ACCWA

Accounting for Climate Change in Water and Agriculture management

H2020-MSCA-RISE-2018, 2019- 2023

Grant agreement no: 823965

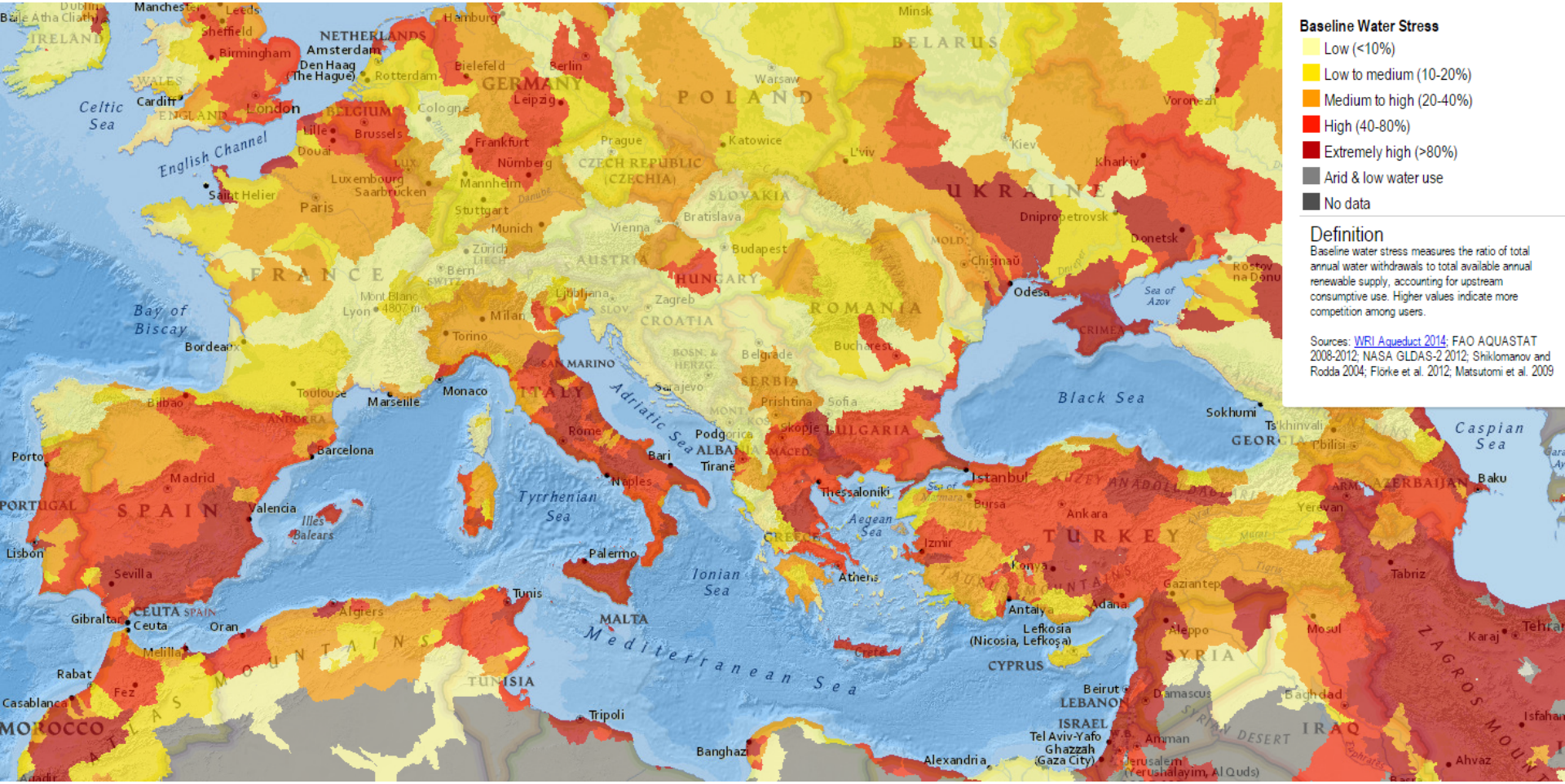
OPD Meeting UCAR, November 12th, 2019

Marie Curie Actions

HORIZON 2020

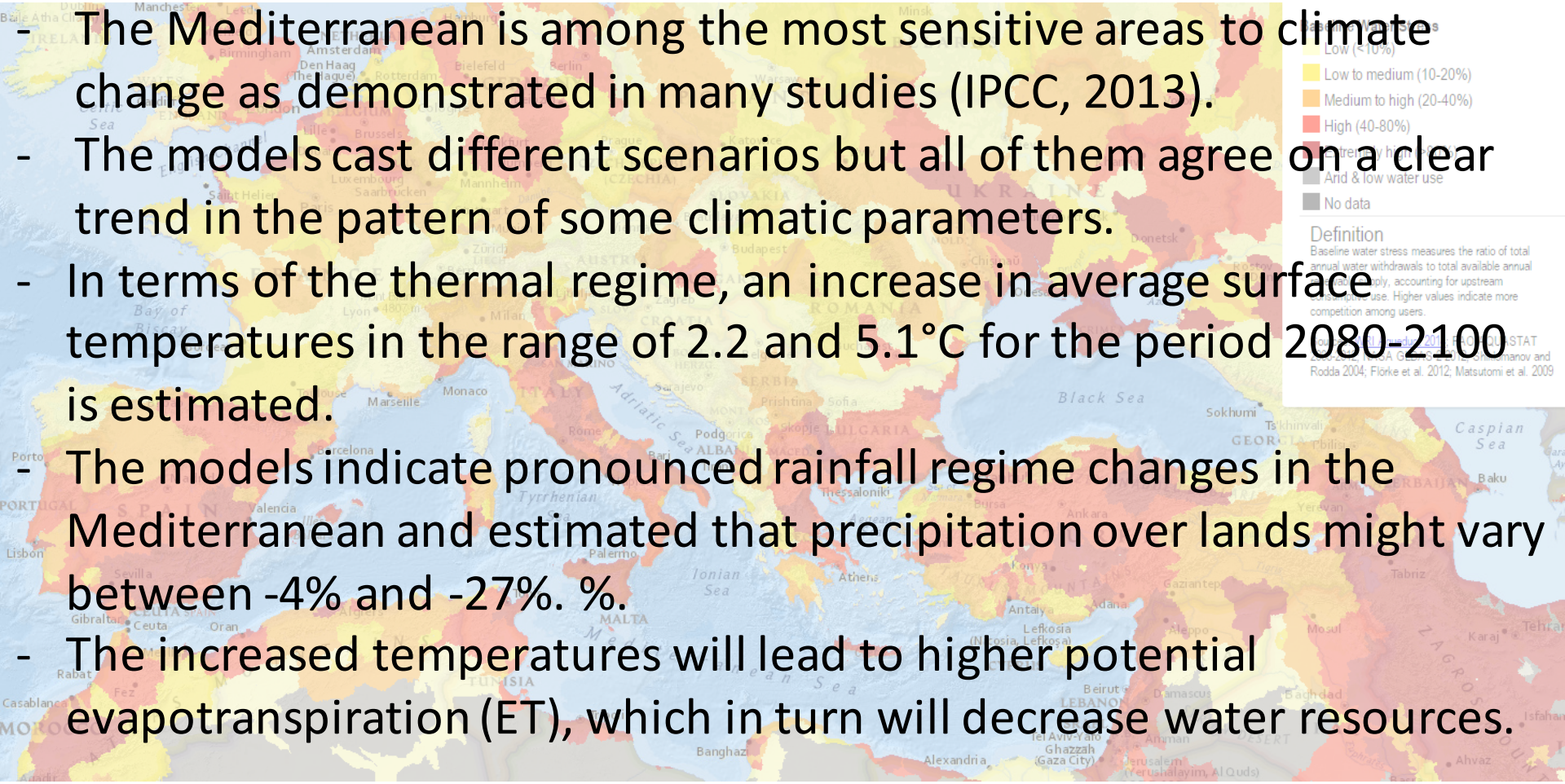
ACCWA

Context



Context

- The Mediterranean is among the most sensitive areas to climate change as demonstrated in many studies (IPCC, 2013).
- The models cast different scenarios but all of them agree on a clear trend in the pattern of some climatic parameters.
- In terms of the thermal regime, an increase in average surface temperatures in the range of 2.2 and 5.1°C for the period 2080-2100 is estimated.
- The models indicate pronounced rainfall regime changes in the Mediterranean and estimated that precipitation over lands might vary between -4% and -27%. %.
- The increased temperatures will lead to higher potential evapotranspiration (ET), which in turn will decrease water resources.



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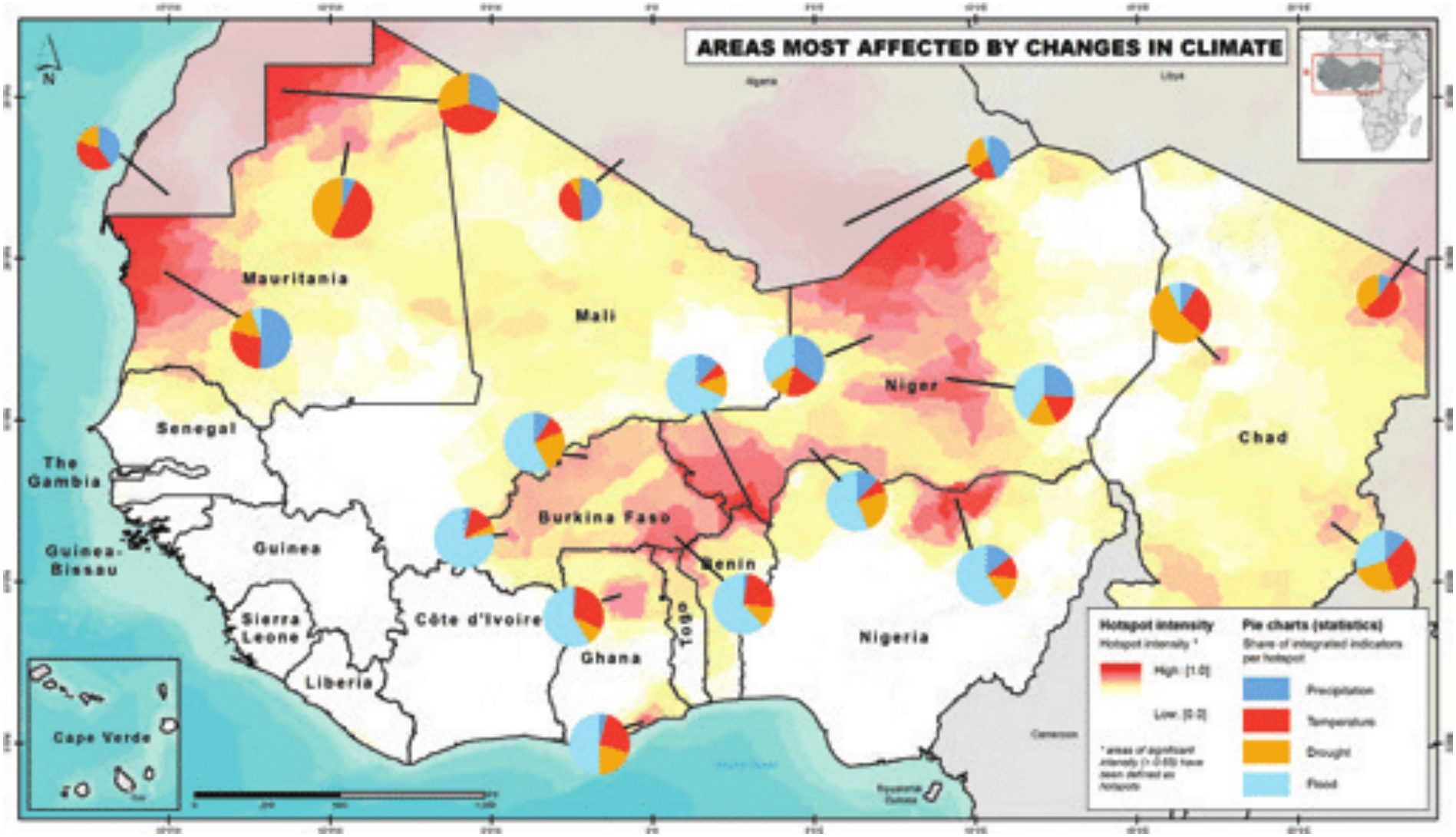
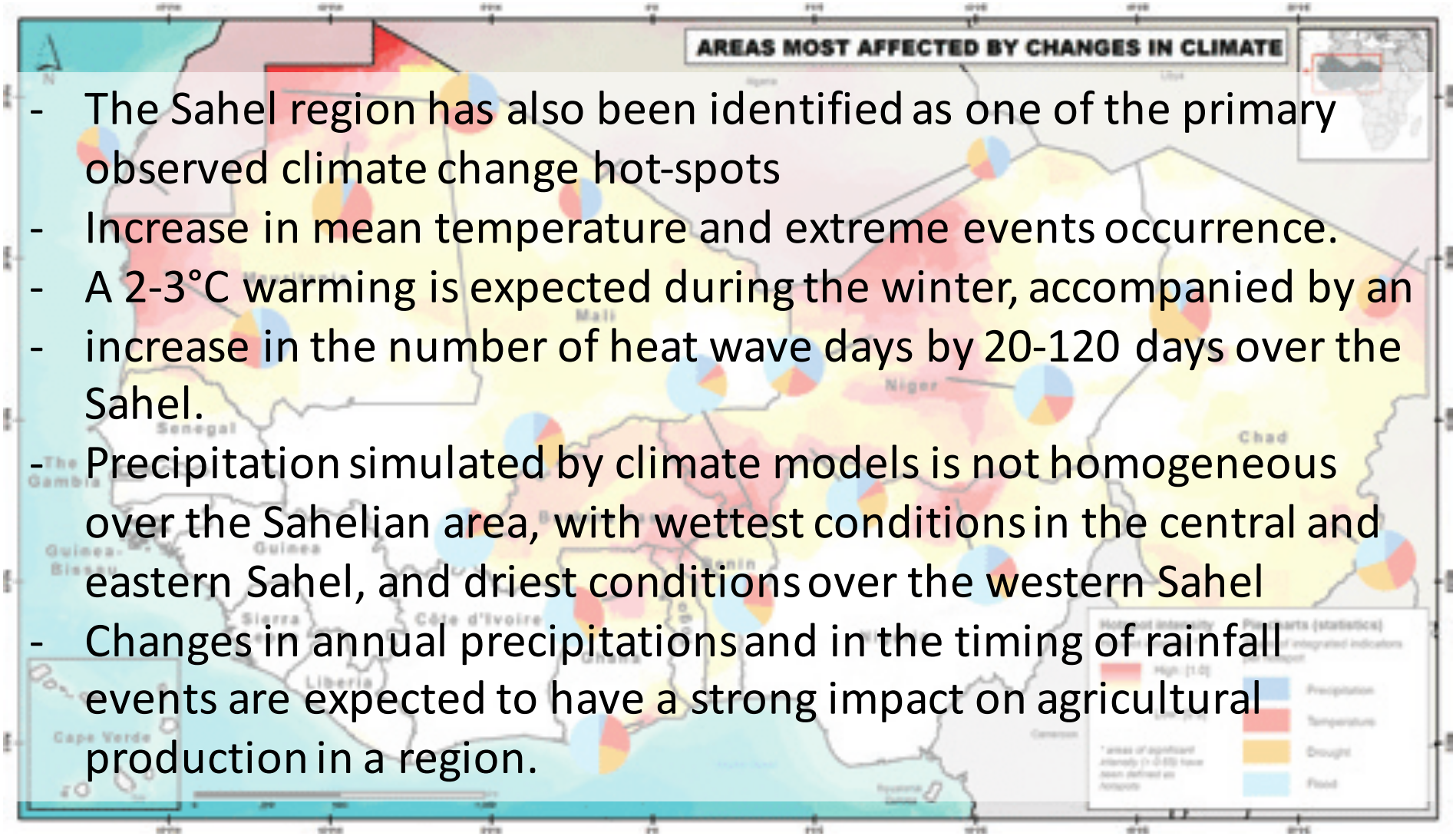
Context



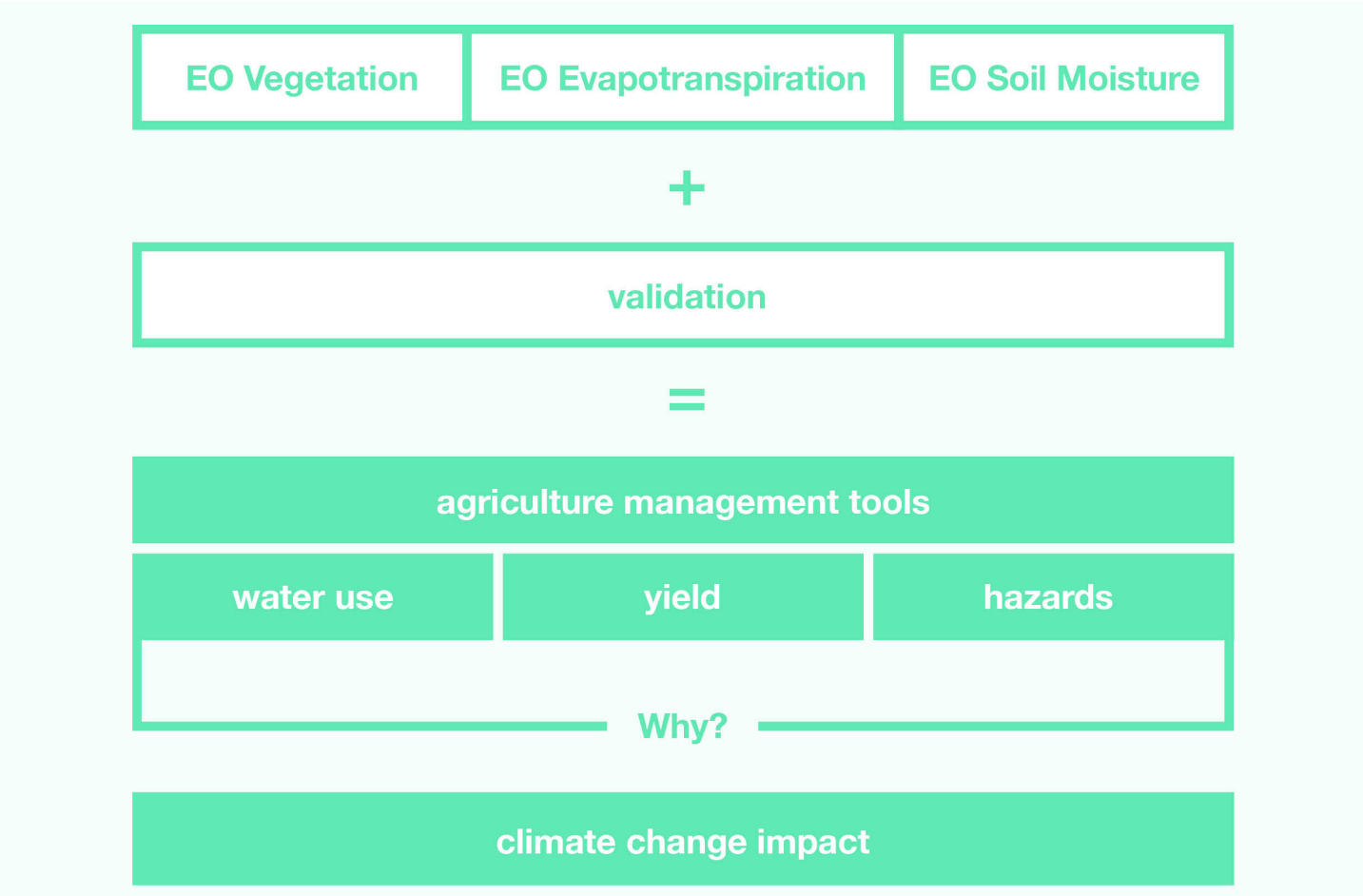


- The Sahel region has also been identified as one of the primary observed climate change hot-spots
- Increase in mean temperature and extreme events occurrence.
- A 2-3°C warming is expected during the winter, accompanied by an
- increase in the number of heat wave days by 20-120 days over the Sahel.
- Precipitation simulated by climate models is not homogeneous over the Sahelian area, with wettest conditions in the central and eastern Sahel, and driest conditions over the western Sahel
- Changes in annual precipitations and in the timing of rainfall events are expected to have a strong impact on agricultural production in a region.

- **Water:** A rapid change in the water cycle due to increased evaporation and less rainfall
- **Soil:** A drop in water storage capacity (because of changes in porosity as a result of temperature change, making it drier), accelerated desertification which is already underway (soil over-use and depletion)
- **Forests:** increased fire hazard

- **Dryland:** ET increase -> decrease in Yield
- **Irrigated Crops:** ET increase -> increase of competition for water resources
- **Hazards:** increased extreme weather: dry spells, severe storms and huricanes -> droughts, floods, fire risk and pests.

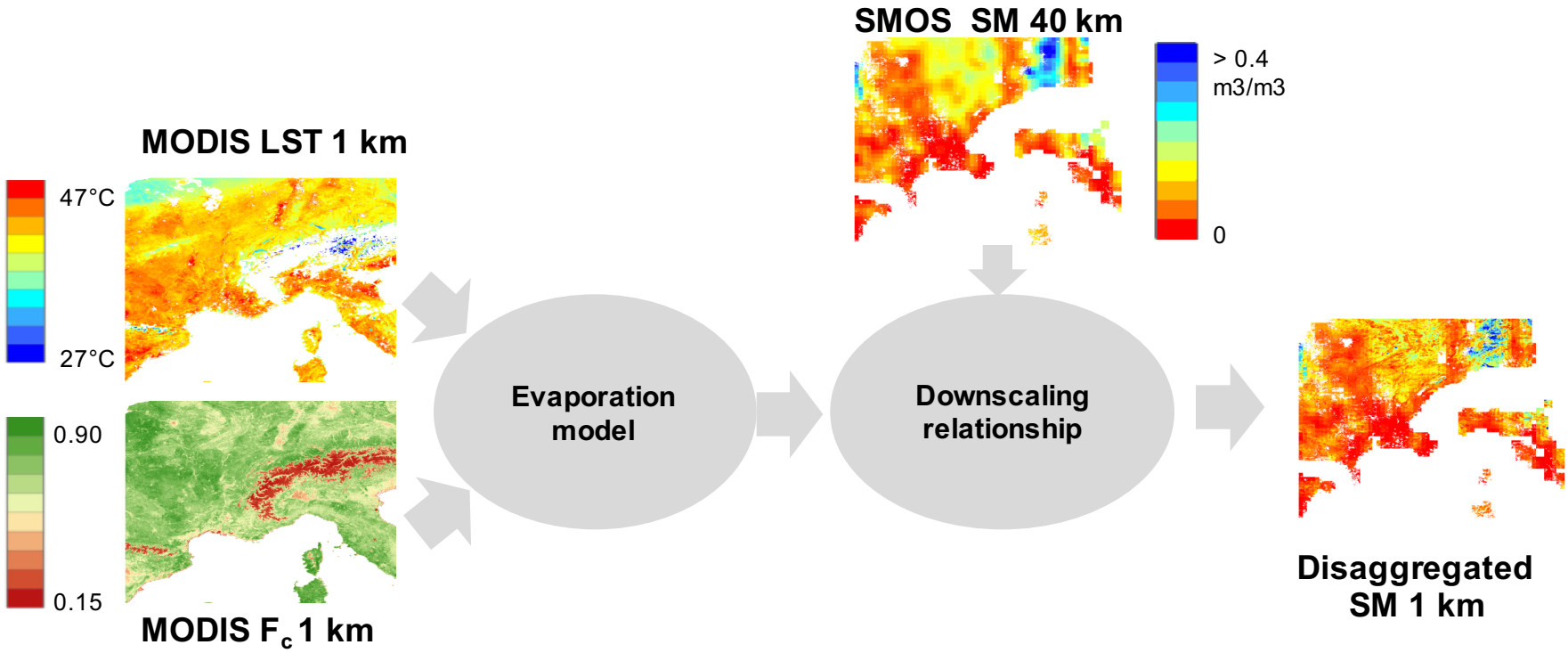
Objectives



ACCWA aims to develop the remote sensing based management and monitoring tools for food security and water & agricultural risk management that allow improving the reliability of decision making regarding water use, yield and hazards in agriculture.

DISaggregation based on **P**hysical **A**nd **T**heoretical scale **CH**ange

(Merlin et al. 2008)



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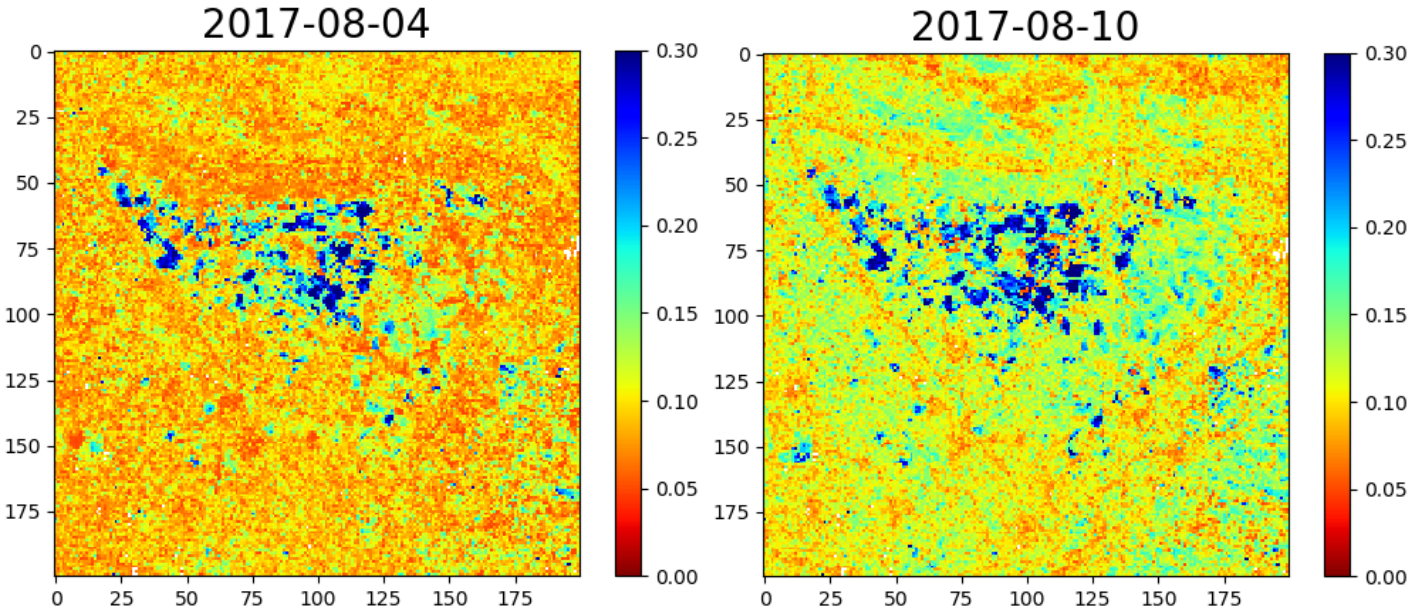
SM

Method 1: backscatter difference ⟷ with the driest date

$Mvmax \approx 0.32\ m^3/m^3$

$Mvmin \approx 0.05\ m^3/m^3$

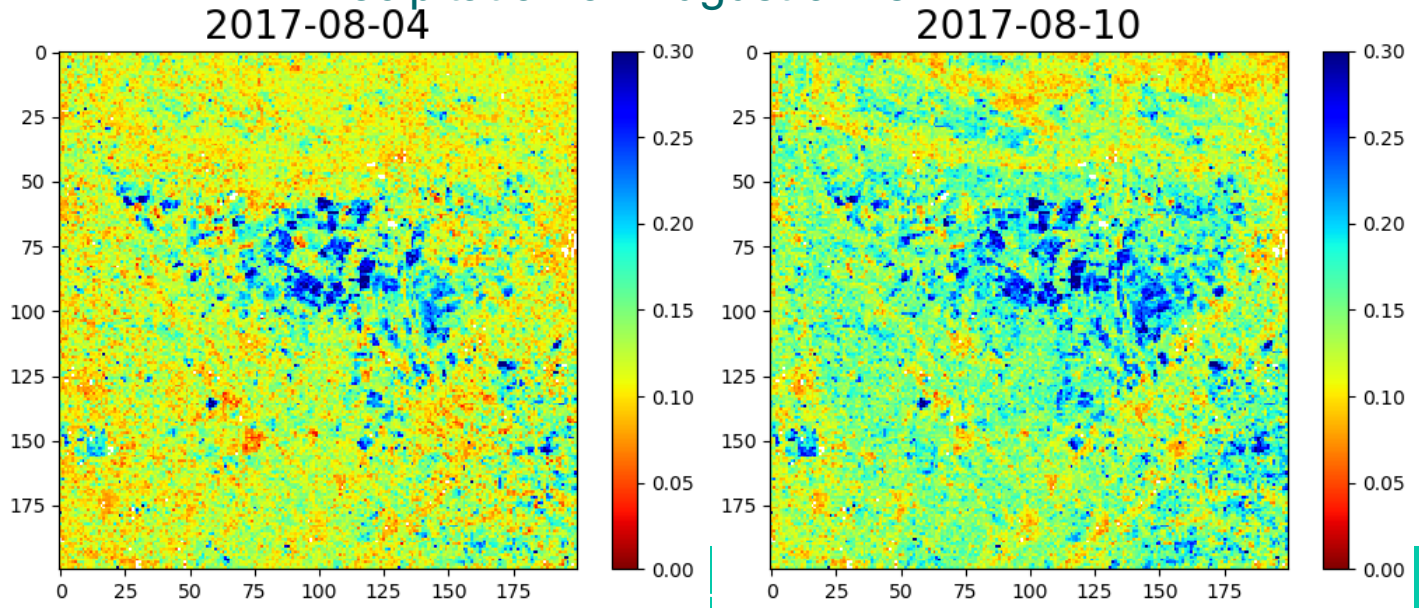


Precipitation on August 9: 18.7 mm

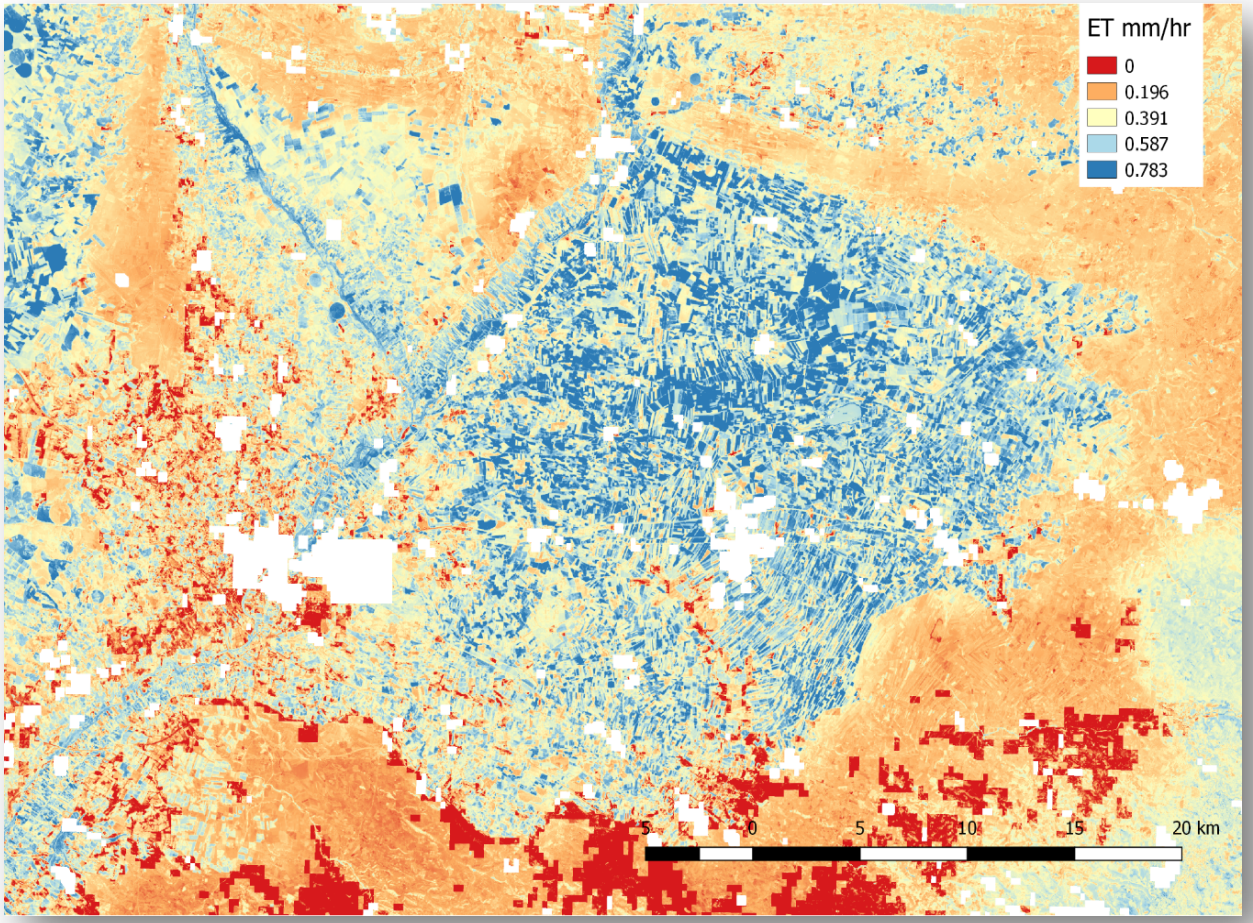
Method 2: backscatter difference ⟷ between two adjacent dates

$\Delta Mvmax \approx 0.2\ m^3/m^3$

**Initial image is from Method1 result*



ET based on S3/S2 synergy



David GOMEZ-CANDON (IRTA Fruitcentre) secondee:

- University Cady Ayad Marrakech
- 2019: September 30th - November 30th

Two main research topics:

1. Use of satellite imagery and TSEB-PT model for evapotranspiration estimation in wheat fields submitted to water stress conditions. Comparison with ground-based data.
2. Aquacrop model adjustment to wheat varieties from a phenotyping platform.

Other activities:

- Presentation: High throughput field phenotyping of durum wheat varieties submitted to water stress conditions. On November 22nd .
- Participation in team meetings and fieldwork.
- Participation in Master students final report presentations

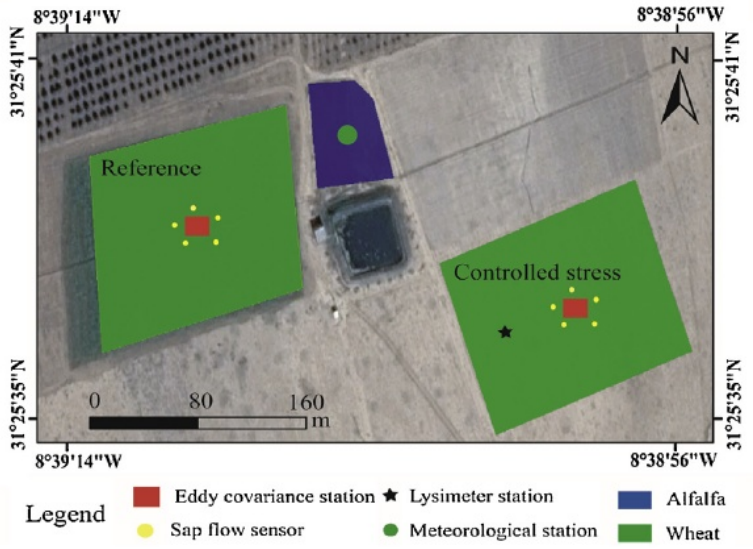
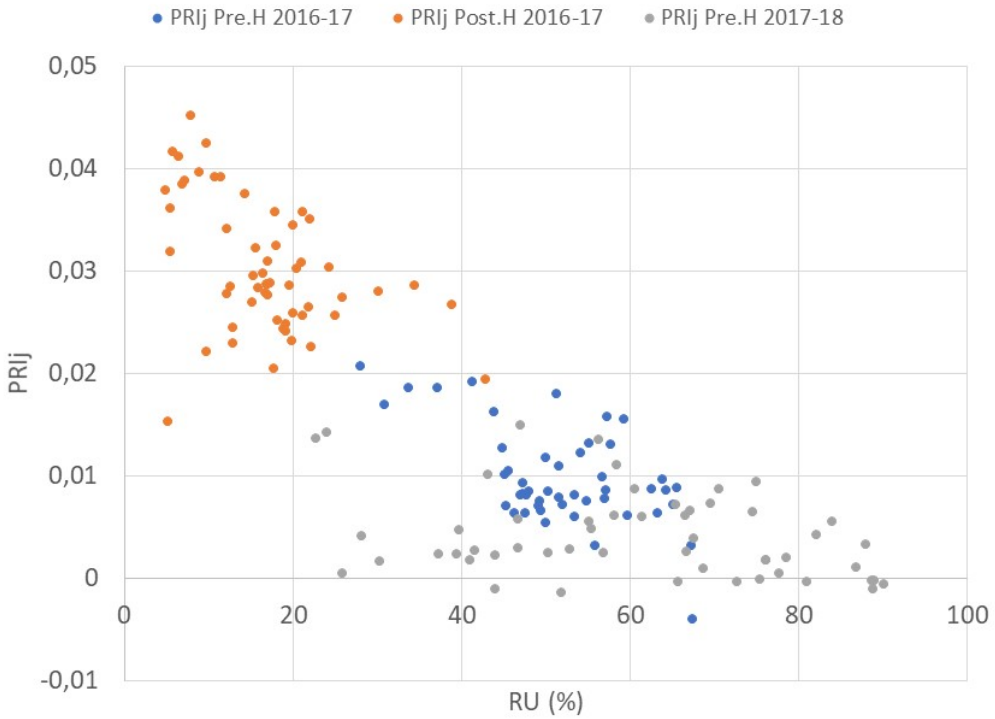


Fig. 1: Wheat plots form first research topic (Marrocco)

Using the photochemical reflectance index (PRI) to detect the water stress of winter wheat in semi-arid regions

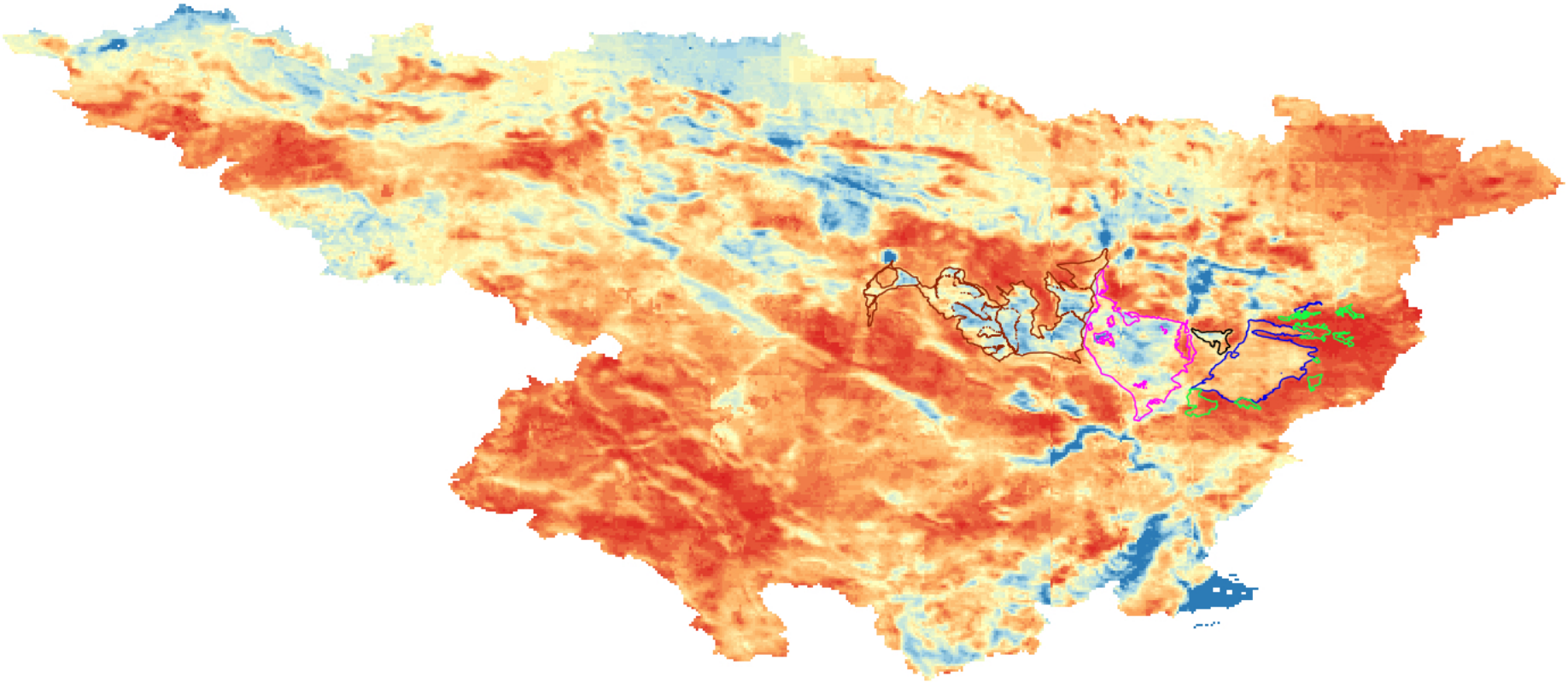


Correlation between the PRIj and the RU (extractable soil water) in the soil during the 2016-17 season and before heading (Pre H) for the 2017-18 season..

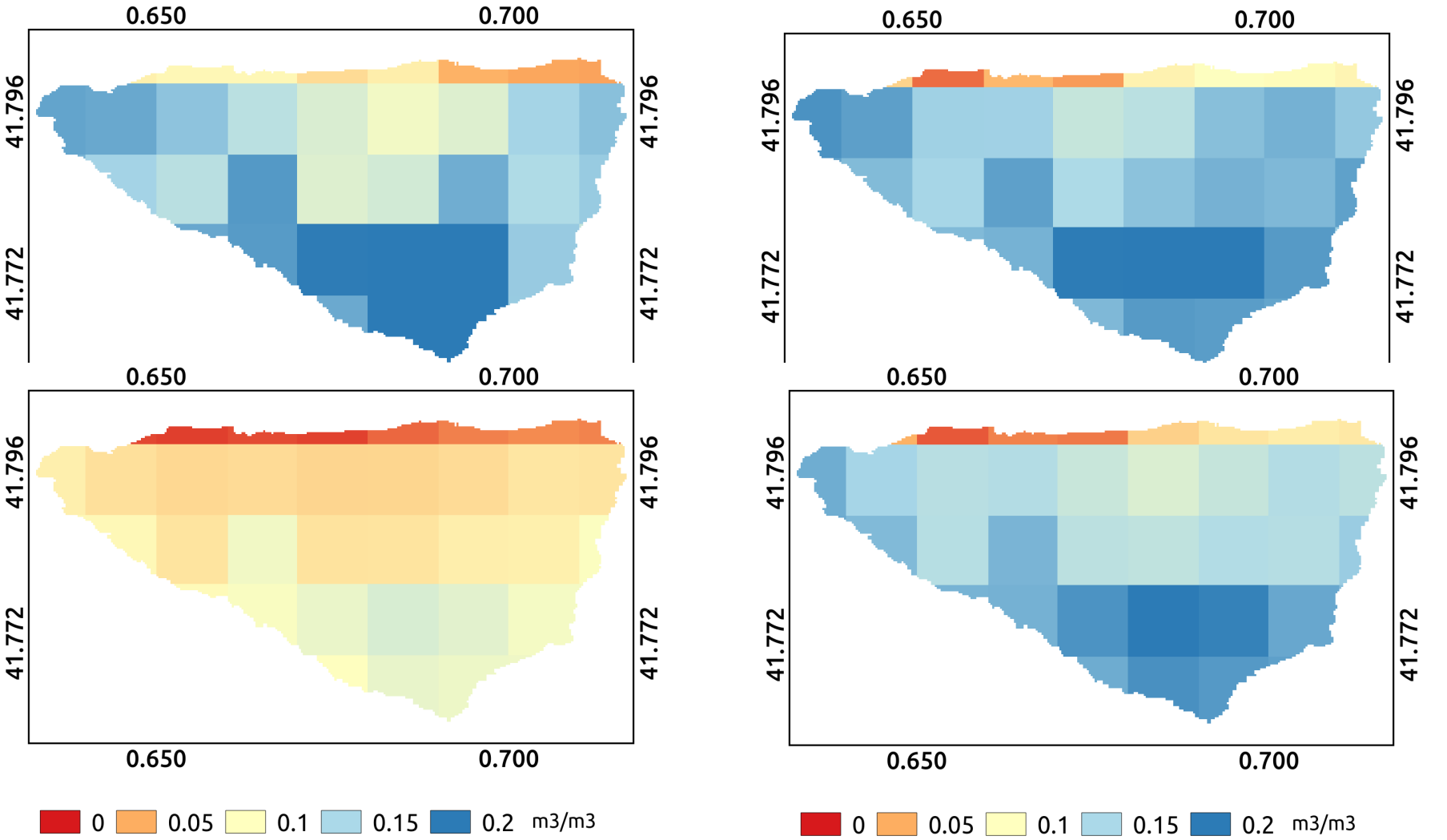
PRIj decrease according to the increase in soil water availability.

PRIj can provide us with information on the water status of wheat

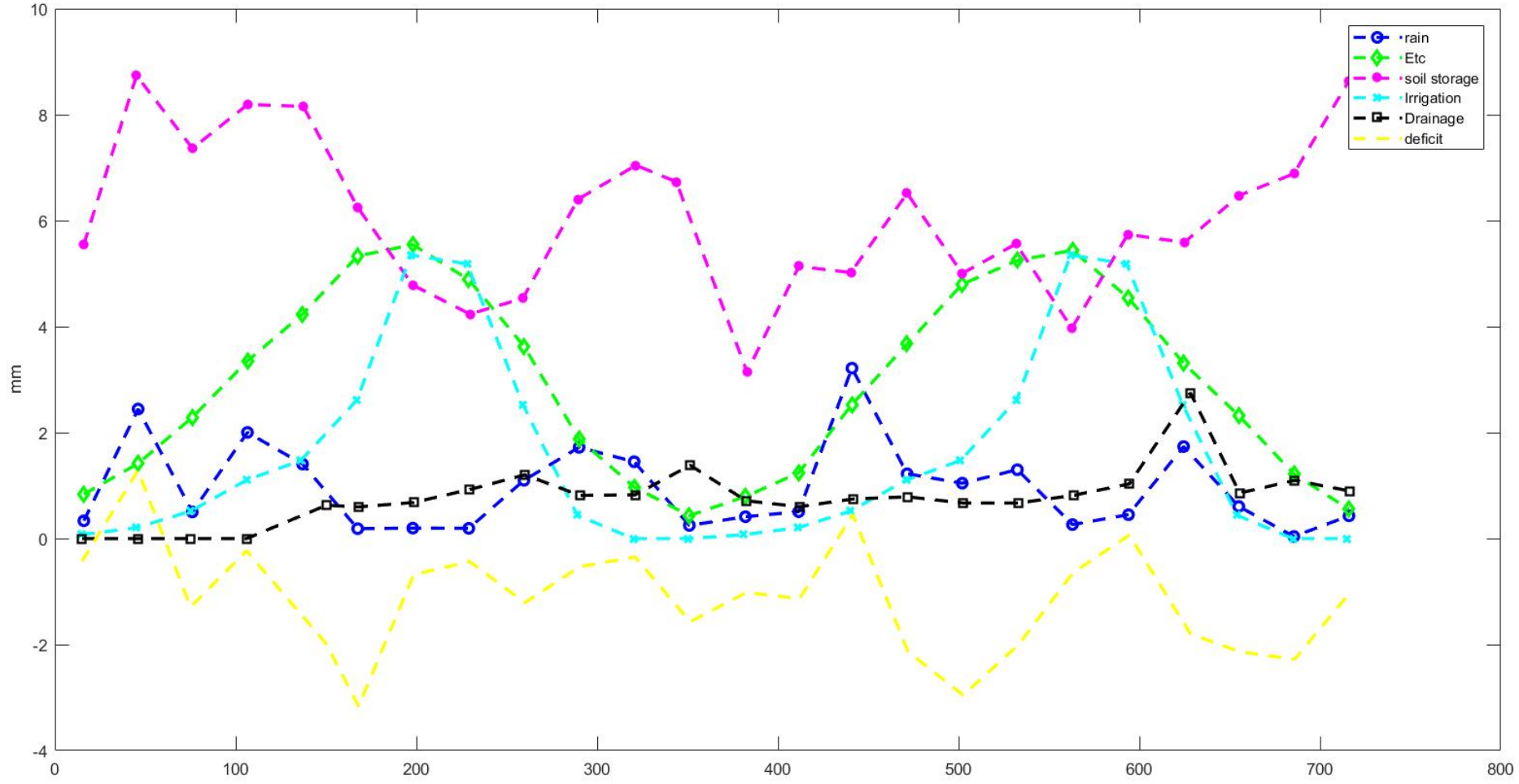
Average SM 1km over Ebro Basin August 2017



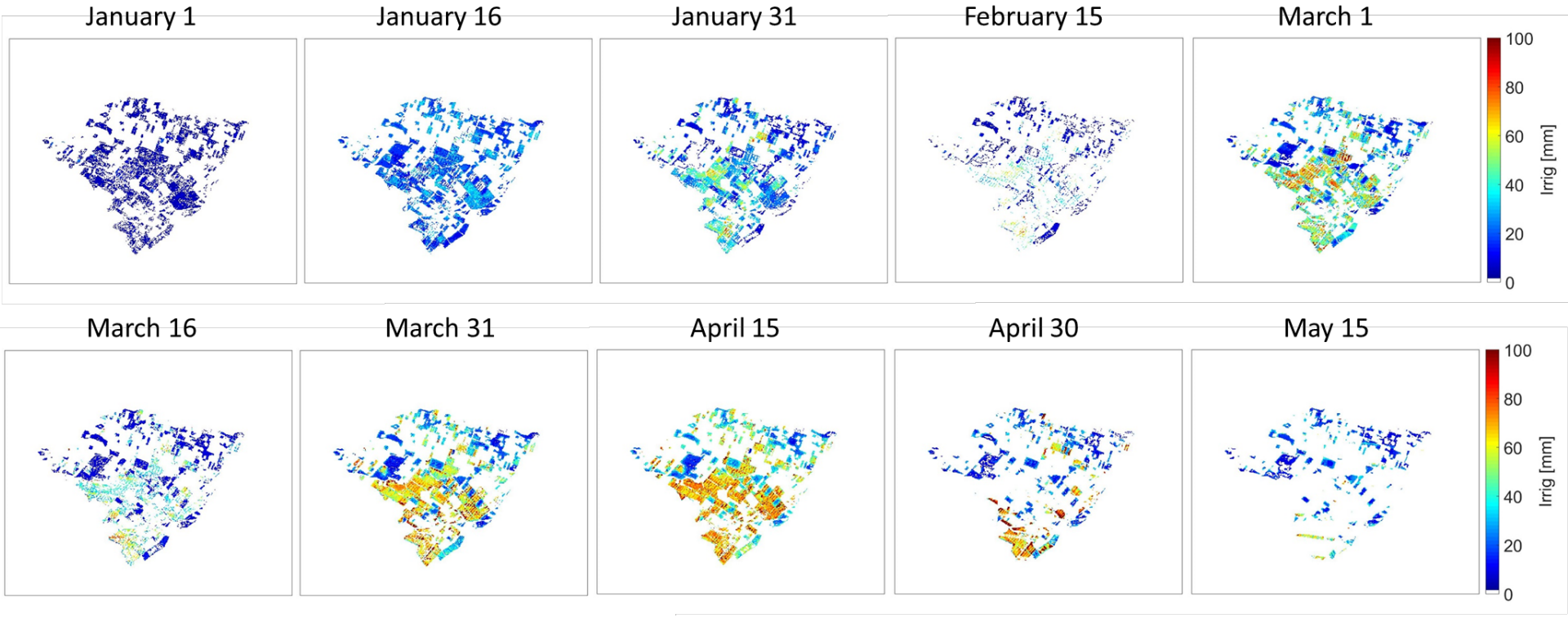
Water Balance at the Basin Scale



Water Balance at the Basin Scale



15-days Irrigation amount R3



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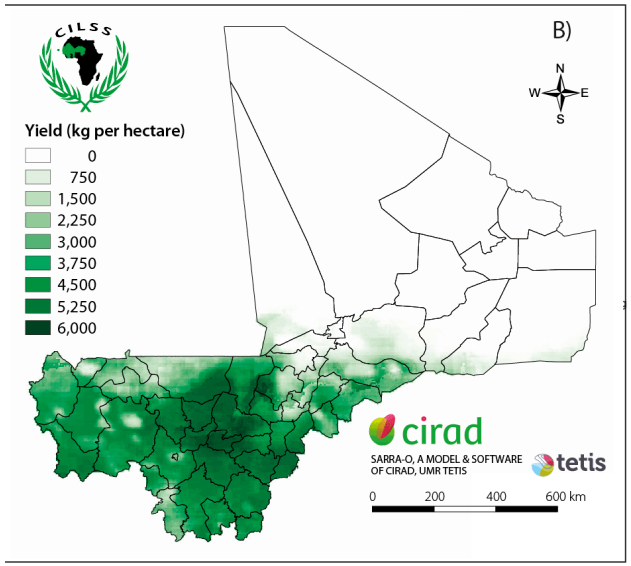
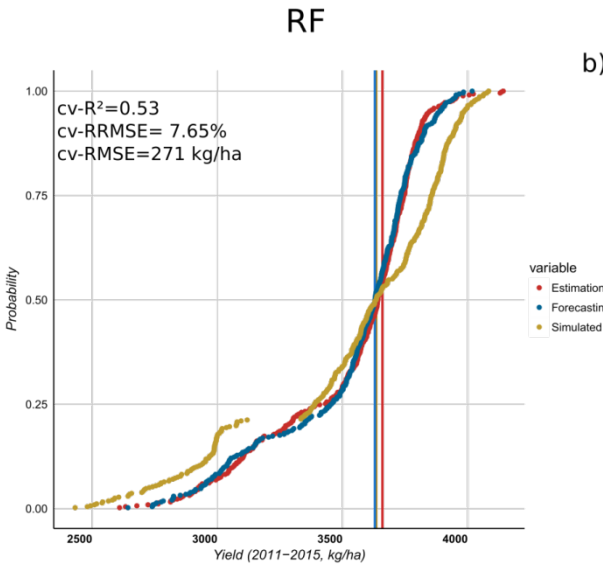
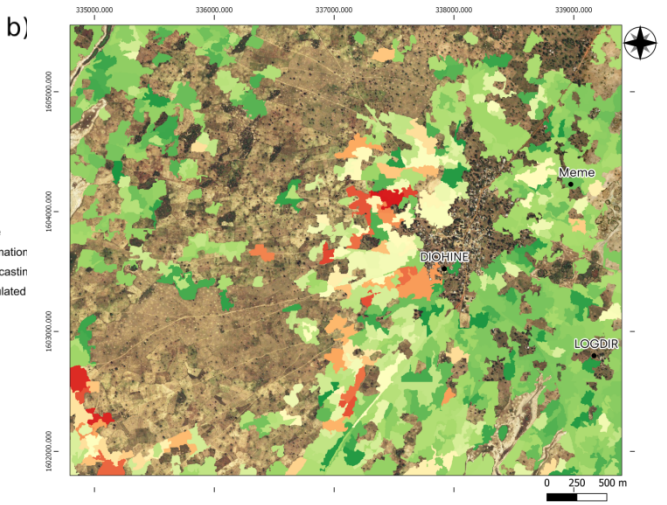
Yield

Scale

Nationale	Regional	Local

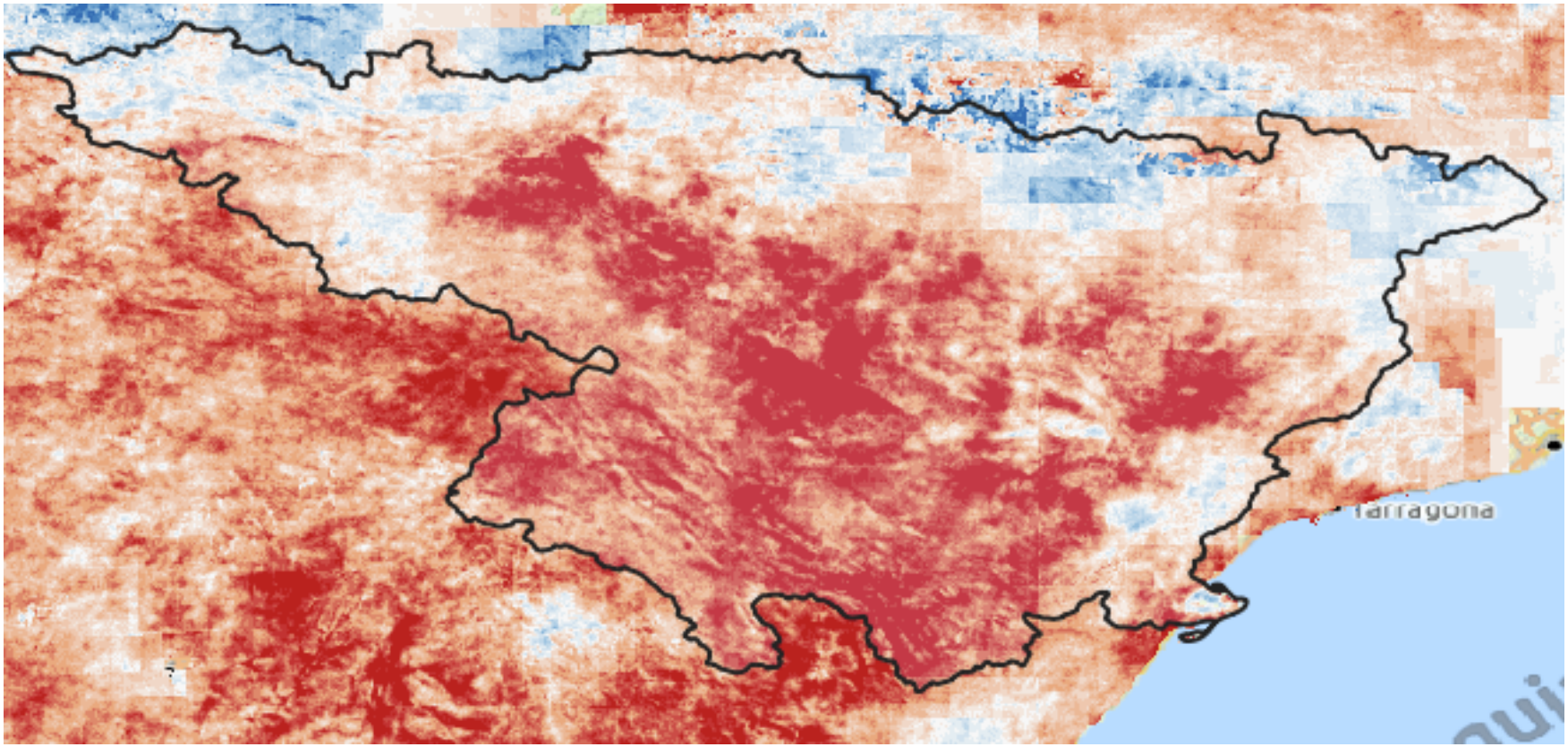






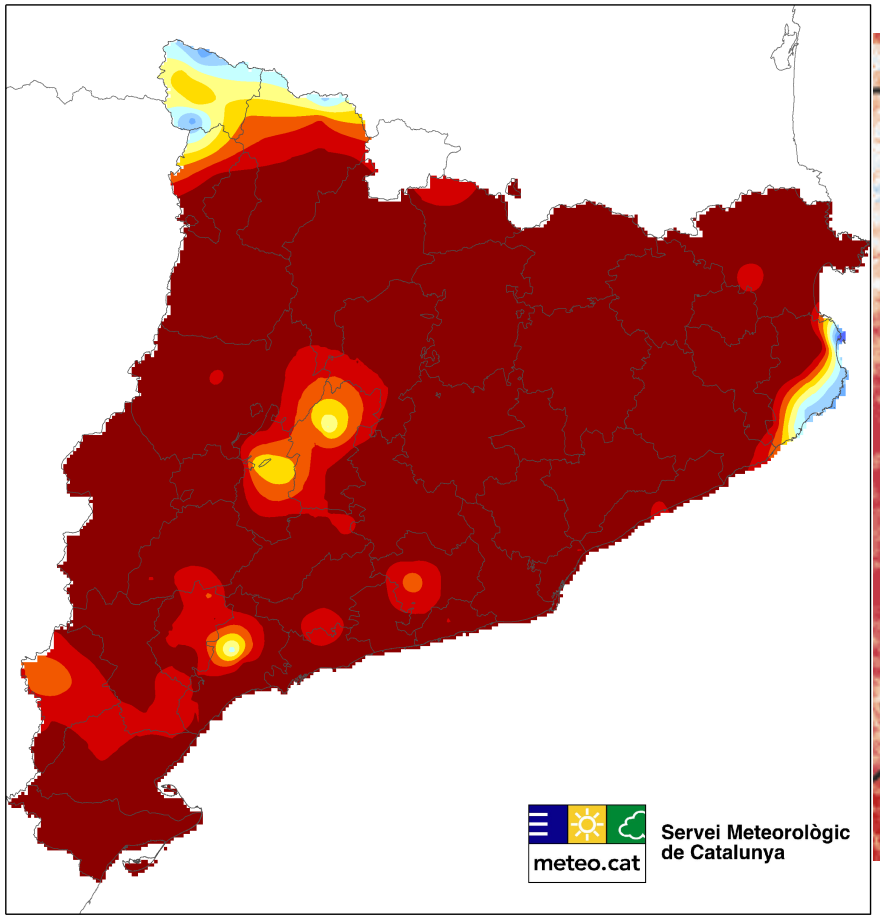
Crop model + SMOS	Crop model + Remote sensing (SMOS) + Statistical modeling	VHR optical remote sensing+ Statistical modeling
Approach	Leroux et al., 2019, EJA	Leroux et al., 2019, in prep for Agr, Eco & Envi

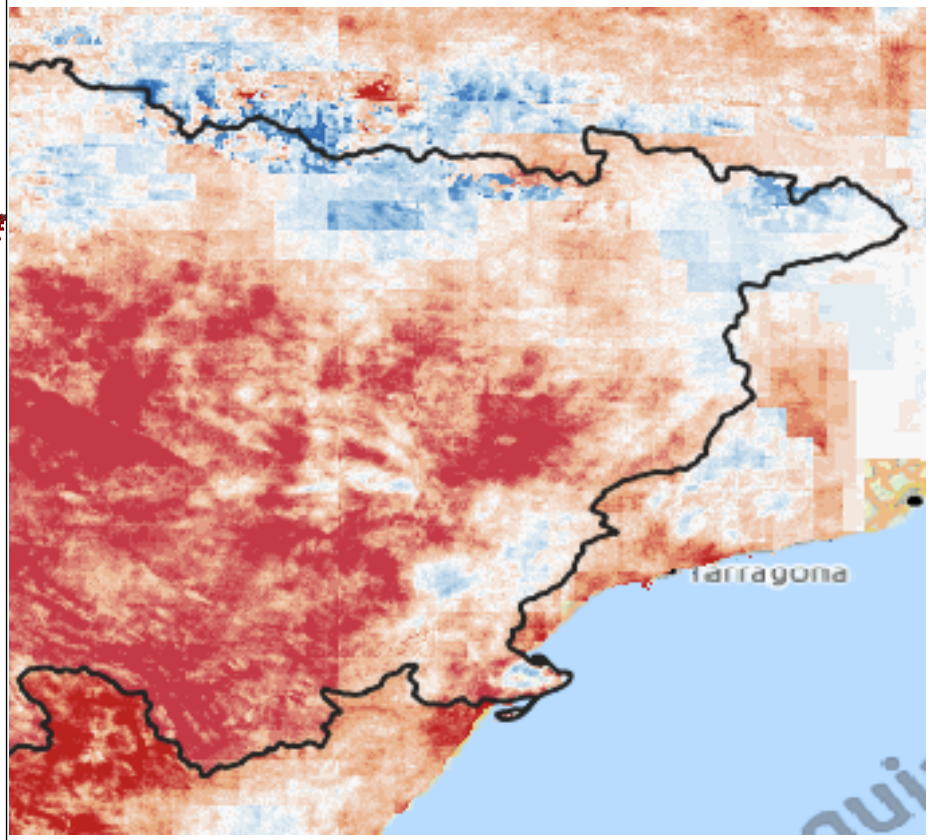
November 2017

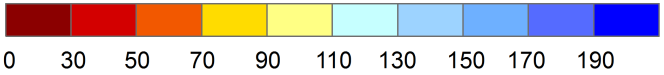


% PRECIPITACIÓ ACUMULADA RESPECTE DE LA MITJANA CLIMÀTICA

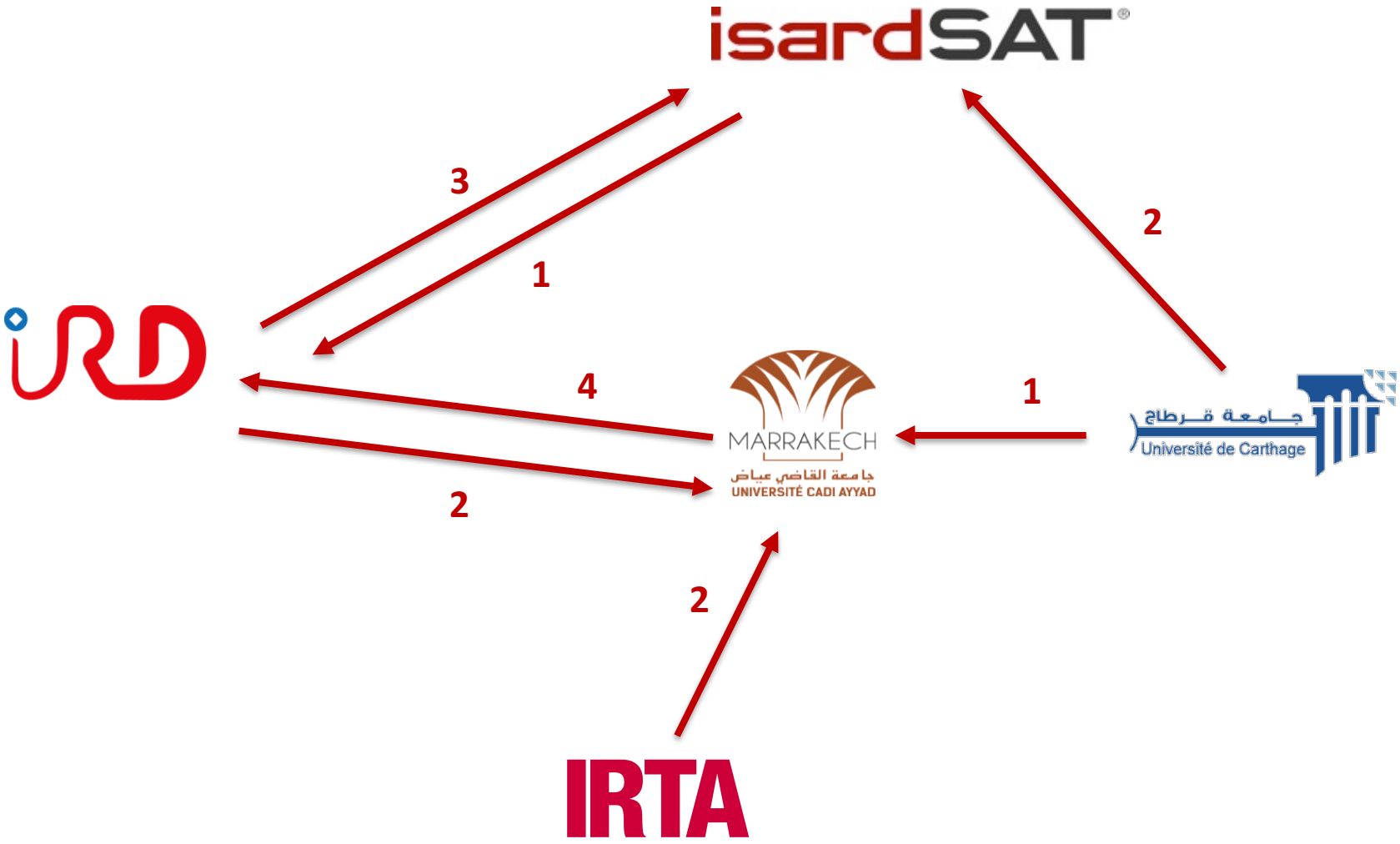
NOVEMBRE 2017







Secondments



Outreach

Target Groups	Planned Actions
Industry	• Link to other European projects • Participation to specialised exhibitions and conferences • Direct contact to possibly interested companies
Agriculture and Water Agencies	• Project Open Workshops • Participation to specialised exhibitions and conferences • Direct contact to possibly interested associations
Scientific Community	• Link to other European projects • Organisation of workshops • Link with other R&D centres and scientific organizations • Participation to national and international conferences • Articles, reports in scientific and technical journals
General Public	• Project reference identity • Public area of the project web site • Other dissemination materials (webinars, multimedia releases, e-newletters)
Project Consortium	• Project management board, workshops, and technical meetings • Initiatives for students of the universities participating to the project • Seminars & tutorials • Private area of the project web site • Internal mailing lists

Outreach

- More applied research: data available on web site to stimulate used uptake https://accwa.isardsat.space/
- Twitter **@accwa_info**

- Each team organises at least one Formation, advertised well in advance to allow Secondments to be planned
- Effort on multimedia releases: webinars, videos

- Articles openly published.

  'The ACCWA project is funded by the European Commission Horizon 2020 Programme for Research and Innovation (H2020) in the context of the Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE) action under grant agreement no: 823965'

Outreach

Name	Place	Objectives	Date
KO Meeting	**Brussels**	**Dedicated know how transfer**	**April 29th, 2019**
Progress Seminar 1	AGRHYMET	Initial EO data review	M14
MTR	LabFerrer	Project mid term review	M25
Progress Seminar 2	Observatori Ebre	Validation Plan and MS2 review	M30
Progress Seminar 3	isardSAT	Management Tools review	M41

Name	Place	Date
POD1	**University of Carthage, Tunisia**	**November 12th - 13th, 2019**
POD2	Cadi Ayyad University, Marrakech	M19
POD3	Ecole Nationale Supérieure Agronomique of Toulouse	M37
FIWS	School of Agricultural Capacitance of Tàrrega	M48

Projectes internacionals de millora de la gestió del reg

Jornada tècnica
BARCELONA, divendres 28 de juny de 2019

Presentació

La jornada tècnica té com objectiu la presentació de tres projectes el VIA.FARM a l'Àfrica, FERDOÑANA al Parc de Doñana i la Zona regable de Lleida. Tots tres projectes tenen en comú la millora de la gestió del reg, la combinació de coneixement i tecnologia TIC i la formació i l'aprenentatge a través de pràctica. En tots els casos, l'objectiu també ha estat l'avaluació a través d'indicadors de sostenibilitat econòmica, mediambiental i social.

En la present Jornada s'intercanviarà experiències sobre l'aprenentatge en estratègies i accions de millora de l'ús de l'aigua en zones de regadiu, que consideren tant aspectes tecnològics con sobretot de formació per part de tots els actors que hi participen.

La jornada va destinada a professionals del món acadèmic, de recerca, empresarial, administració que treballen en temes relacionats amb l'ús de l'aigua, canvi climàtic, hidrogeologia i agricultura.

Programa

9.45 h **Presentació de la Jornada**
Sr. Jaume Massó, director de l'Institut Cartogràfic i Geològic de Catalunya (ICGC).
Sr. Francesc Ferrer, LabFerrer.
Sr. Neus Ferrete, sub-directora general d'Agricultura del DARP.

10.15 h **Accions i canvis en la gestió del reg en els últims 20 anys a la zona regable de Lleida**
Sr. Jaume Casadesús, IRTA.
Sr. Francesc Ferrer, LabFerrer-METER.

11.00 h **Pausa**

11.30 h **L'acadèmia virtual VIA.FARM a l'Àfrica per la millora de la producció d'aliments mitjançant l'optimització i el control del reg, la salinitat i la fertilització**
Sr. Richard Stirzaker CSIRO, director de via.farm.

12.30 h **El Projecte FERDOÑANA per a fomentar la sostenibilitat econòmica, ambiental i social de l'agricultura al voltant del parc de Doñana**
Sr. Sebastien Guéry, director d'Optiriego Consulting i coordinador de Ferdoñana.

13.30 h **Cloenda de la Jornada**

Lloc de realització

Institut Cartogràfic i Geològic de Catalunya
Parc de Montjuic
08038 BARCELONA

Inscripcions

La jornada és gratuïta però cal inscriure's, **abans del 26 de juny**, a través de RuralCat: ruralcat.gencat.cat/inscripcionspatt

O a través de l'Oficina del Regant: Sra. Maite Sisquella (Tel.: 973 310 715 – A/e: mtsisquella@gencat.cat

Organització

Departament d'Agricultura, Ramaderia, Pesca i Alimentació

ICGC Institut Cartogràfic i Geològic de Catalunya
LABFERRER

@ruralcat

Col·laboració

IRTA
Oficina del Regant
Enginyers agrònoms de Catalunya
EsAgua
OPTIRIEGO CONSULTING
ACCWA
SAF SAMPLING
VIA
METER
Universitat de Lleida

Generalitat de Catalunya
Departament d'Agricultura, Ramaderia, Pesca i Alimentació

PLA ANUAL 2019 DE TRANSFERÈNCIA TECNOLÒGICA

190854 / 2,75

Workshop on "International projects to improve irrigation management"
2nd May 2019

Articles

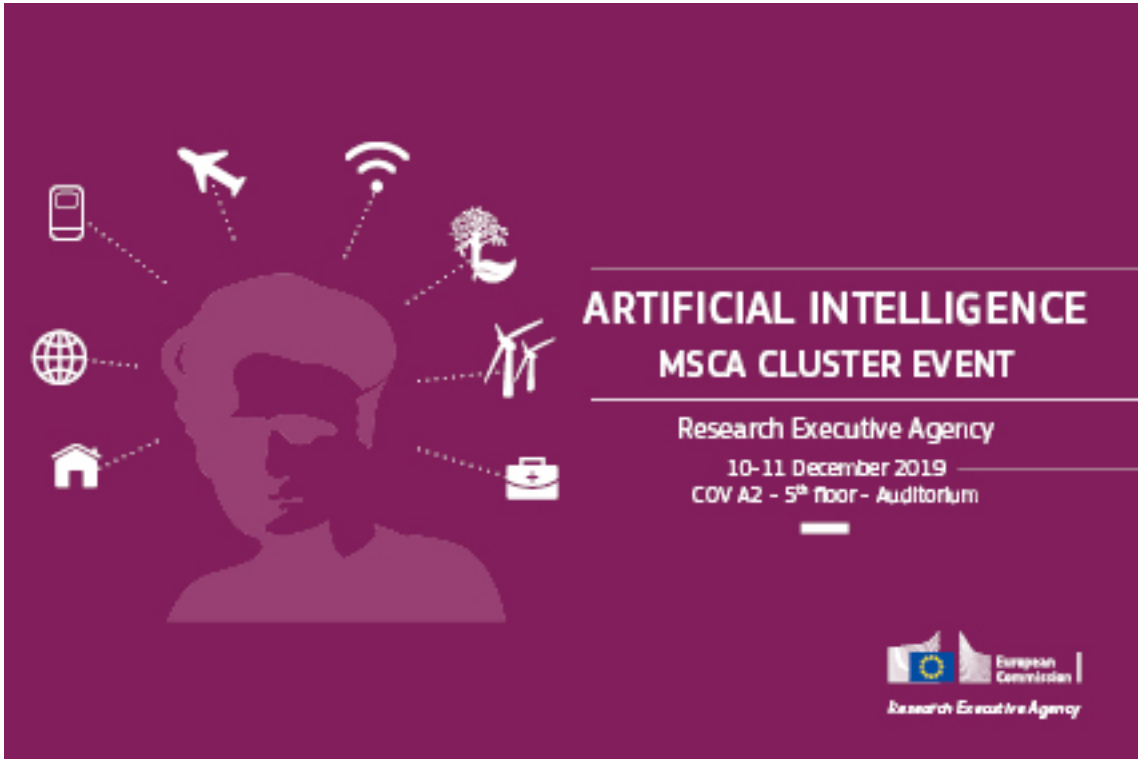
Ojha, Nitu, et al. "Stepwise Disaggregation of SMAP Soil Moisture at 100 m Resolution Using Landsat-7/8 Data and a Varying Intermediate Resolution." *Remote Sensing* 11.16 (2019): 1863.

Conferences

Escorihuela et al. ACCWA: An Innovative Set of Remote Sensing Based Monitoring Tools for Agriculture and Water Management in the Mediterranean Region; the Ebre Basin Case Study. MED 2018, 11-12 December 2018 in ESA-ESRIN, Frascati, Italy.

Zoubair Rafi et al. Using the photochemical reflectance index (PRI) to detect the water stress of winter wheat in semi-arid regions. EGU General Assembly Vienna | Austria | 7–12 April 2019

Marie Skłodowska-Curie actions Artificial Intelligence Cluster



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Thank you!