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**CSIC**  
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

# Simulation of the real water cycle: Impacts of irrigation using a land-surface model and remote sensing data

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**IDEWA**



**IRRIGATION+**  
**4DMED-Hydrology**






# Research questions and strategy

## LIASE Science Questions:

- Anthropogenic impacts on the hydrological water cycle.
- Sustainability of current agricultural activities.

## Methodology:

-  SASER modelling chain (SURFEX LSM).
-  New irrigation scheme in v9.
-  Data to validate and improve our simulations
  - a. Remote Sensing Data.**
    - i. ET.
    - ii. Soil moisture.
    - iii. Irrigation.
  - b. In-situ observations.**
    - i. Irrigation observations from canal network (areal).
    - ii. Irrigation observations in Algerri-Balaguer (plot).
    - iii. Drainage network in Algerri-Balaguer.
    - iv. ET observations (LIAISE and IDEWA).
    - v. Streamflow and dam volume.

## IDEWA (PRIMA)

- Area: Algerri-Balaguer (AB) and Ebro basin.
- Impact of different irrigation scenarios on drainage, ET and streamflow.
  - Observed scenario.
  - Alternative scenarios.

## IRRIGATION+ (ESA)

- Area: Urgell, Pinyana, CAyC, AB and Ebro basin.
- Development of RS irrigation datasets (soil-moisture based).
- Validation by feeding RS irrigation observations to SASER and comparing to observations (streamflow, ET, ...).
- Assessment of impact of irrigation on ET and streamflow (using SASER).
- Usefulness of RS datasets for stakeholders.

## 4DMED-Hydrology (ESA)

- Resolving the land water budget of the Med. (1km, 1 day).
- Ebro basin case study.
- Estimation of land evaporation (1km, 1 day).
- Remote sensing and LSM.

## PIRAGUA (POCTEFA)

- Future climate scenarios using SASER (natural cycle only).


# SASER : SAFRAN-SURFEX-Eudyssée-RAPID

## SAFRAN

- **Meteorological forcing dataset.**
- Observations: AEMET + SMC (meteo.cat).
- Period: 1979-2020.
- Geographical domains and spatial resolution.
  - Iberia (5 km)
  - Pyrenees (2.5 km).
  - Ebro (1 km).
- ERA5 as first guess.

Forcing dataset to be published.

## SURFEX LSM

-  New irrigation scheme.
- Modified ECOCLIMAP SG
- **Improved cover map on irrigated areas (based on SIGPAC).**
  - Improved actual irrigation map (based on SIGPAC + LAI assimilation).
  - New Irrigation method map.
- 5 km (Iberia), 2.5 km (Pyrenees), 1 km (Ebro).

Improved Ebro  
ECOCLIMAP-SG  
dataset to be published.

## Eaudyssee-RAPID

- River routing
- Dams (not fully implemented).
- 1 km (HydroSheds).

