

# **SAHARASAR**

## **Potential support to water prospecting in arid Africa by SAR**

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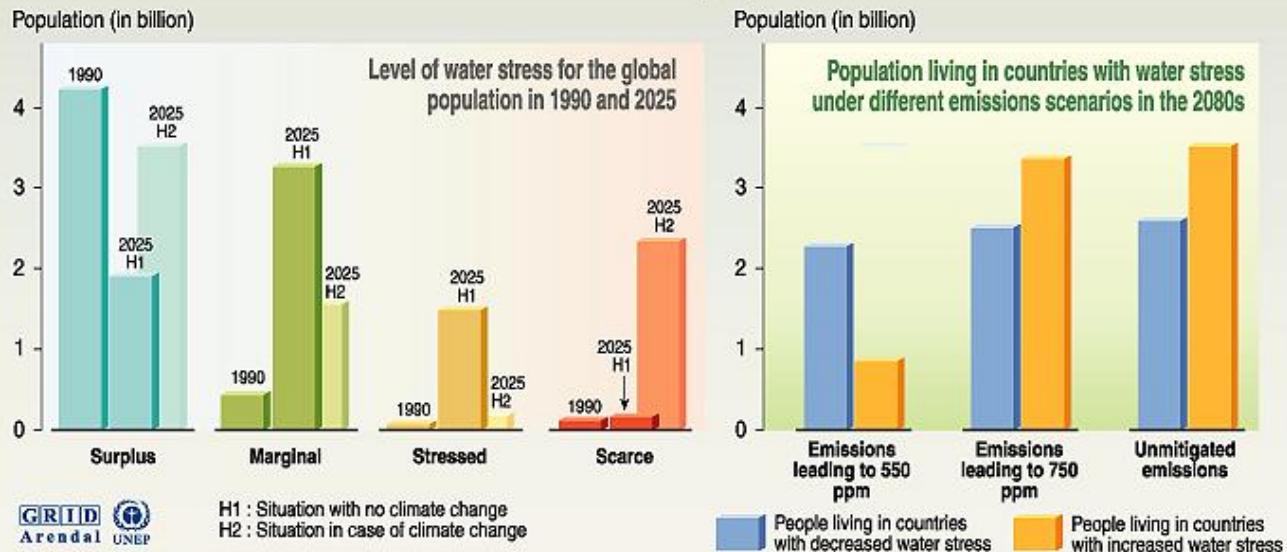
*NASDA / EORC, Japan*



## **Freshwater in the World**

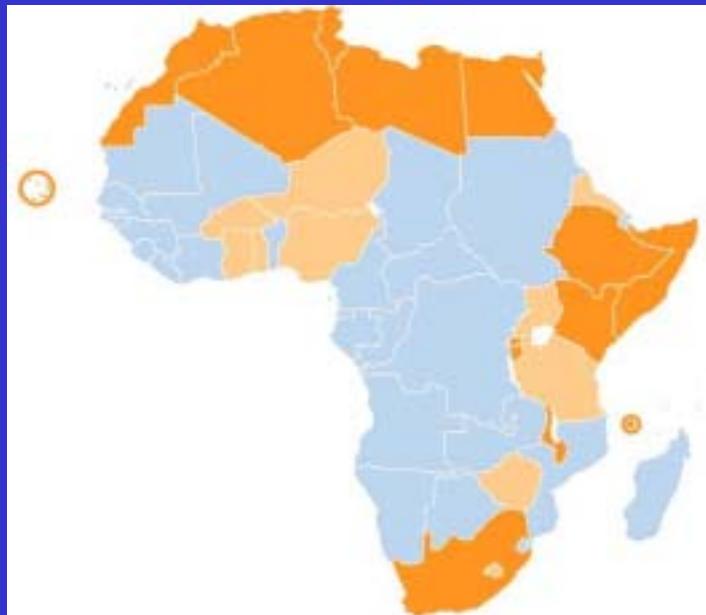
- **United Nations: Sustainable Development (1992)**
  - > AGENDA 21 - CHAPTER 18: “Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources”
- **Second World Water Forum 2000, The Hague**
  - > MINISTERIAL DECLARATION ON WATER SECURITY
- **International Freshwater Conference 2001, Bonn**
  - > WATER, KEY TO SUSTAINABLE DEVELOPMENT
- **WSSD 2002 Johannesburg** -> CEOS WSSD follow-up

## Freshwater stress: Current population at risk



Source: Climate change 1995, Impacts, adaptations and mitigation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996; Climate change and its impacts, stabilisation of CO<sub>2</sub> in the atmosphere, Hadley centre for climate prediction and research, the meteorological office, London, 1998.

## The Future for Africa: 2025

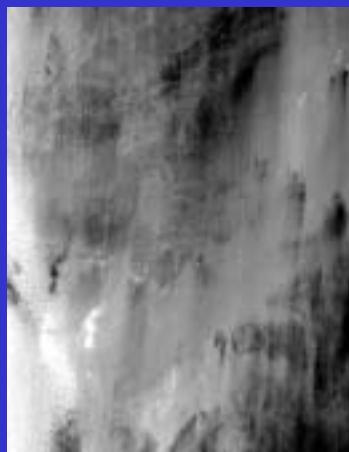




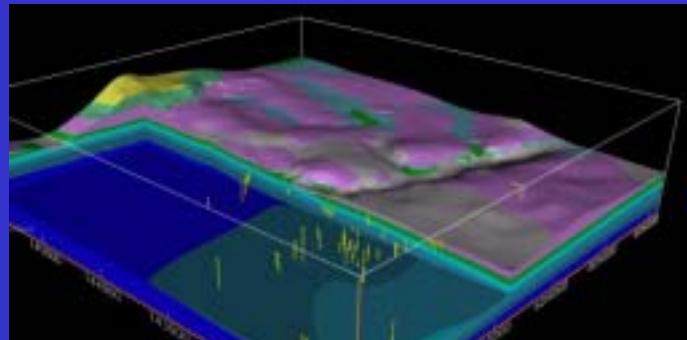
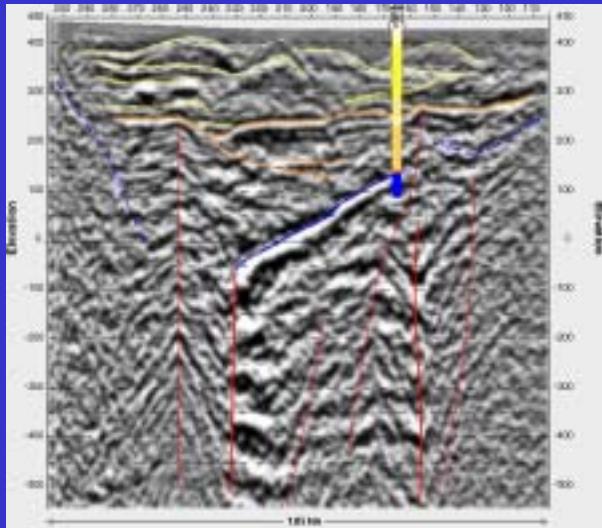
## Water prospecting in arid Africa: Existing resources



# Where to look for water



## Water prospecting in arid Africa: *Modeling groundwater*



# *Drilling and ...*



## Potential of SAR: *Global Mapping of Subsurface Geology*



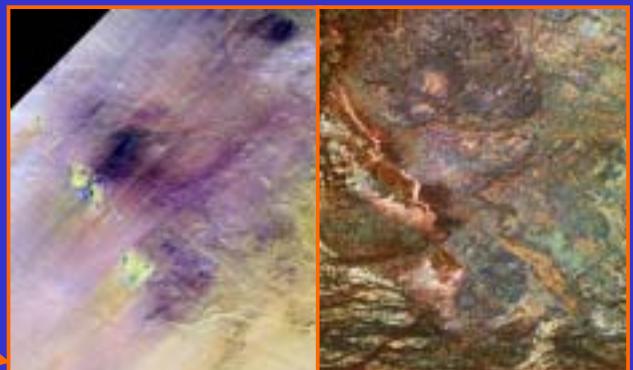
**-> SUB-SURFACE GEOLOGY**  
*water resources, oil prospection, mining*

**-> PALEO-ENVIRONMENTS**  
*hydrology, tectonics (Quaternary)*

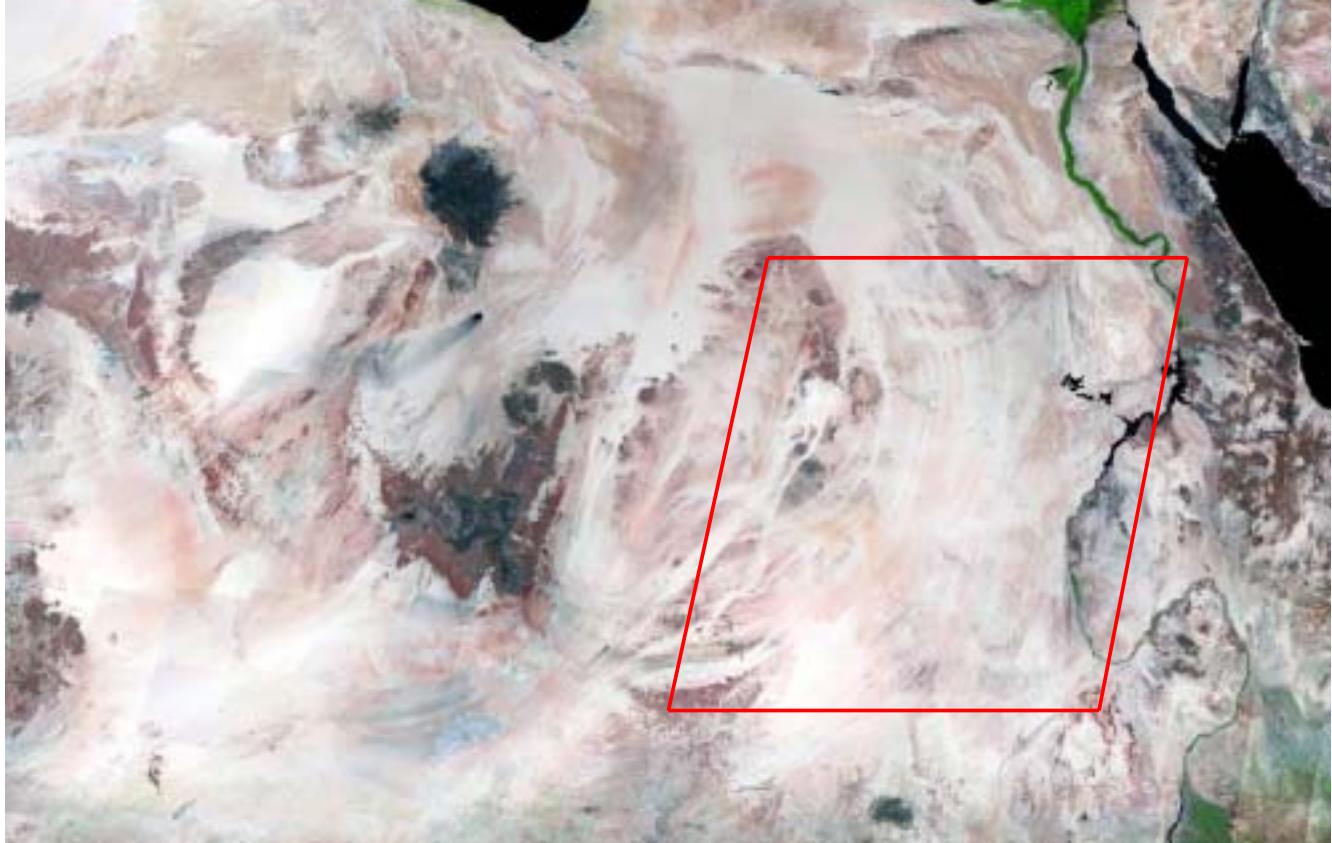
**-> MOISTURE MAPPING ?**  
*dynamics of shallow aquifers*



**STEP 1:** *Eastern Sahara (2002-2003)*  
JERS-1 SAR archives

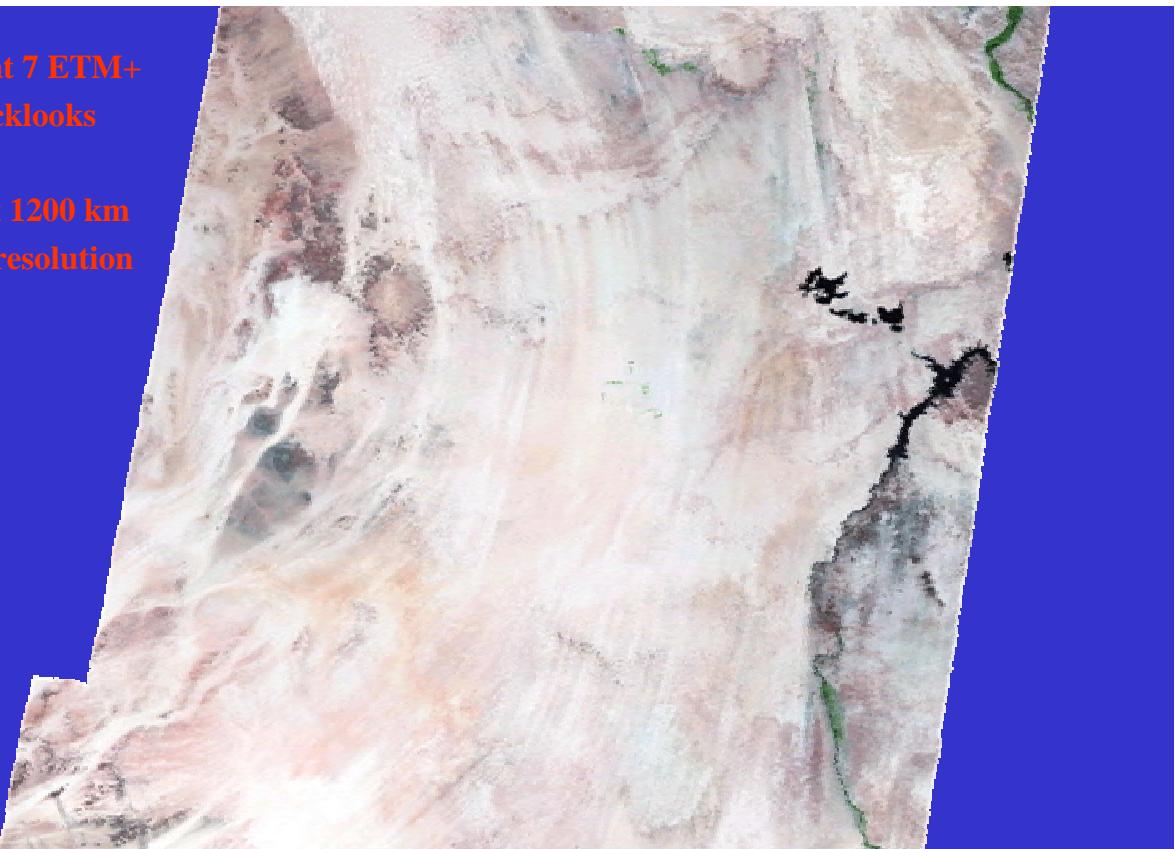


1600 JERS-1/SAR scenes (L-band) > 97 Go  
+ Landsat 7 ETM+ quicklooks (250m)

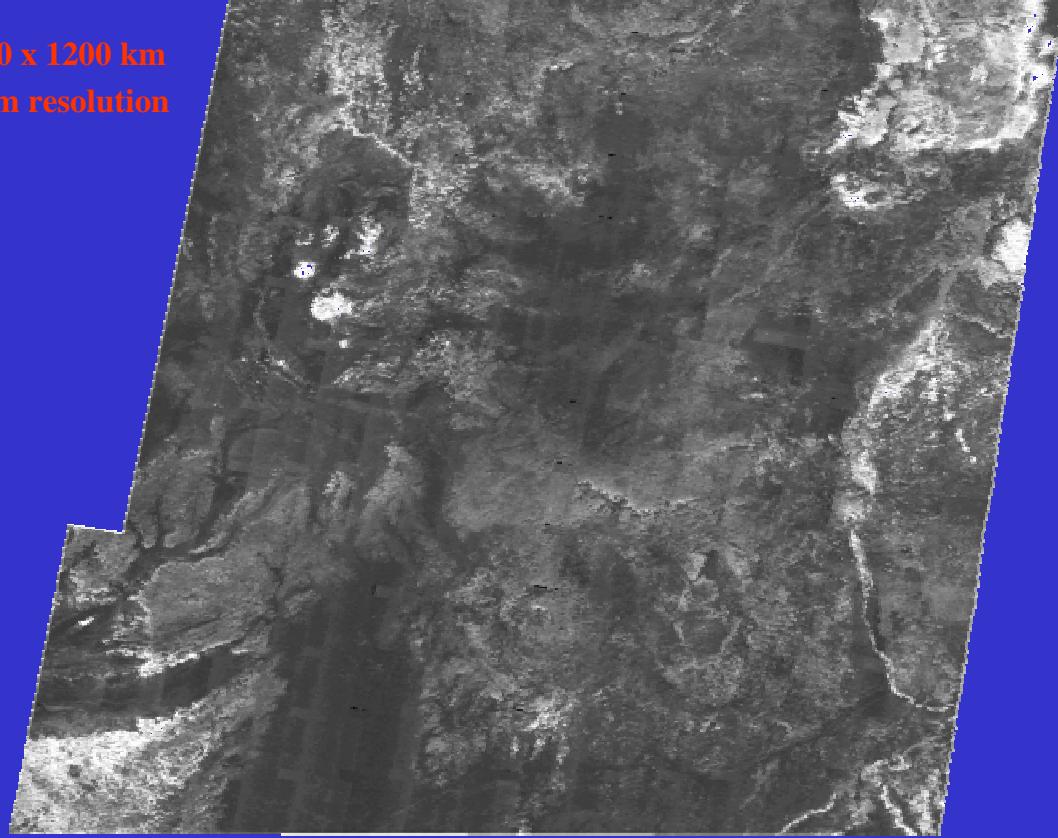


Landsat 7 ETM+  
quicklooks

1200 x 1200 km  
250m resolution



1200 x 1200 km  
250m resolution



## *Paleo-hydrology*

(205 x 190km, 250m resolution)

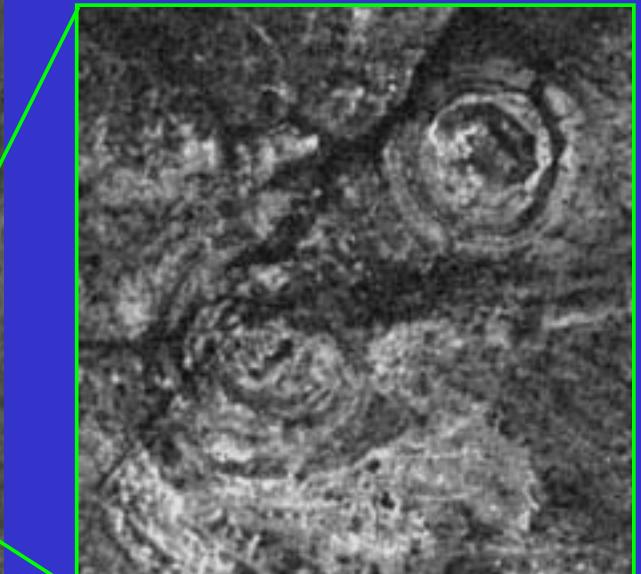


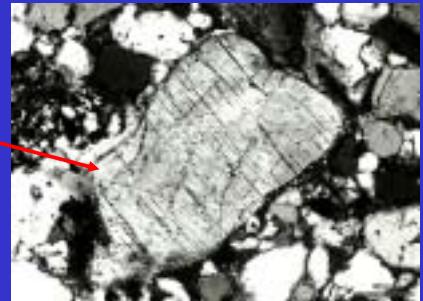
JERS



## ***Impact Craters (1)***

(*60 x 90km, 250m resolution*)



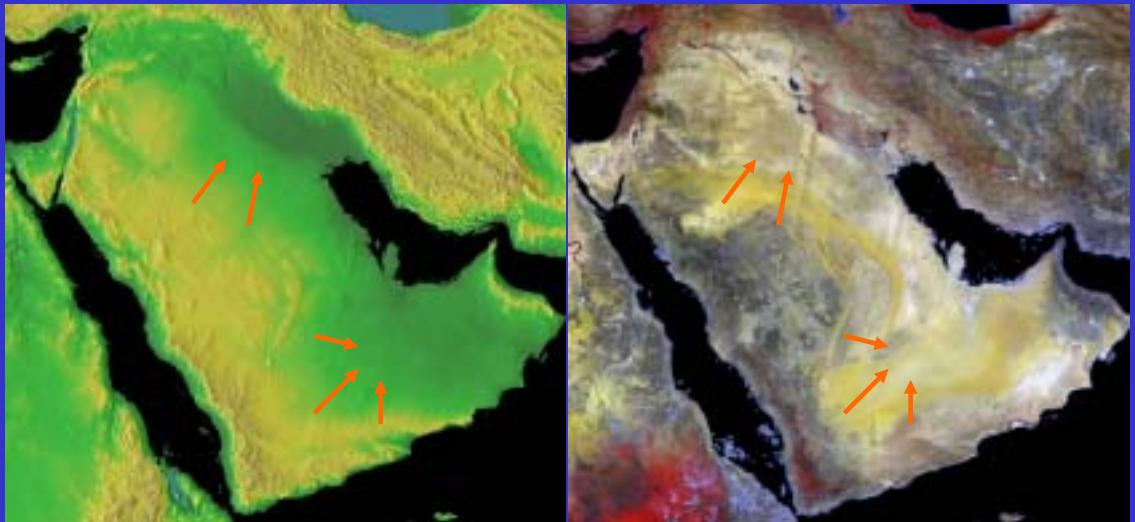


## *Impact Craters (3)*



**Thank you NASDA !!!**



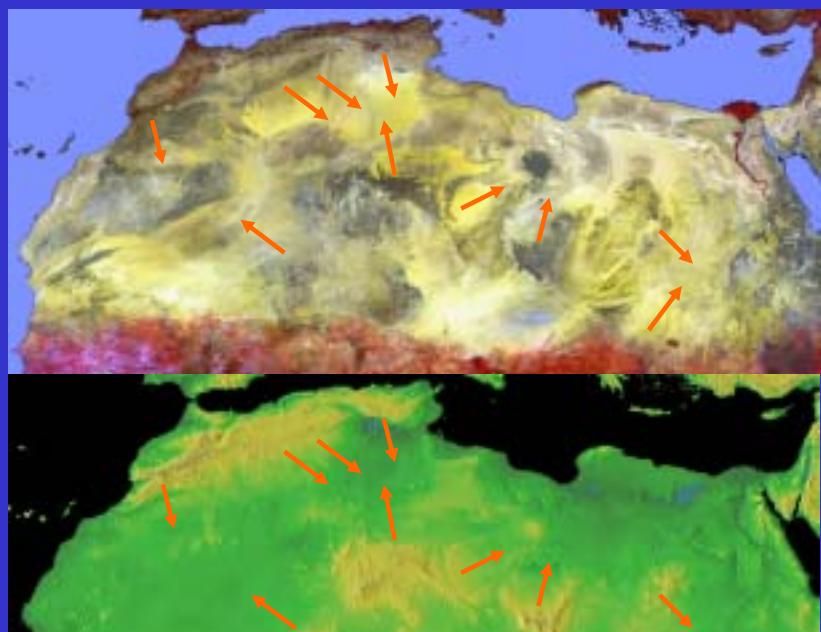


### *STEP 3: Sahara + Arabia (2004-2006)* ALOS/PALSAR dual-pol data

> 6000 PALSAR scenes

+ visible counterpart

ADEOS GLI / Landsat 7  
(low resolution 250m)



**NASDA**

**PALSAR strips: HH+HV 34 deg.  
ground range  
processing level 1.5  
acquisition 5/6/7 2005 (E1+E2+D7)  
+ GLI coverage ?**

**USGS**

**Landsat 7 ETM+ quicklooks (250m)  
SRTM 1x1 deg. coverage (90m -> 250m)**

## **Output Products**

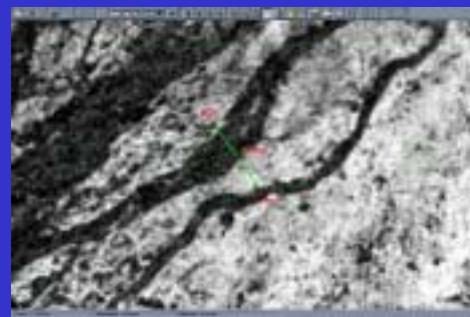
**ALOS PALSAR mosaics (-> 50 m -> 250 m) = AOB + NASDA  
+ visible counterpart (ADEOS/GLI, Landsat 7 ETM+ -> 250 m)  
+ SRTM DEM (250 m)**



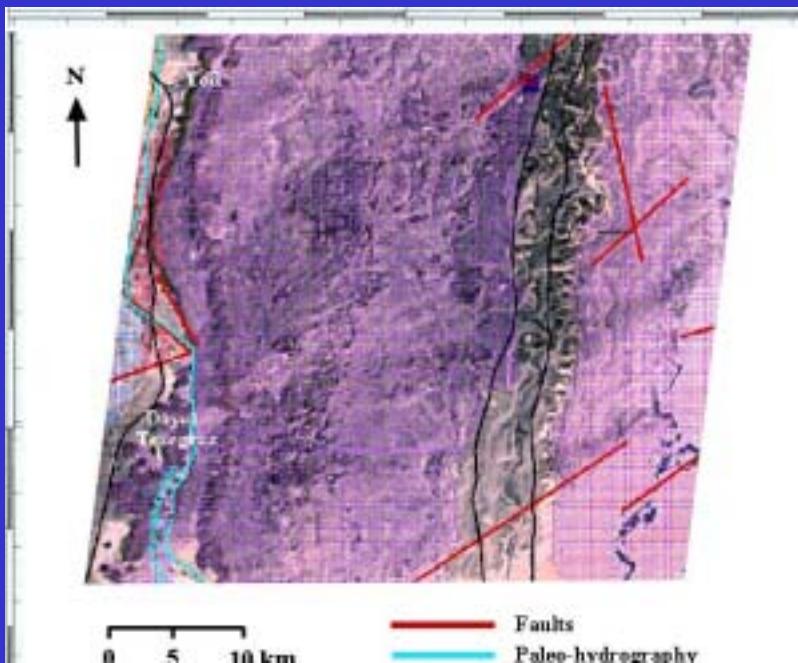
**Web-based access to a GIS database (Sahara, Arabia) = AOB  
-> Wide access for the international community  
-> Tool for defining water prospection strategies**



**Geo-radar maps with geological interpretation = End User  
> New “start point” for water prospecting**



## Geo-radar maps with geological interpretation



## -> National

*Astronomical Observatory of Bordeaux  
French Ministry for Research  
NASDA (JERS-1/ALOS data providing)*

## -> International

*European Union (6th Framework Program) ?  
United Nations ?  
UNESCO (International Hydrology Program) ?*

## Future Partnership

### -> FAO ?

Web access to Saharasar database

### -> UNESCO ?

International Hydrology Program

### -> JPL ?

Analogs to Mars (T. Farr)

### -> ESA ?

Titan Liquid Ices