

Richiesta di attivazione di Assegno di Ricerca

TITLE

Assessment of water resources availability and distribution and cascading implications for the human society and the environment.

BACKGROUND AND PROJECT OBJECTIVES

The hydrologic cycle, and particularly water resources, are extremely affected by the global environmental change. Impacts of population growth and human activities as well as climate change effects are relevant modifiers of the water cycle. As the conversion of rural lands into urban areas is occurring at an increasingly rapid rate, the definition of new management policies and adaptation strategies are an urgent need in order to guarantee the sustainability of freshwater resources.

Remote sensing data are becoming increasingly important for this type of analysis because they provide the advantages of global spatial coverage, high temporal resolutions and fast updating. This technology offers the opportunity to analyze many hydrological processes, such as evapotranspiration, soil moisture, snow cover, and water levels. Furthermore, satellite data enable to monitor land use change in time and the spatial allocation of crop areas, human settlement and economic activities, which alter the hydrological processes. From this information it is possible to assess how water resources are distributed in space and time and therefore identify key cascading implications for the human society and the environment.

In the proposed research project, remote sensing data will be processed to investigate the relationship between water resources availability, consumption and depletion and anthropogenic and climatic factors. In particular, new criteria will be defined to quantify the level of water stress as a comparison between water availability and water use.

The results of this analysis will allow to identify and isolate the main driving factors (e.g., climate, elevation, land and water management practices, population density) responsible for positive and negative effects on water resources. Finally, the results of this project can be employed as a decision-making tool for the definition of new mitigation and adaptation strategies under various water resources management scenarios.

ACTIVITY PLAN

The work suggests the following steps in order to perform the planned activities.

1. The first step is data collection, both remotely-sensed and ground-based data. A database will be created as the basis for the forthcoming analysis.

2. The second step consists of data analysis, in order to assess how water resources are distributed in space and time and therefore identify key cascading implications for the human society and the environment.

The activity plan is expected to include also the preparation of research papers to be submitted to international journals.