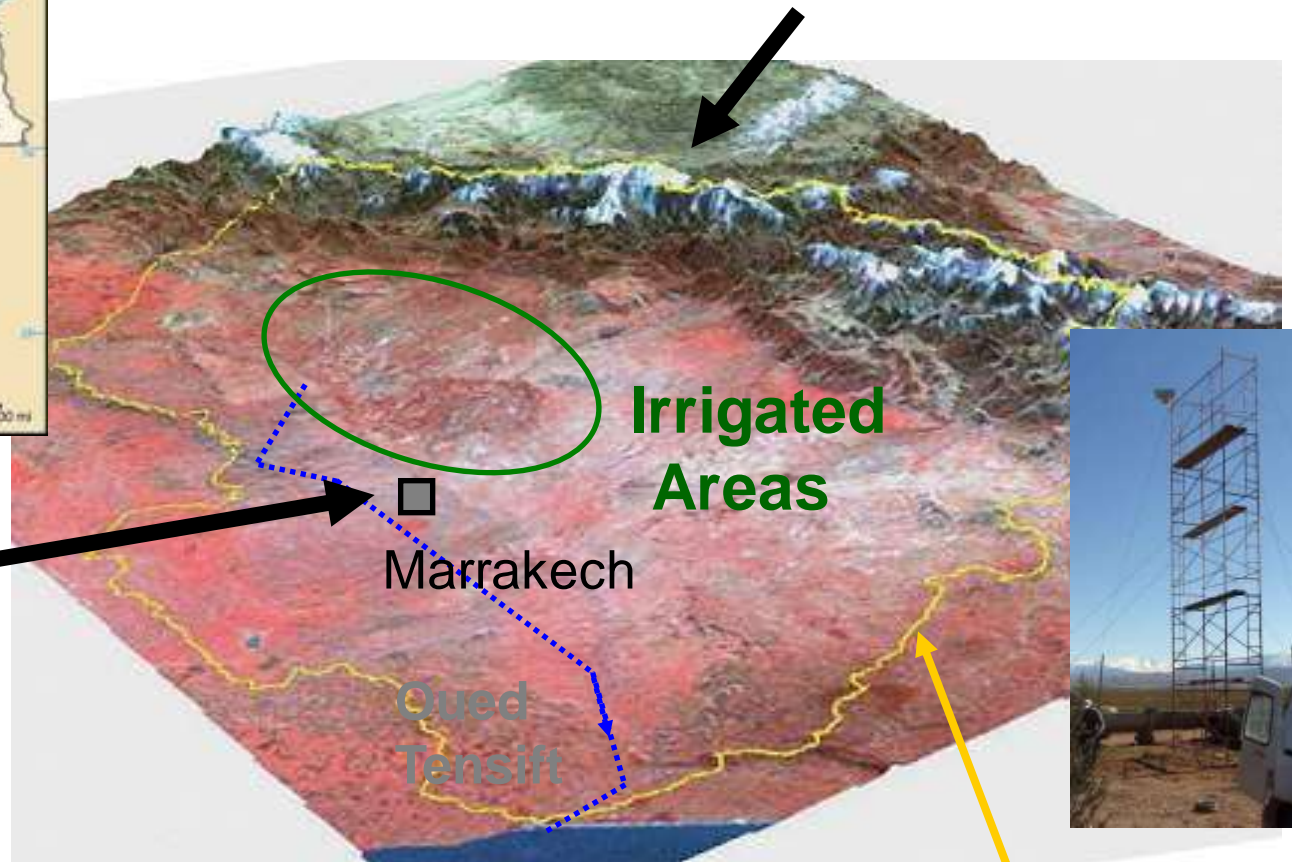




« MedMex » : Tensift's observatory Functioning and hydro-ecological resources in semi-arid regions



High Atlas Mountains
up to 4200 m above sea, up to 600 mm/y precipitation



**Tensift Basin (central
Morocco)**

Arid Plain

Rainfall ~ 240 mm/y

PET ~ 1400 mm/y

**Agriculture Uses 85% of
Available Water**

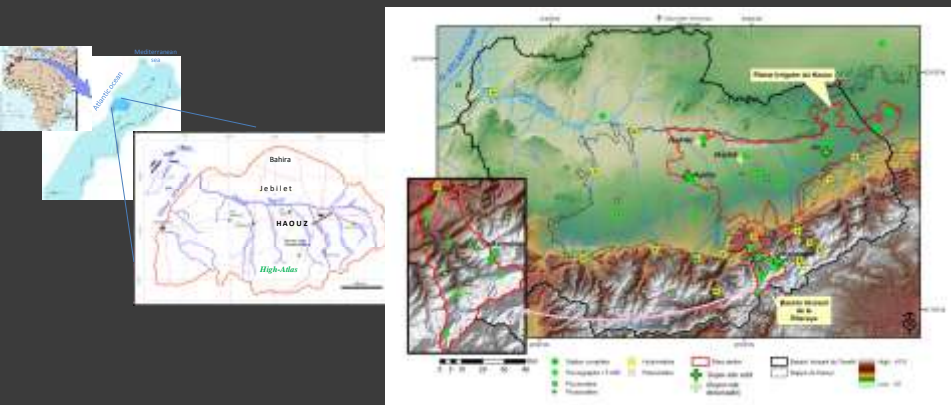
Limits of Tensift water catchment (20 000 km²)



Tensift Basin JECAM site (Morocco)

ABHT, CESBIO, IRD, UCAM, ORMVAH

Team: Berjamy B., Er-Raki S., Jarlan L., Khabba S., Kharrou H., Le Page M., Mangiarroti S., Merlin O.



Site description (started in 2002)

Tensift Basin: Central Morocco, 24 800 Km² , 2.9 Mhab (40% urban and 60% rural)

Climate: Semi-arid in the plain: about 1600mm ETP & 240mm Rainfall. Higher precipitations (snow+rain) in the Atlas range (600mm). Very low cloud coverage.

Landscape: The Haouz Plain (6000 km²) is mainly flat (600 to 400 masl). The Atlas range on the south tops at 4167 masl. The Jbilet range on the North tops at 1000 masl

Agriculture: From traditional to highly modernized. Field Size from 0.5 to 40ha. Highly dependent on irrigation (90% gravity, 10% drip), but rainfed crops also exists.

Crops: cereals (wheat, barley), olive groves (only irrigated), orange orchards.

Soil texture: Diverse, but the agricultural area we are working on is mainly sandy clay loam





Tensift Basin JECAM site (Morocco)



In situ data 2013 (rather similar data since 2002)

1) Three plots were monitored for LAI, Radiometry and Soil moisture.

A set of 2 winter wheat plots and 1 alfalfa plot were visited 11 times at five inner points. A single measurement was realized for:

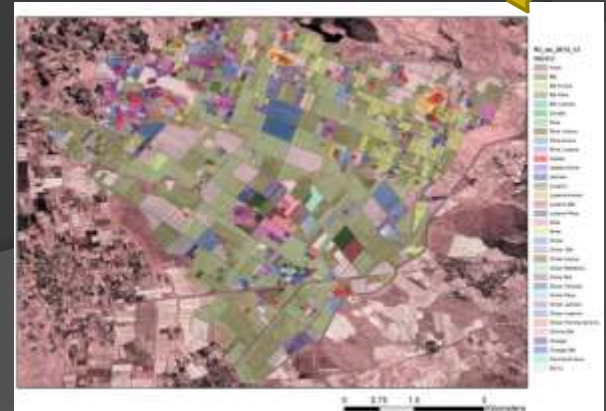
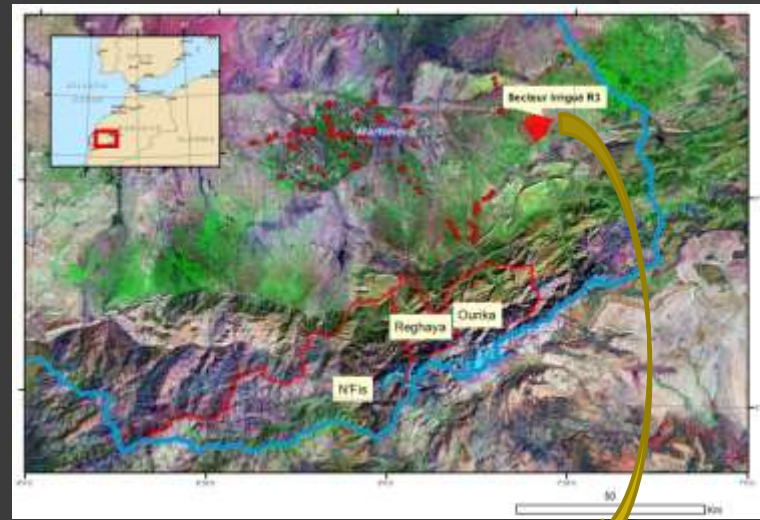
- Leaf Area Index (LAI): Hemispherical photography
- Radiometry: Cropscan MR16
- Soil Moisture: Thetaprobe MR2

2) Landcover at three different scales

- A detailed landcover over a 3000ha irrigated area (1074 plots)
- A sampling of 111 plots over the Tensift plain
- A rough landcover of three upstream watersheds

3) Meteo and Fluxes (H2O)

Two Eddy correlation measurements were conducted over the two wheat plots.





Tensift Basin JECAM site (Morocco)

Ongoing activities

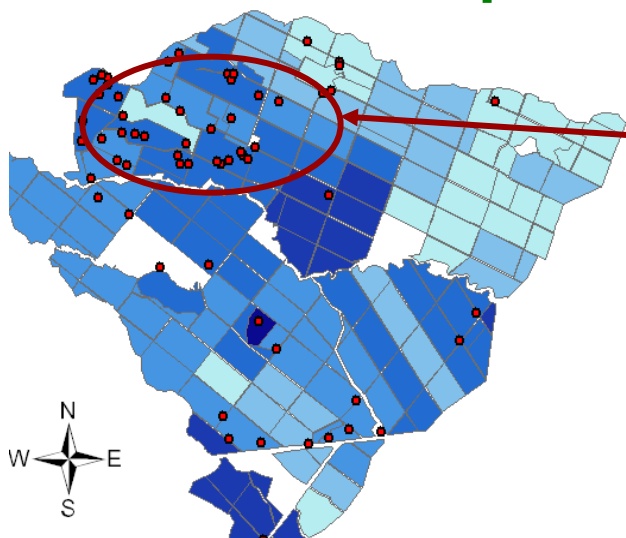
- Comparison of different evapotranspiration estimation techniques based on Remote Sensing Imagery (optical and thermal)
- DISaggregation based on Physical And Theoretical scale Change: Passive micro-wave (SMOS, SMAP) & Optical Data (Modis, Landsat)
- Assimilation schemes (into SURFEX/ISBA)
- Integrated watershed modeling
- Development of a WEB application for irrigation triggering (SAT-IRR)
- Topological and geometrical analysis of a chaotic model obtained for the dynamics of cereal crops cycles observed from satellite in semi-arid region (Pomos & Glomo)

Ongoing collaborations

- CNRST, moroccan program
- LMI TREMA, french project
- ANR-AMETHYST french project
- SICMED/MISTRALS french program
- TOSCA/CNES french program

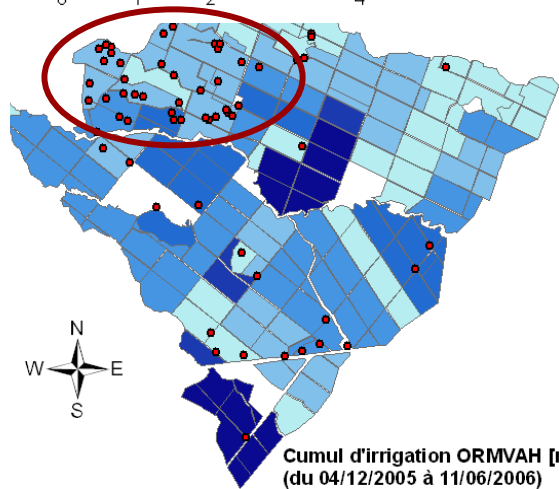
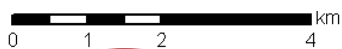
<http://trema.ucam.ac.ma>

Crop water demand monitoring (Morocco)



Over-estimation due to uncontrolled groundwater pumping

Simulated irrigation



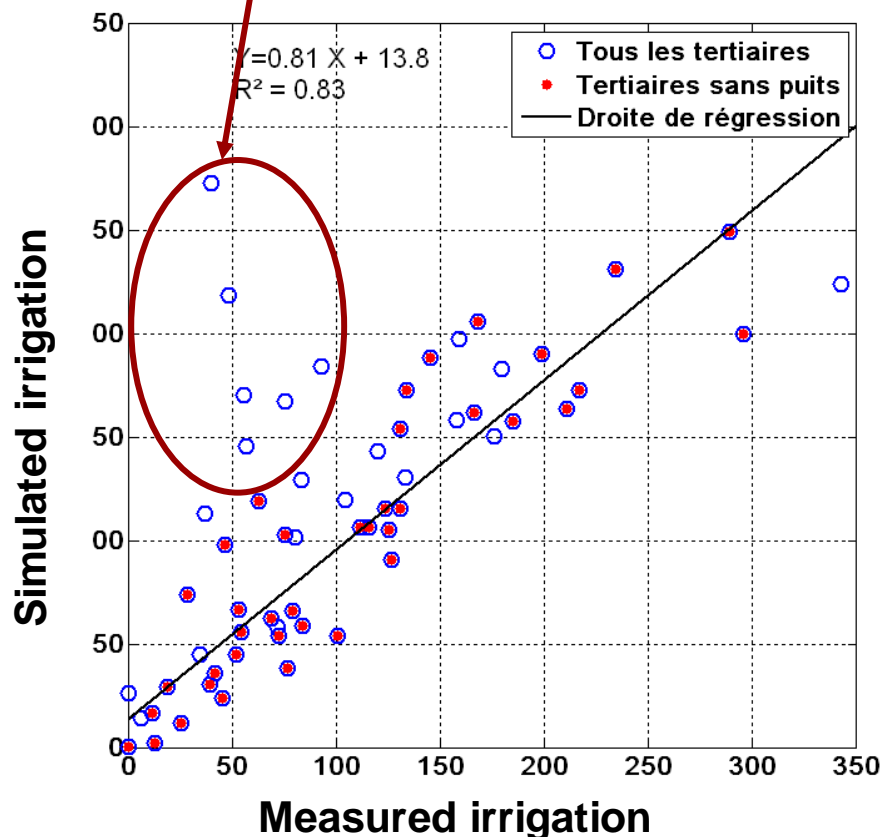
Wells

[mm]



Cumul d'irrigation ORMVAH [mm]
(du 04/12/2005 à 11/06/2006)

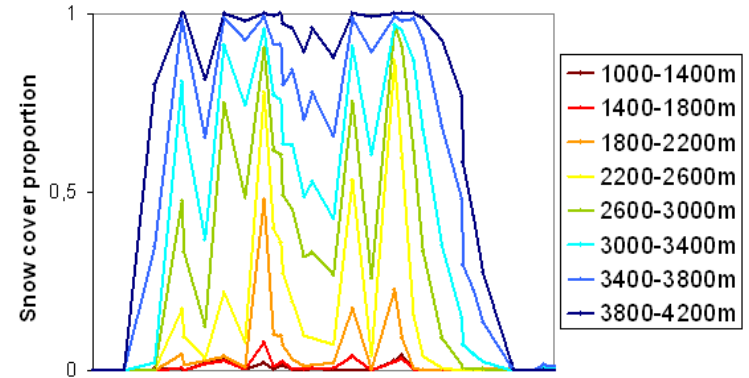
Declared irrigation



Snow cover monitoring and snow melt modeling



High resolution Formosat-2 image over the Atlas mountain, Morocco (february 2008)



Snow cover evolution as a function of time and altitude (winter 2004-2005)

Snow melt and stream flow modeling

Respective contribution of rainfall and snow to the flow of two rivers

