

MENA NWC

Middle East and North Africa Network of Water Centers of Excellence

MENA NWC Research Project Summary

RADAR PROBING OF GROUNDWATER IN HYPER-ARID ENVIRONMENTS IN MOROCCO AND OMAN: UNDERSTANDING AQUIFER DYNAMICS IN HIGH-DISCHARGE AREAS



Groundwater

Desert countries face serious water shortages in an increasingly thirsty world. Groundwater systems are a critical source of water and an important regional resource. In Morocco and Oman, the distribution and dynamics of these fossil aquifers is little known because current knowledge relies on measurements from local wells that are sparsely distributed and cover only a small percentage of the desert area.

To locate and map desert aquifers in Morocco and Oman, an international research team, led by the California Institute of Technology (Caltech), is using radar sounding technology that was developed to explore the subsurface of Mars. Using an airborne 40-mHz, low-frequency sounding radar prototype, the team is creating high-resolution maps of freshwater aquifers buried deep beneath deserts. This is the first use of airborne sounding radar for aquifer mapping. In addition to facilitating the location and mapping of desert aquifers, this research will help scientists better understand current and past hydrological conditions in Earth's deserts and assess how climate change is impacting them.

Building capacity and supporting local water management governance are critical aspects of this research:

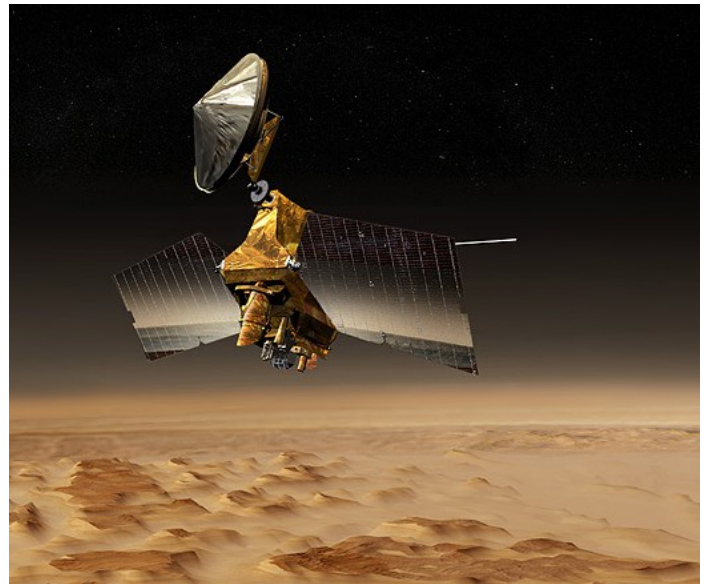
Principal Investigator:

- California Institute of Technology, USA

Co-Principal Investigators:

- Hassan II Agronomy and Veterinary Institute (IAV), Morocco
- Sultan Qaboos University (SQU), Oman

Photo courtesy of JPL



Mars Reconnaissance Orbiter probing the Martian subsurface using SHARAD sounding radar technology.

- All project elements will be conducted jointly; this includes planning, site selection, data acquisition, data analysis, and interpretation and dissemination of science results.
- Caltech will provide short courses in such technologies as InSAR and radar sounding to MENA NWC Centers and other stakeholders.
- The international research team will sponsor meetings with Moroccan and Omani water stakeholders to help build linkages between local users of the aquifer and the Centers.
- Planned science publications, as well as knowledge transfer, will position the two collaborating Centers to compete for future international funding opportunities to continue this critical regional science.



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