

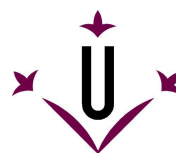
IDEWA project: a water accounting system of irrigation districts including downstream rivers

H2020-PRIMA-S2-2019, 2020-2023, GA# ANR-19-P026-0003

Open Project Day

isardSAT, Barcelona | March 11th, 2022

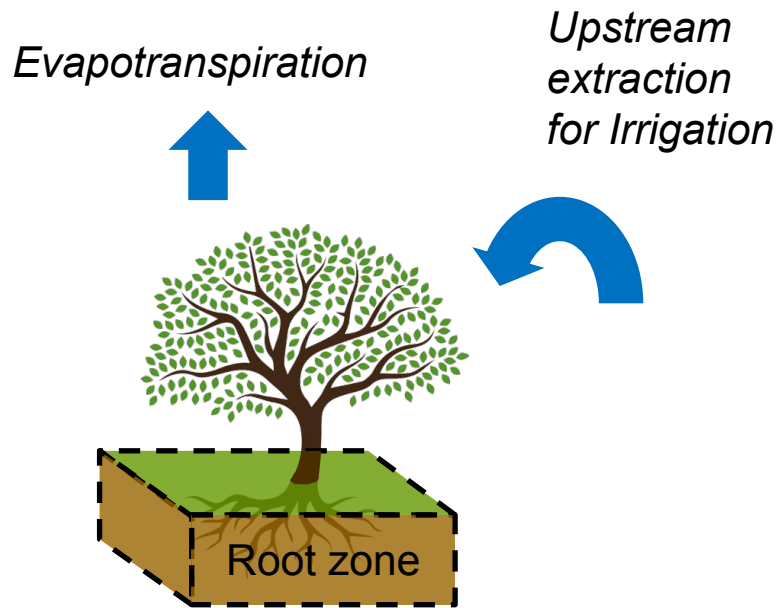


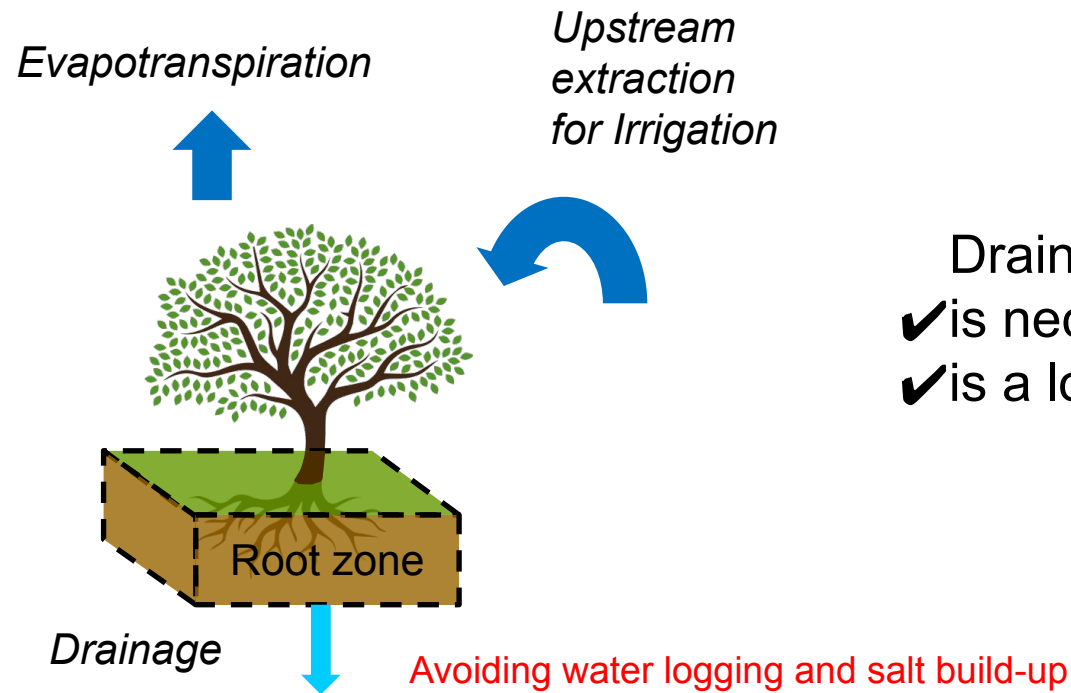


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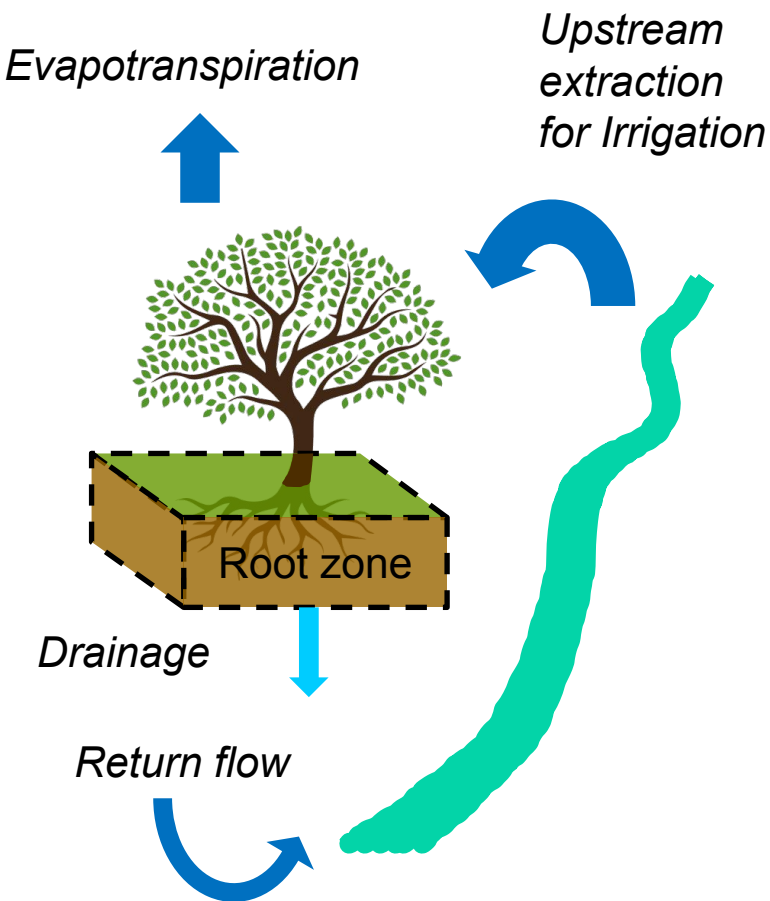


IDEWA: Irrigation and drainage monitoring by remote sensing for ecosystems and water resources management

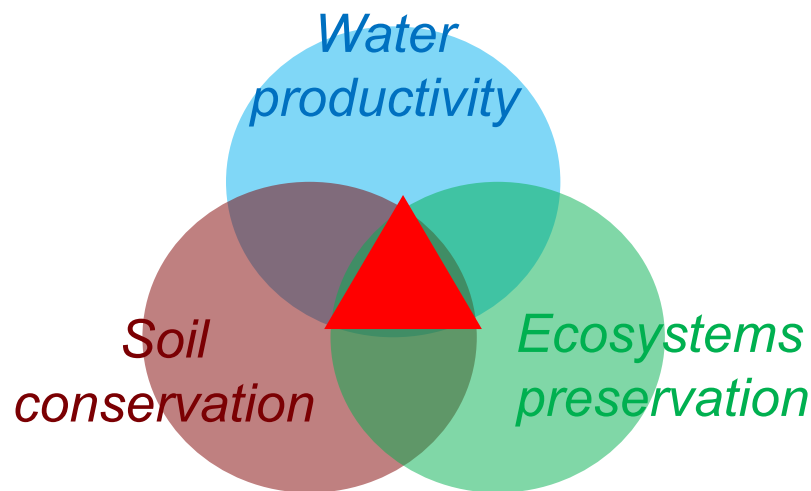




- Drainage :
- ✓ is necessary for agricultural soils
 - ✓ is a loss for crops



- Drainage :
- ✓ is necessary for agricultural soils
 - ✓ is a loss for crops
 - ✓ may affect the quality of downstream rivers



By how much the drained irrigation water impacts the quality of rivers downstream irrigated districts?

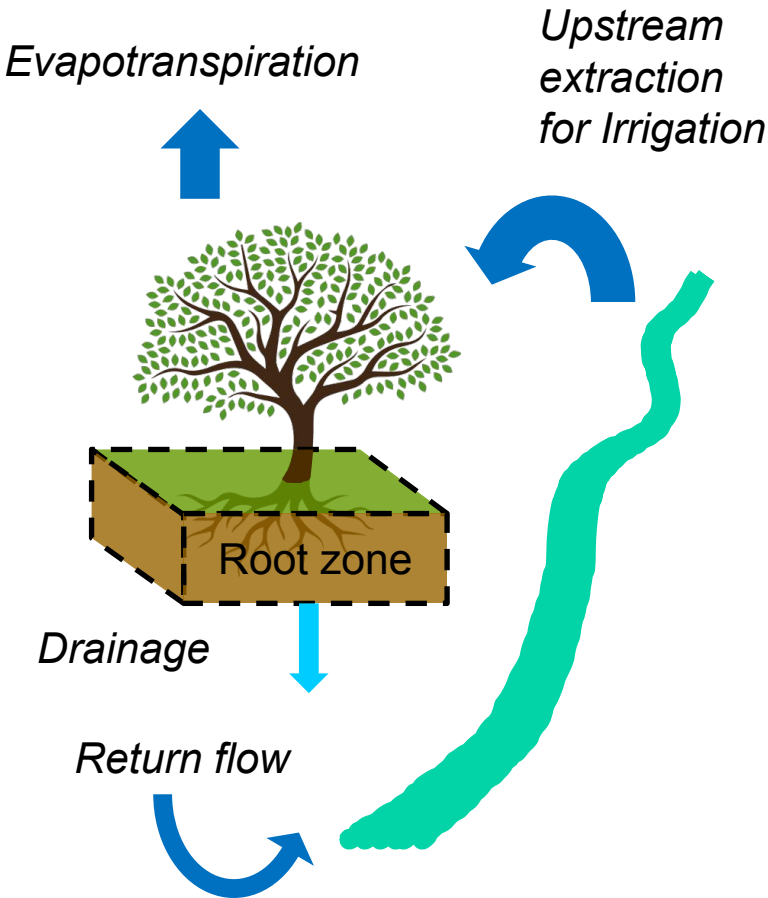
How to adjust irrigation practices according to crop and drainage requirements?



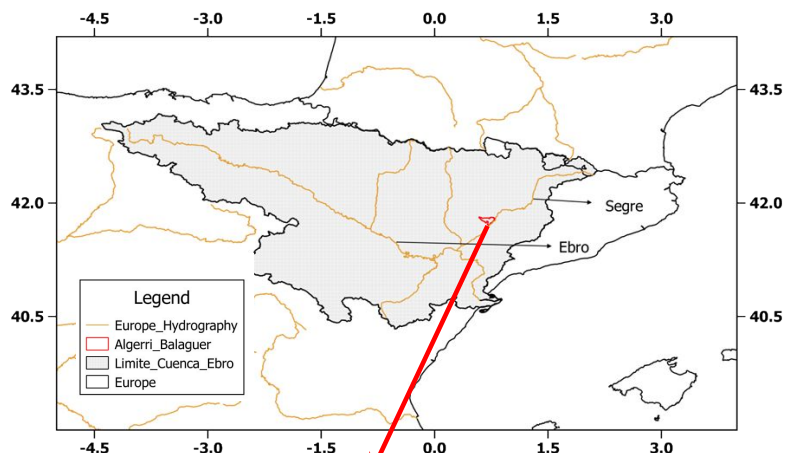
No drainage

Potential drainage

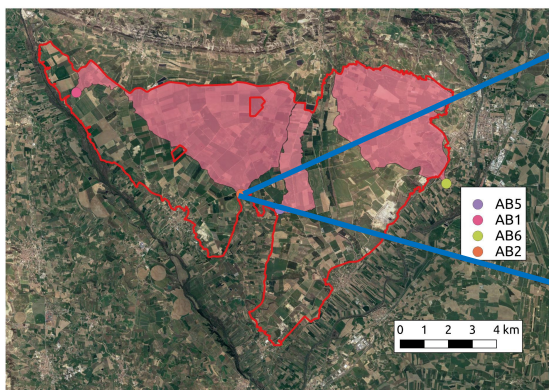
Actual drainage



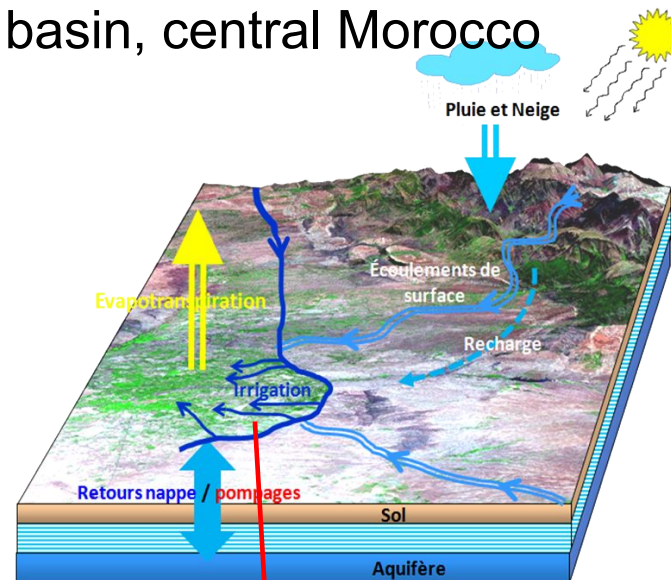
Ebro basin, Northeastern Spain



Algerri-Balaguer district



Tensift basin, central Morocco



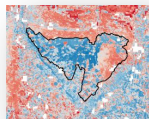
Experimental fields



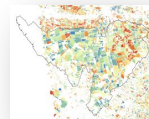
Vegetation index



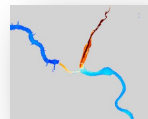
Evapotranspiration



Soil moisture



Water quality index



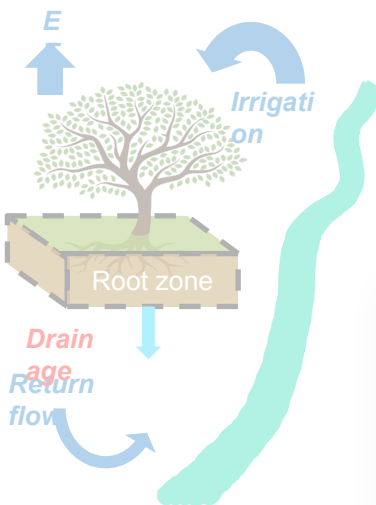
Multi-sensor EO data

Drainage

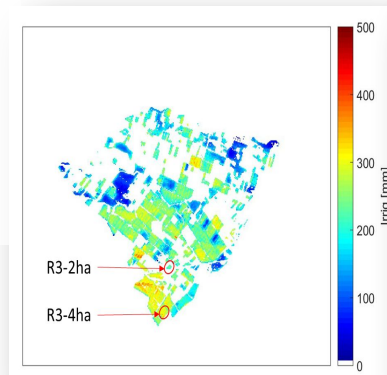


Field measurements

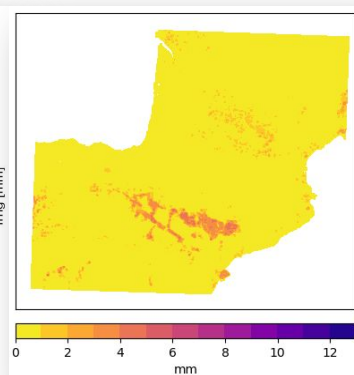
Evapotranspiration



Irrigation estimates at irrigation district scale (SAMIR model)



Irrigation estimates at basin scale (SURFEX model)

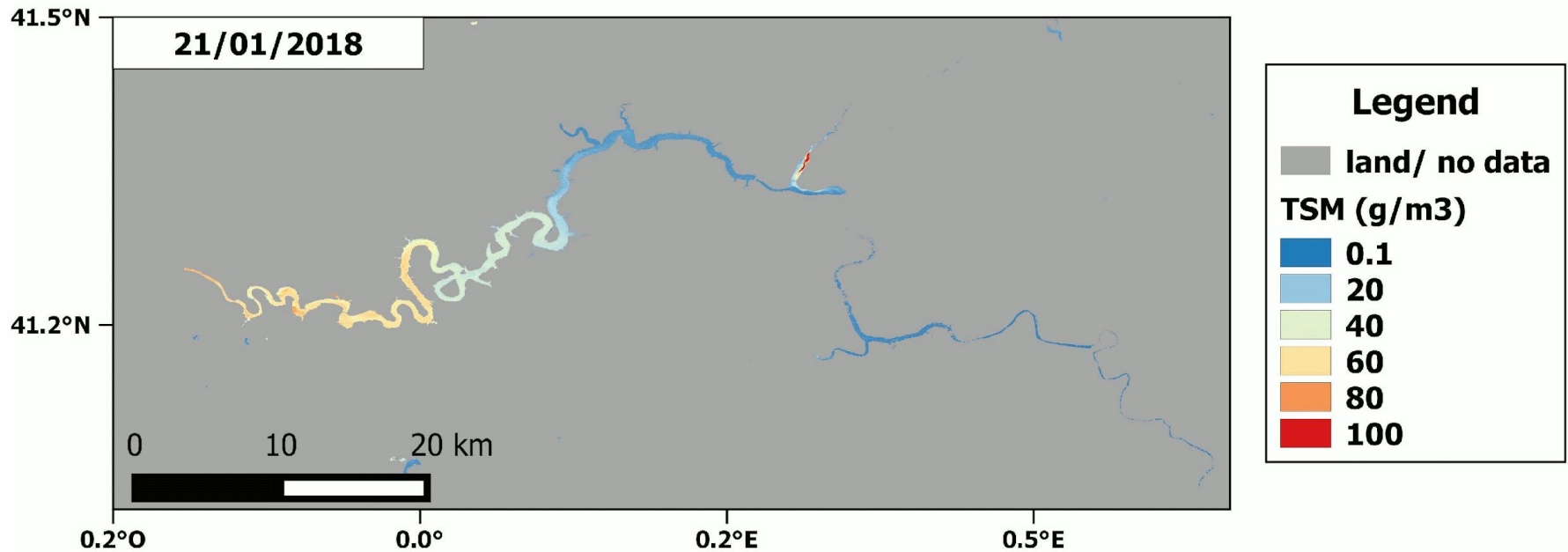


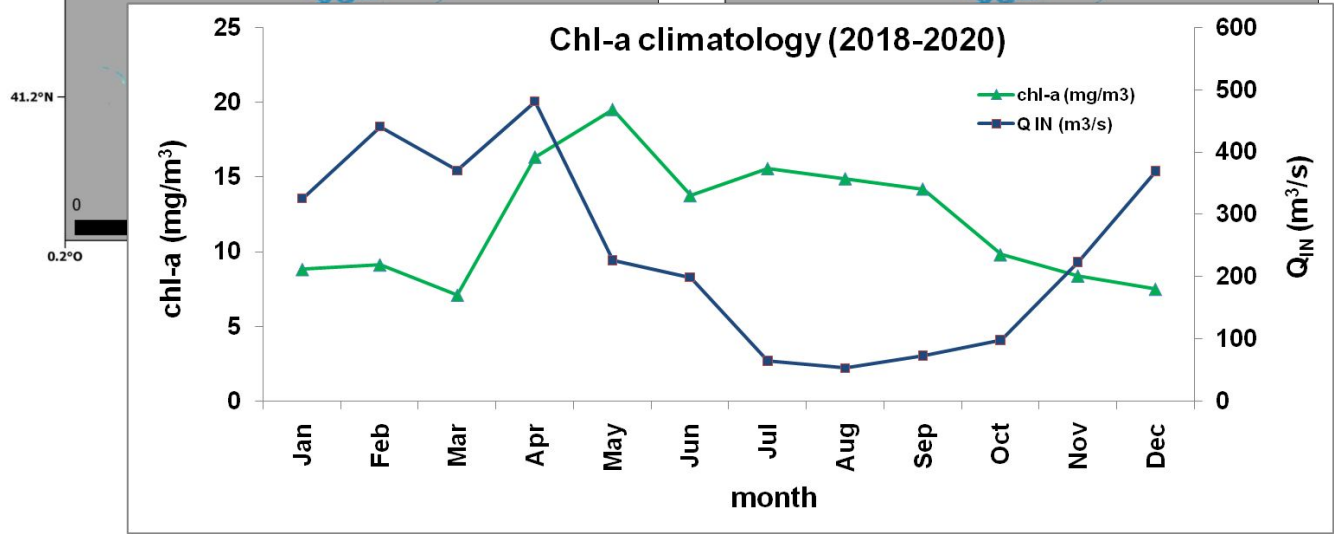
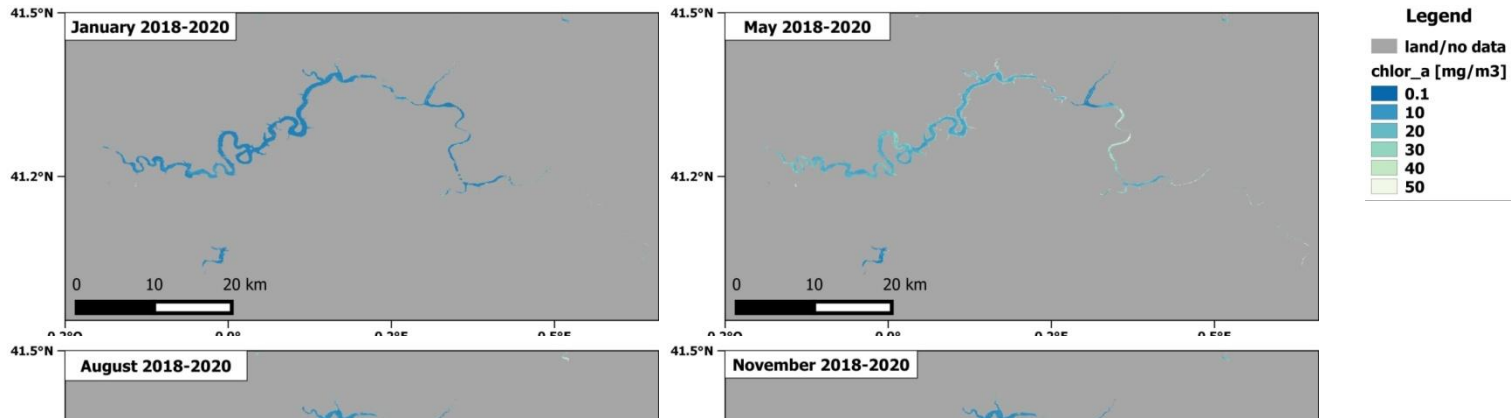
Multi-scale modeling



One year (one image for month in 2018) of Sentinel2-MSI Total Suspended Material concentration (*Nechad et al, 2010*)

$$TSM = \frac{A_p(\lambda) \times \rho_w(\lambda)}{1 - \frac{\rho_w(\lambda)}{C_p(\lambda)}}$$







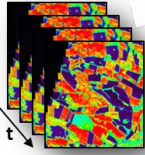
chl-a from April to September:

- Possible explanations:
- high nitrates due to agricultural inputs;
 - low flow or high water residence time;
 - meandering zone.


INPUT DATA



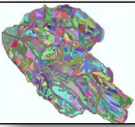
Ruralcat

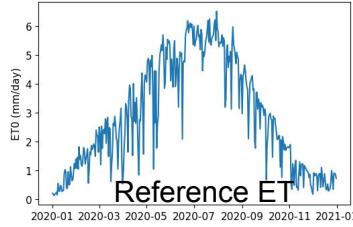
NDVI



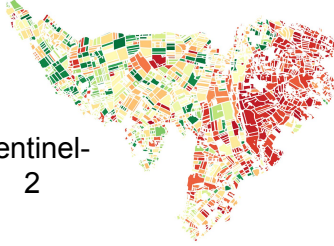
Vegetation type map



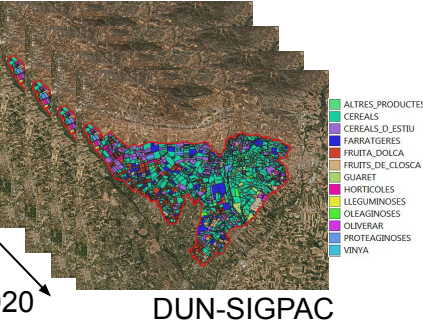
Pedological maps
% Sand
% Clay



Reference ET

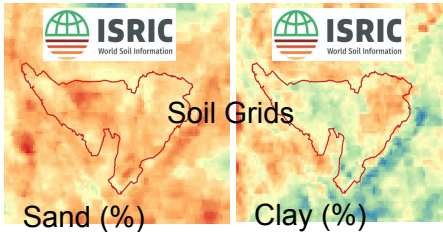


Sentinel-2

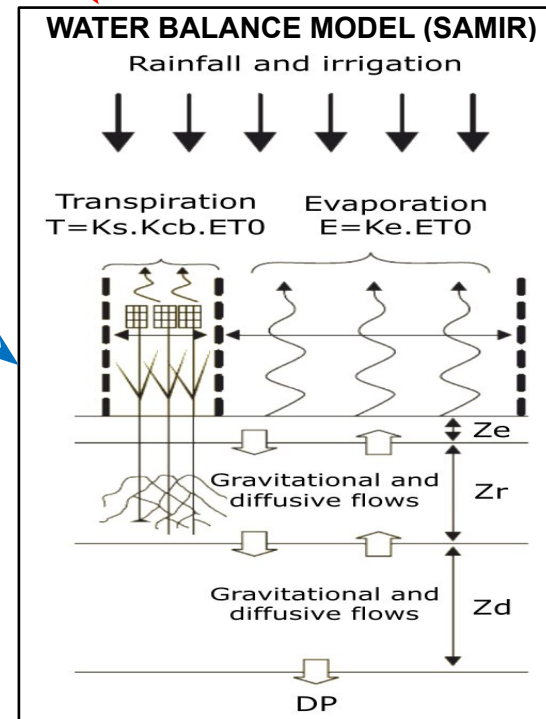
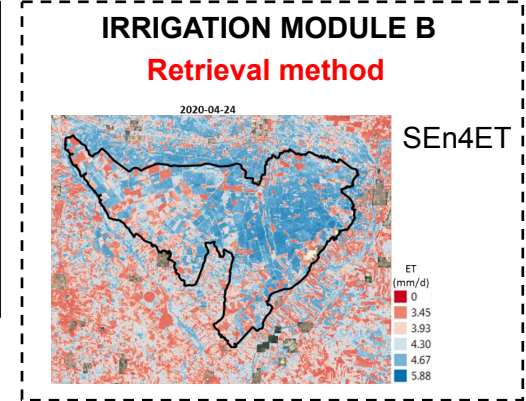
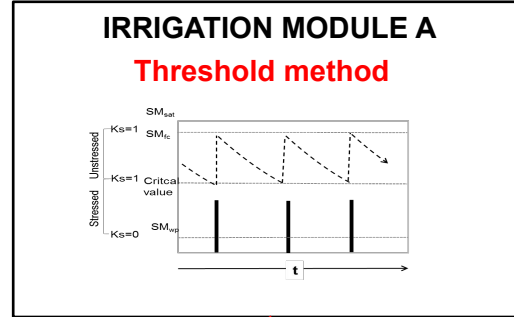


DUN-SIGPAC

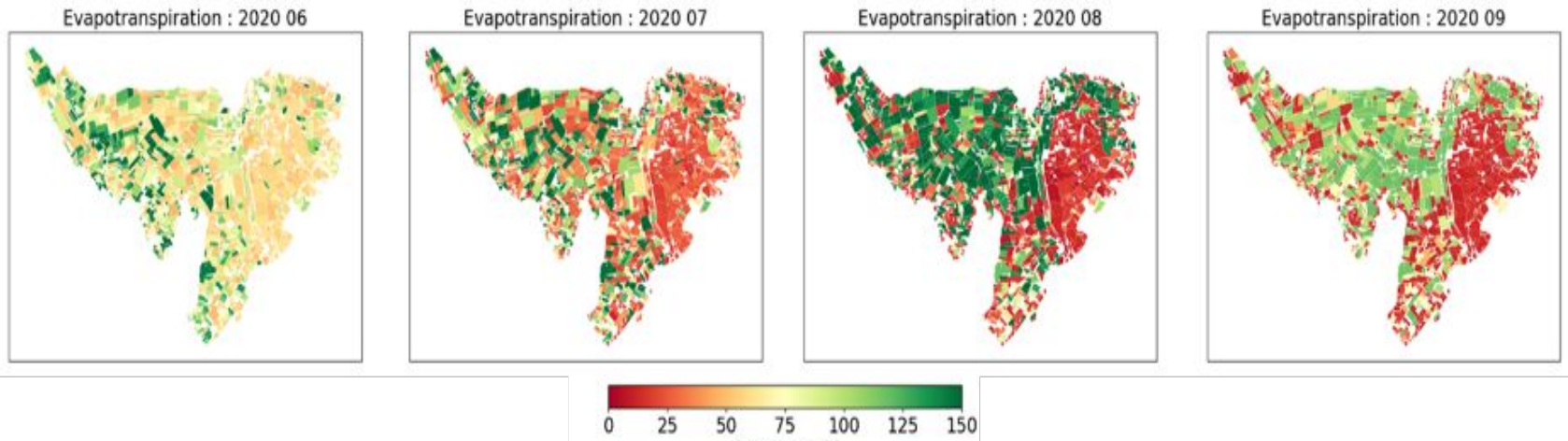
- ALTRES_PRODUCTES
- CEREAIS
- CEREAIS_D_ESTIU
- FARRATGERES
- FRUITA_DOLCA
- FRUITS_DE_CLOSCA
- GUARET
- HORTICOLES
- LLEGUMINOSES
- OLEAGINOSES
- OLIVERAR
- PROTEAGINOSES
- VINYA



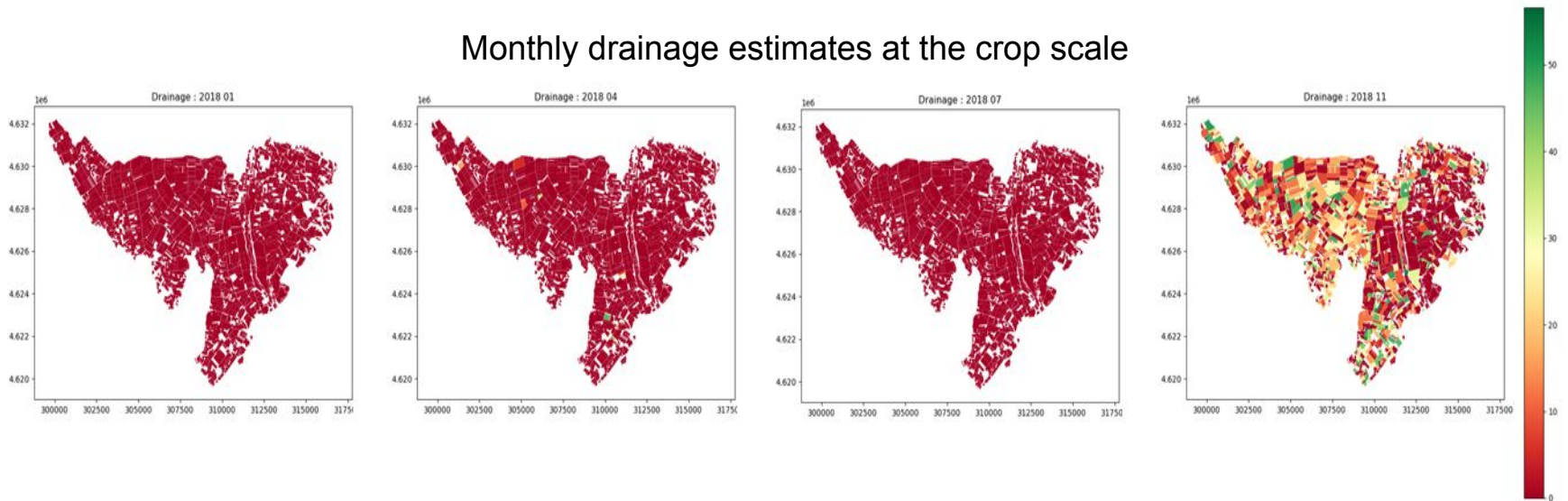
Soil Grids
Sand (%)
Clay (%)

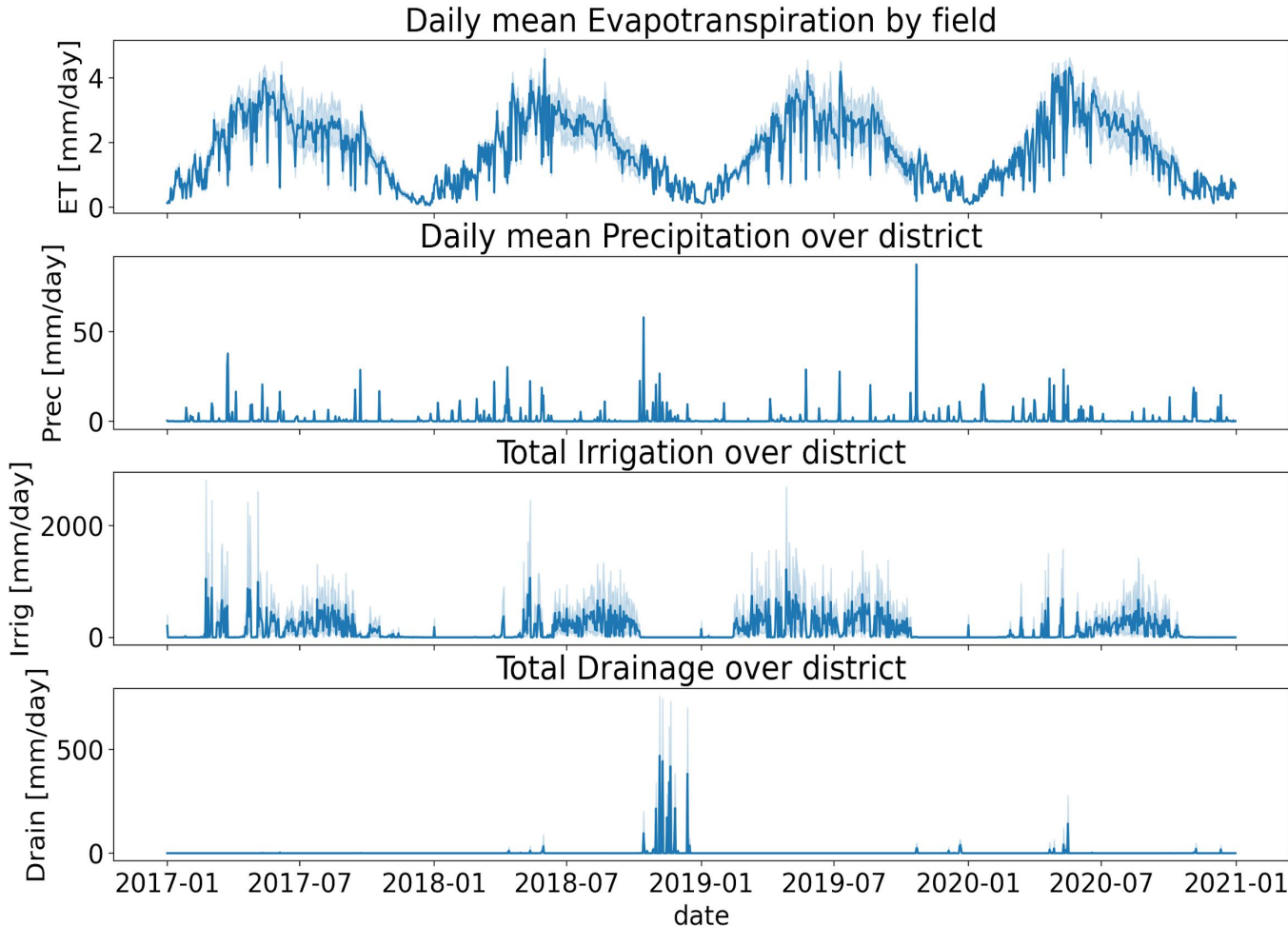


Monthly evapotranspiration estimates at the crop scale



Monthly drainage estimates at the crop scale



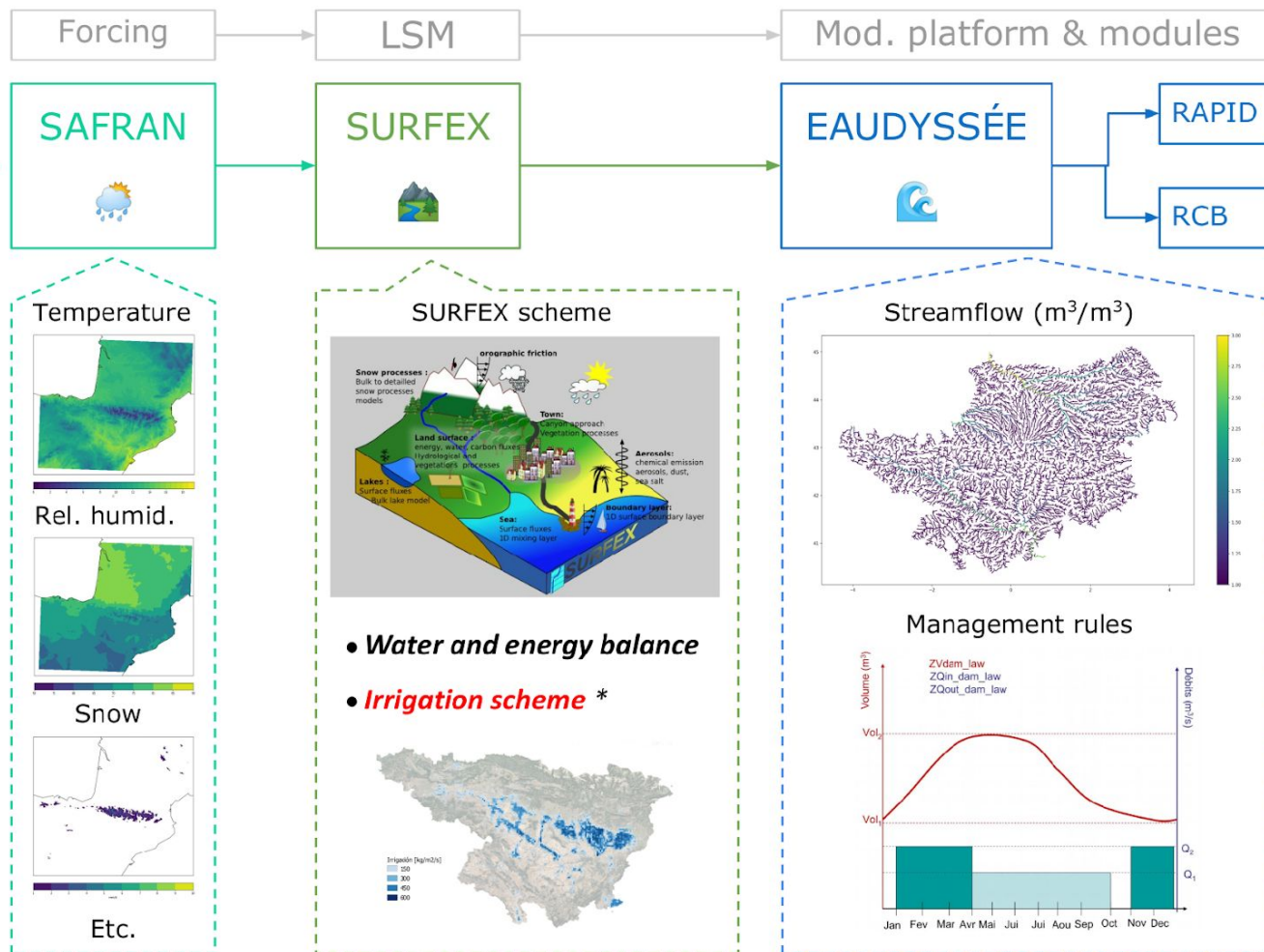


ET highly modulated by ET₀ and phenological data (NDVI)

Inter/intra annual variability

Clearly identify the irrigation period. Different agricultural seasons during the year.

SAMIR is not able to estimate drainage from the simulated irrigation (threshold method)



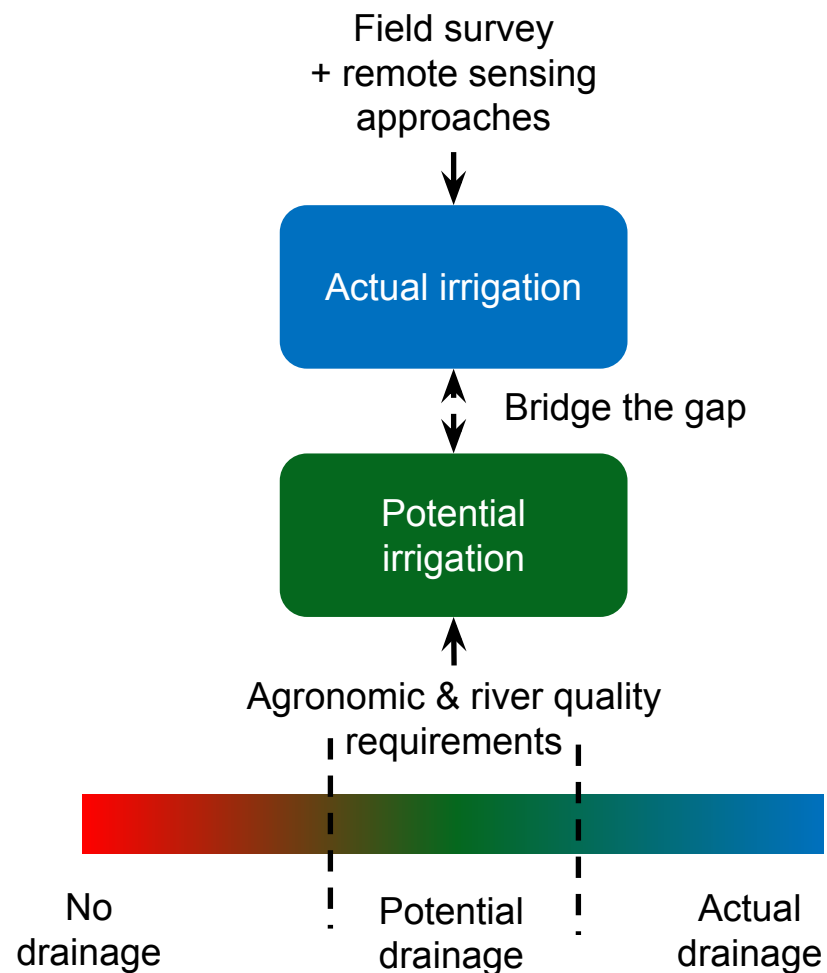
* No link between irrigation and dam management

Assessing the impact of irrigation scenarios on the simulated drainage and river flow



Period	2008 - 2020	
Region	Ebro basin	
	Algerri-Balaguer	
Resolution	1 km	
Type	Reference	Without irrigation scheme
		With default irrigation scheme
	Scenarios	Different irrigation scenarios

SASER simulations



4-minute movie (Arnaud Mansat 2021) of IDEWA activities

<https://www.youtube.com/watch?v=rVKGAKsxyHw>



Thank you!



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