased significantly in both number and severity in the EU. It is calculated that at least 11% of Europe’s population and 17% of its territory have been affected by water scarcity to date.

GMES supports the monitoring of water scarcity and drought from space, revealing areas that are running out of water.

Various satellite instruments, from passive microwave imagers to radars, are used to measure important water cycle parameters such as rainfall, evapotranspiration, soil moisture, surface water bodies and the state of the land. By combining satellite-derived water cycle information with hydrological models, in situ and statistical data, information on water scarcity can be inferred and provided to decision-makers.

Europe experienced an exceptionally warm and dry autumn in 2011. These dry conditions were visible in soil moisture values monitored with ESA’s Soil Moisture and Ocean Salinity (SMOS) mission in November 2011. Comparing SMOS data from the same time in 2010, conditions were significantly drier, especially in Germany, Austria and eastern Europe as shown by the yellow colours on the map. Regions that are wetter in November 2011 than in the previous year are shown in blue.

Source: ESA
**CURRENT ACTIVITIES**

Within GMES, a Global Service for Water Scarcity Information is set up with focus on:

- enhancing forecasting models with statistical and improved Earth observation data
- timely reporting for emerging droughts
- providing long-term continuous time series for climate change studies

Currently, the Water Information System for Europe, WISE, provides the gateway to information on European water issues.

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**HOW ELSE CAN GMES CONTRIBUTE?**

The GMES Sentinel-1, -2 and -3 missions will support water scarcity and drought monitoring by:

- continuous all-weather, day and night radar imagery at high revisit times with a large geographical coverage
- high revisit time and availability of spatially sampled time series of land conditions
- high-end accuracy and reliability
- rapid data dissemination
- free and open data access

The GMES Global Service for Water Scarcity Information will be a one-stop-shop portal for water scarcity information.

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**NEXT STEPS**

The challenges of water scarcity and droughts need to be addressed both as an essential environmental issue and as a precondition for sustainable economic growth in Europe.

Effective strategies are:

- accurately assessing and predicting water scarcity with support of Earth observation data
- streamlining a wide range of important water scarcity information, including space-based information
- providing an open source and open-standard information portal on water scarcity

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**SMOS**

ESA’s Soil Moisture and Ocean Salinity mission

Droughts and water scarcity are increasingly being observed in many regions in Europe. A way to measure water scarcity is by looking at soil moisture data from ESA’s SMOS satellite, one of the GMES Contributing Missions.

Launched in November 2009, SMOS provides global information on surface soil moisture every three days within an accuracy of 4% at a spatial resolution of 50 km. This is comparable to being able to detect one teaspoonful of water mixed into a handful of soil.

The main objective of the SMOS mission is to provide maps of soil moisture and ocean salinity of a specified accuracy, sensitivity, spatial resolution and spatial and temporal coverage.