

# ALTOS

## Task 2.2

# Monitoring heterogeneity

- Canopy scale heterogeneity induced by row and multi-strata structures and / or drip irrigation
  - Targets: water fluxes in discontinuous canopies, subsurface hydraulic redistribution.
  - Methodological innovations: joint use of sap flow sensors (installed in both tree roots and trunks), isotopic tracers, eddy-covariance devices and in-situ remote-sensing to characterize the 3D functioning.

Partners: INAT, CESBIO, UNICA, IRTA

Study areas: Merguellil, Segre, Orroli.

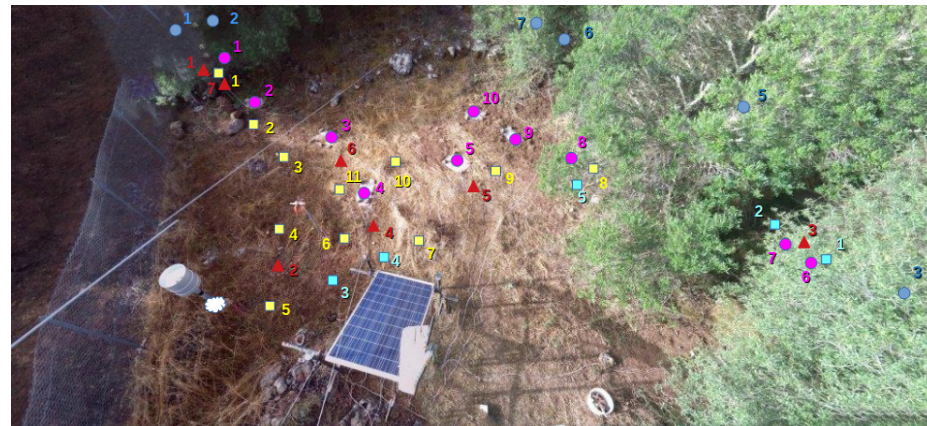
- Landscape scale heterogeneities induced by soil, topography and canopies.
  - Targets: water fluxes in heterogeneous landscapes.
  - Methodological innovations: joint use of eddy covariance data at sub-catchment scales (few tenths of hectares), of scintillometry data across field transects, and of remote sensing data with embedded metric to kilometeric resolutions à analysis of spatiotemporal dynamics.

Partners: INRGREF, SUPCOM, CESBIO, LISAH, UCAM , UNICA, IRTA

Study areas: Cap Bon, Merguellil, Tensift, Segre, Orroli.

# Key features

- Strong link with 1.1, 1.2, 2.1 (data acquisition) and 3.1+3.2 (modelling)
  - Need to characterize impact of **heterogeneities** on the functioning from data gathered in previous tasks, pass it on to constraint models in 3.1+3.2
- 3 types of observations:
  - EC towers
  - low cost network (SM, ...)
  - integrative measurements (LAS, XLAS, EC)



● Stem Sap   ● Root Sap   ■ CS615   ■ CS616   ▲ MPS2   ☁ ARG100

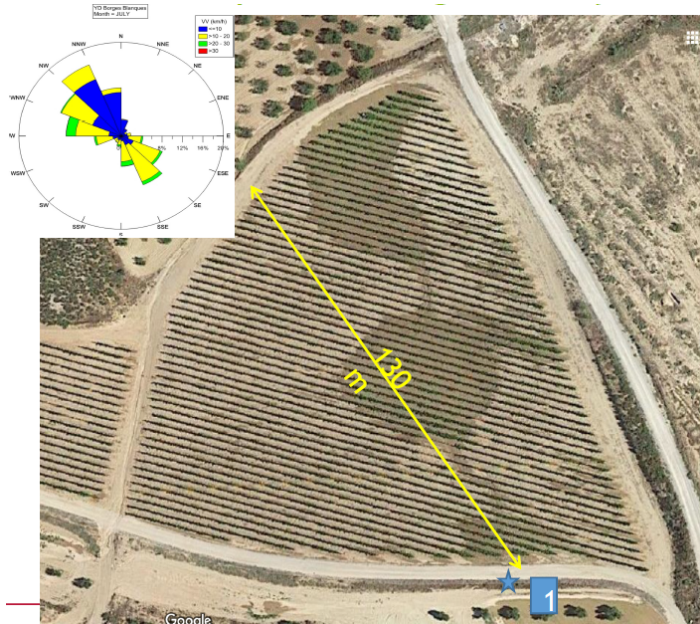
# Canopy scale heterogeneity

- Row crops (Vineyard), isolated trees (Olive, Orange), complex vegetation with understorey, in rainfed conditions or various irrigation types
- Energy budget observations accounting for variability in soil and leaf temperatures (low cost IRT + NDVI ?)
- Water budget observations linked with drip irrigation and the ecophysiological aspects of tree functioning (incl. hydraulic lift etc)
- In-situ RS (VIS/PIR/TIR, Radar) + LR (S3), HR (S2, S1, L8) and VHR (e.g. Pleiades) satellite RS data > ET, E+T inversion using (py)TSEB and SPARSE EB models

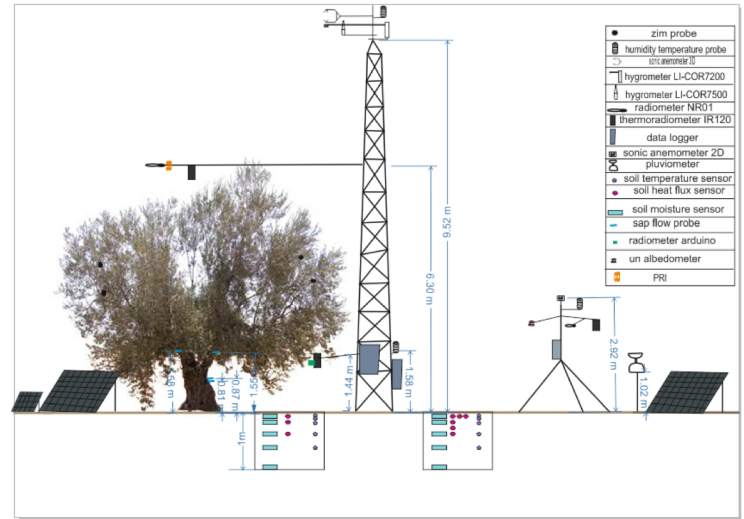
**Key issue: building and sharing protocols, ensuring link with model requirements**

**Key outputs: partitioning ( $E$ ,  $T_{\text{tree}}$ ,  $T_{\text{under}}$ ) + monitoring of phenology and water stress**

# Row crop SP



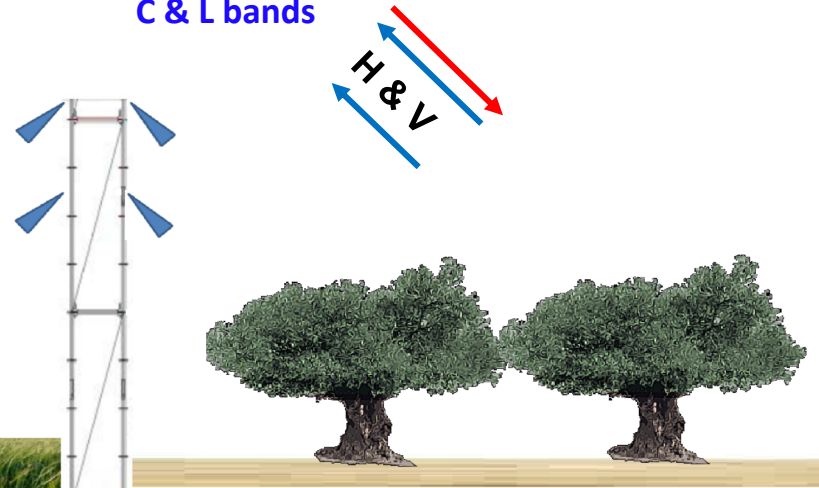
# Isolated Tree TU, MO



# Complex natural landscape IT



# Transmitter/receiver C & L bands



# Landscape scale heterogeneities

- Tensift: Hydrological functioning of the mountain-foothill connecting zone (piedmont)
  - Evaluation of the ETR over the practiced heterogeneous covers,
  - Extension of SAMIR Software,
  - Estimation of deep percolation with water balance (groundwater recharge)
- Kamech:
  - hilly topography
  - need of gap filling
  - analysis of the footprint

