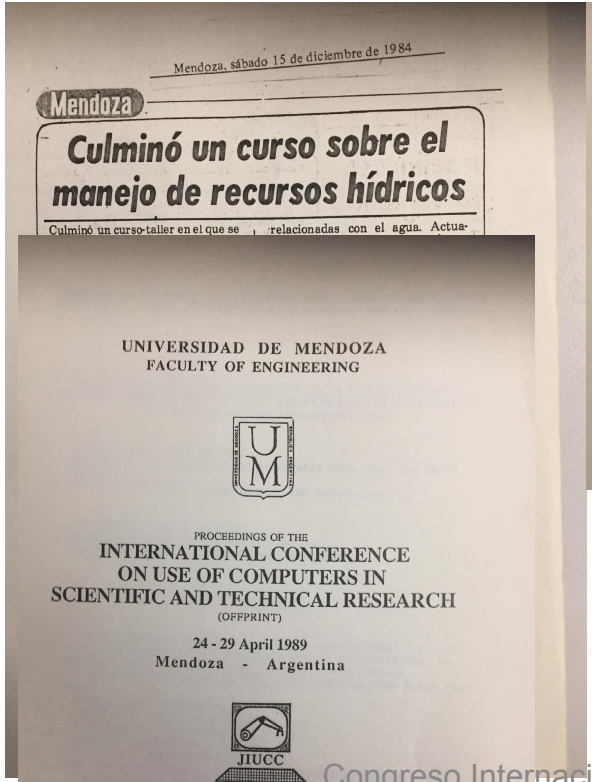
"Remote Sensing information services to support irrigation management: 40 years of evolution"

"Massimo Menenti"

Aerospace Information Research Institute (AIR)
Chinese Academy of Sciences (CAS)

Very early experiments

The dawn of remote sensing and irrigation management: Mendoza 1981 – 1985



Mendoza, sábado 15 de diciembre de 1984

Mendoza

Culminó un curso sobre el manejo de recursos hídricos

Culminó un curso-taller en el que se ... relacionadas con el agua. Actua-

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FACULTY OF ENGINEERING

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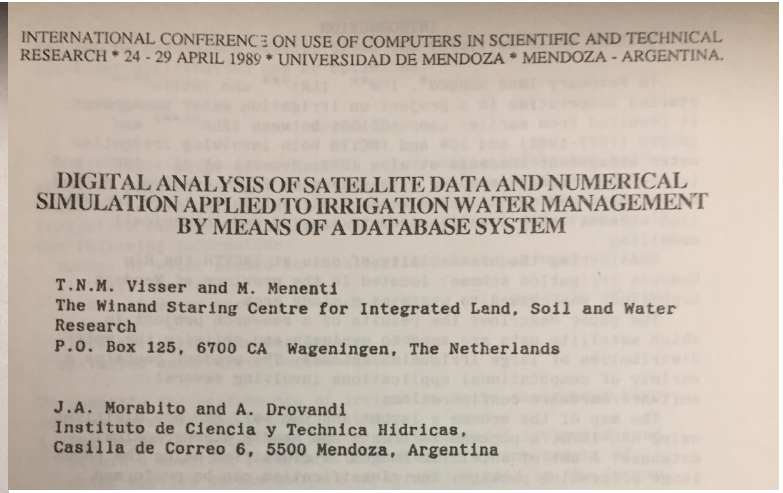

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DIGITAL ANALYSIS OF SATELLITE DATA AND NUMERICAL SIMULATION APPLIED TO IRRIGATION WATER MANAGEMENT BY MEANS OF A DATABASE SYSTEM

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Instituto de Ciencia y Technica Hidricas,
Casilla de Correo 6, 5500 Mendoza, Argentina

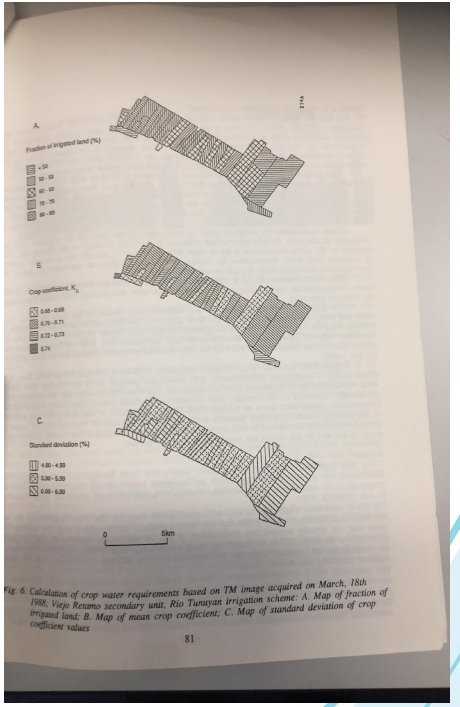

Fig. 6. Calculation of crop water requirements based on TM image acquired on March, 18th 1988; Viejo Retamo secondary unit, Rio Tunuyan irrigation scheme: A. Map of fraction of irrigated land; B. Map of mean crop coefficient; C. Map of standard deviation of crop coefficient values

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Early need 1978: how to estimate and locate the non irrigated fields in Mendoza? How large was the difference with the area having water rights?

Early need 1985: how to estimate and map crop water requirements?

Early european projects

1985 – 2005: STD1, STD2, STD3, FP4

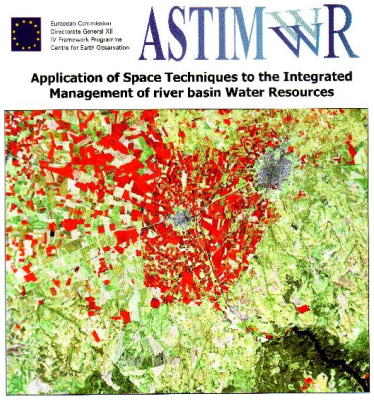
SDT2: Watershed hydrology and irrigation water management

FP4 ASTIMWR 1997 – 1999:

Water managers can find on the software market a very wide choice of 'horizontal' products that allow expert customer to perform a huge amount of GIS operations. Nevertheless, water managers request 'vertical' products, with few functionalities, tailored to the routine water problems and easy to use by their technicians.

System design: PC-based Visual Basic User Interface (UI) to link data with the Integrated Land and Water Information System' (ILWIS) through Dynamic Data Exchange (DDE)

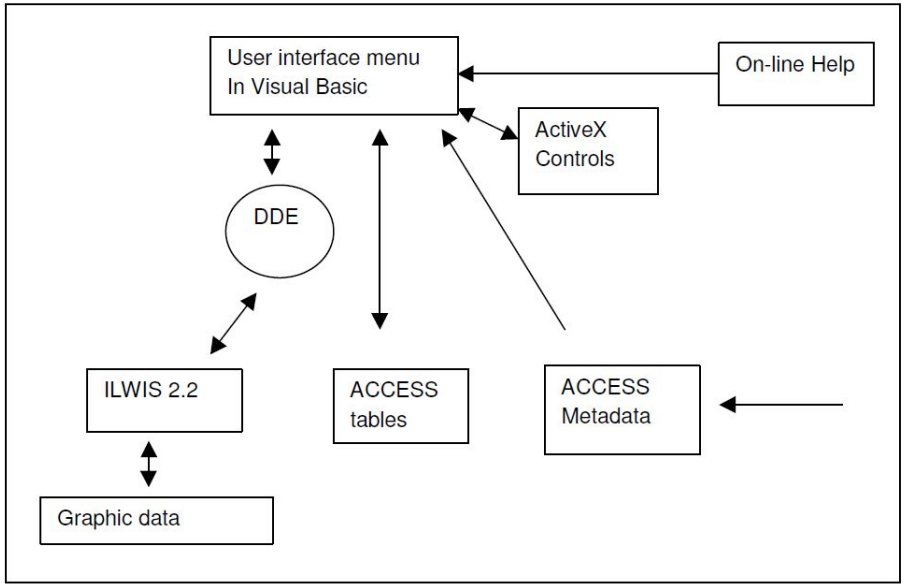
The connection Wageningen – Mendoza – Albacete: crop water requirements, actual ET, irrigation performance



Early european projects

1985 – 2005: STD1, STD2, STD3, FP4

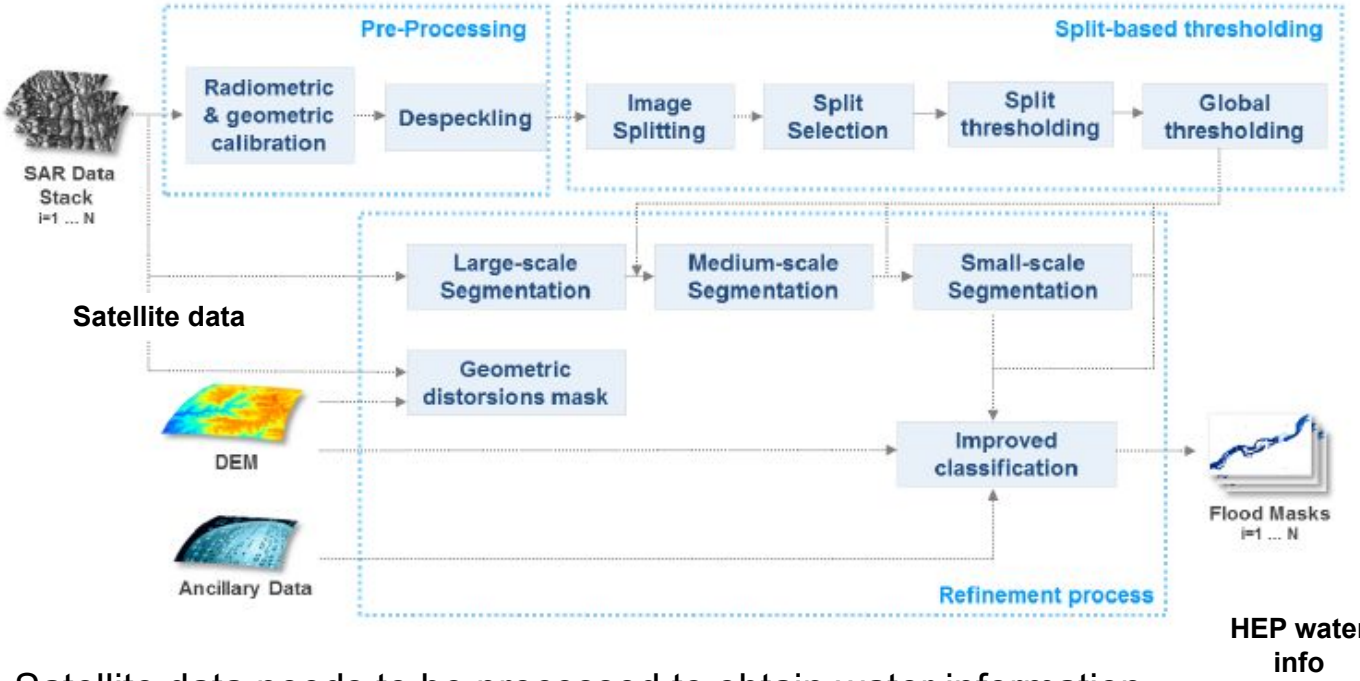
ASTIMWR: A very important component of the system was the meta database in which all information on the capture, processing and output of data analysis is maintained.



- Loading into the system of the data sets.
- The conversion of these data to the formats of the ASTIMwR system required a carefully planned procedure
- The data base administrator had to control the quality of the data before loading.

From satellite data to HEP water information (TEP family)

2015 - 2018



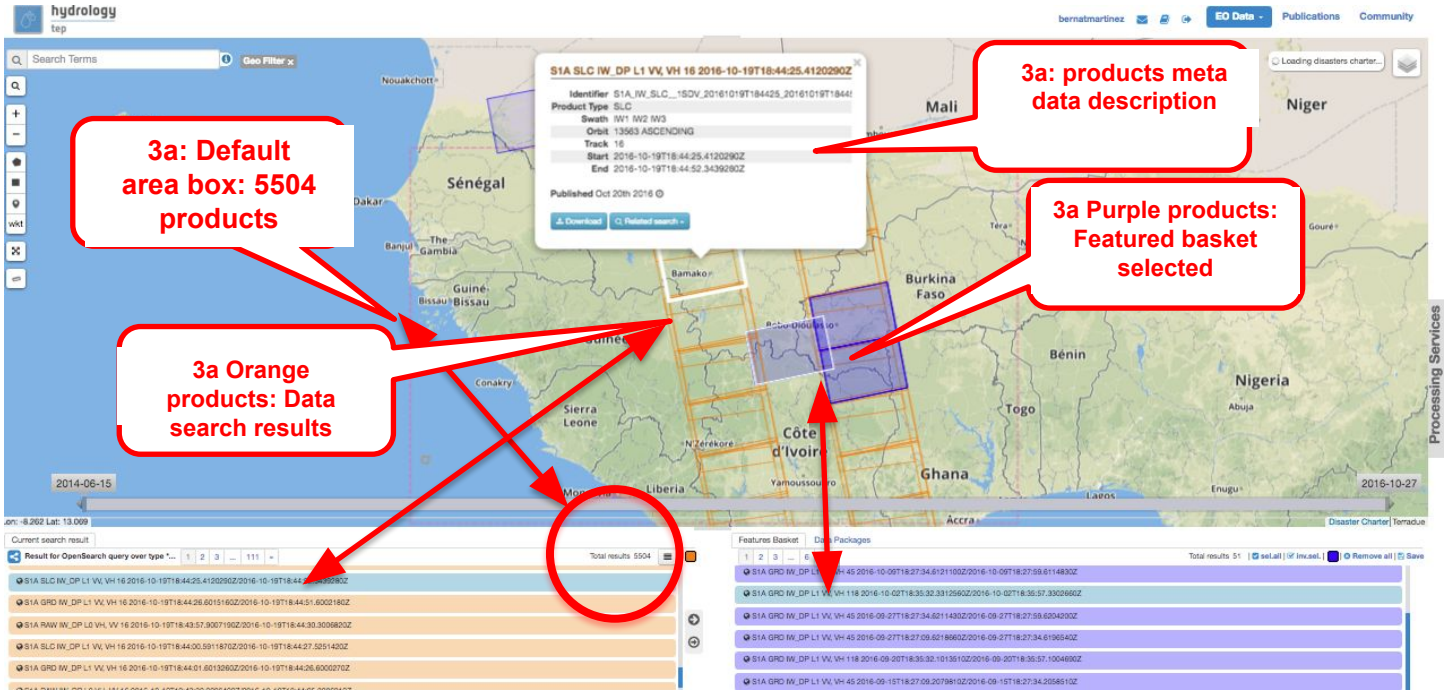
Satellite data needs to be processed to obtain water information
Data quality and realiability is a main requirement from users

Main characteristics of HEP satellite data

Spatial Resolution, Temporal Resolution and Accuracy shall be adequate for water resource management applications

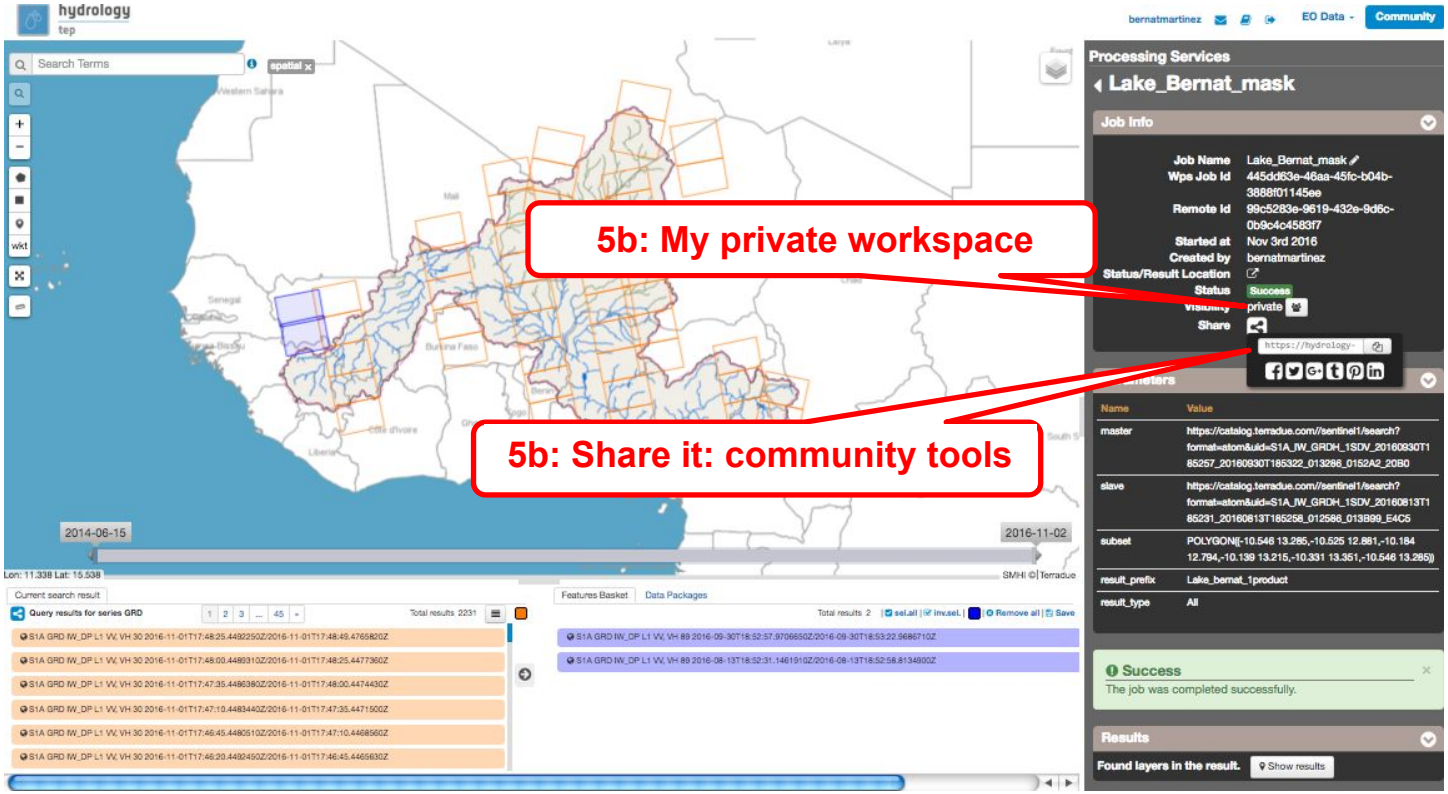
Variables		EO mission	Time resolution	Spatial resolution	Accuracy
Water Quality	Surface temperature	Sentinel 3 / SLSTR	2 d 1d (from 2017)	1 km	0.3 K
	Total Suspended Matter	S2/S3 Landsat 7/8 MODIS A/T	1-8 d	10-500 m	20%
	Chlorophyll-a	S2/S3 Landsat 7/8 MODIS A/T	1-8 d	10-500 m	30%
	Total Organic Carbon	S2/S3 Landsat 7/8	2-8d	10-300m	50%
	Cyanobacteria	S2/S3 Landsat 7/8	2-8 d	10-300 m	False detection 25%
	Harmful algae bloom indicator	S2/S3 Landsat 7/8	2-8 d	10-300 m	False detection 25%
Soil Moisture		SMOS/ SMAP/ AMSR-2/ ASCAT	2-3 d	1 km	0.05 m3/m3
Water Extent		Sentinel-1A Sentinel-1B	12 d 6 d (from 2016)	5 – 20 m	1 dB
		Sentinel-3	1 d	1 km	95%
Water Level		CryoSat -2/ Sentinel -3A/ Sentinel -3B	30 d 13.5 d (from 2017)	300 m	10 cm
Snow Water Equivalent		SSMIS/ AMSR2	1 d	2.5 km	30 mm
Evapotranspiration		AVHRR/MODIS/S3	1 d	5 km	85%

Selection of input data



Default area selected is Niger River wide area

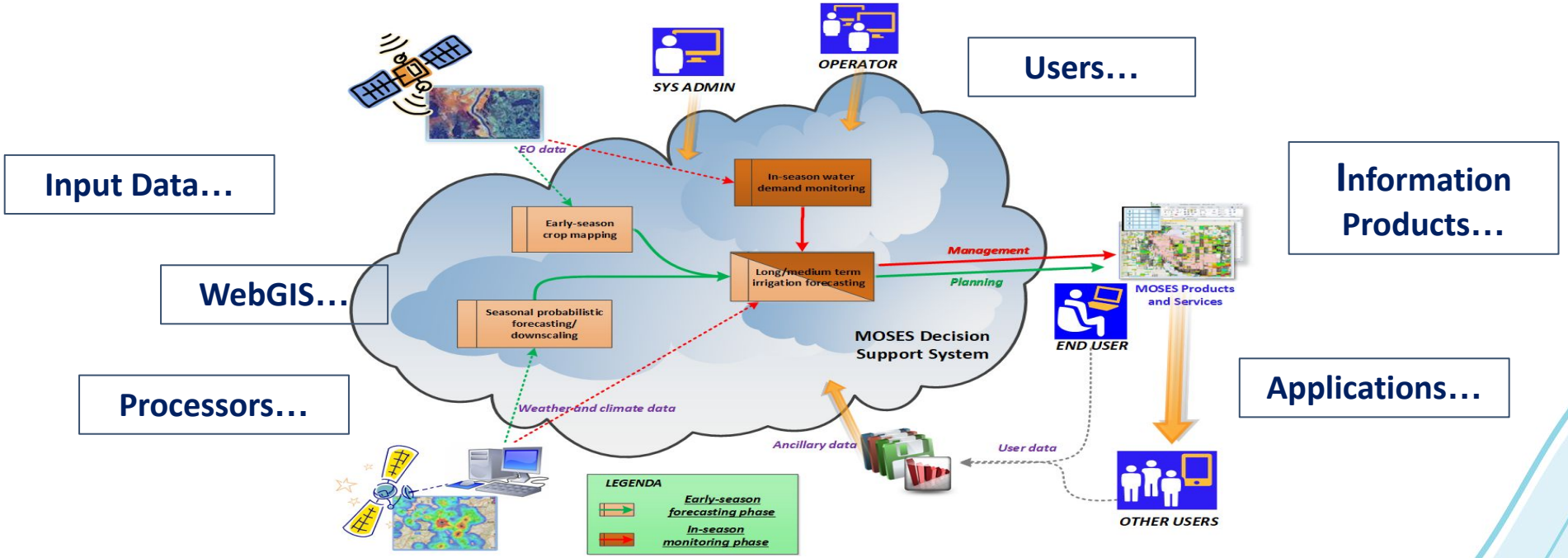
Community Sharing (2)



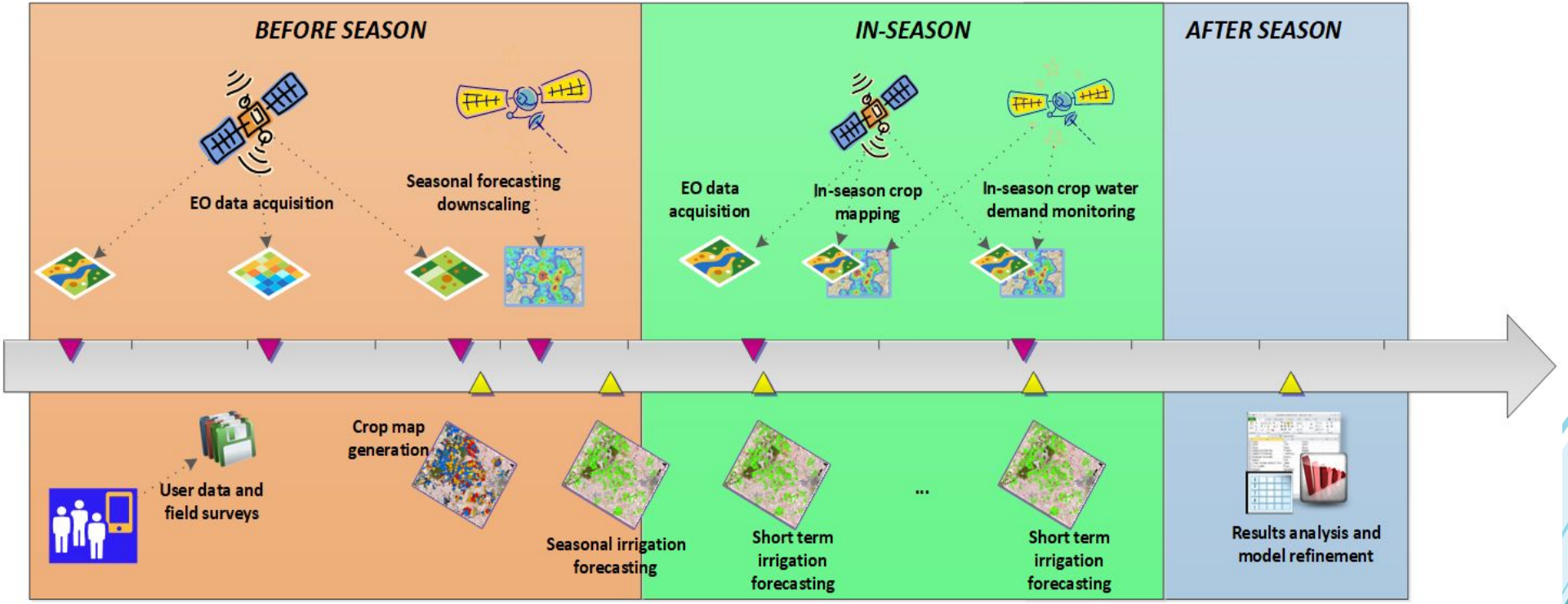
HERRAMIENTAS PARA LA GESTIÓN FUTURA DEL AGUA

The "Managing crOp water Saving with Enterprise Services MOSES platform

2015 - 2018



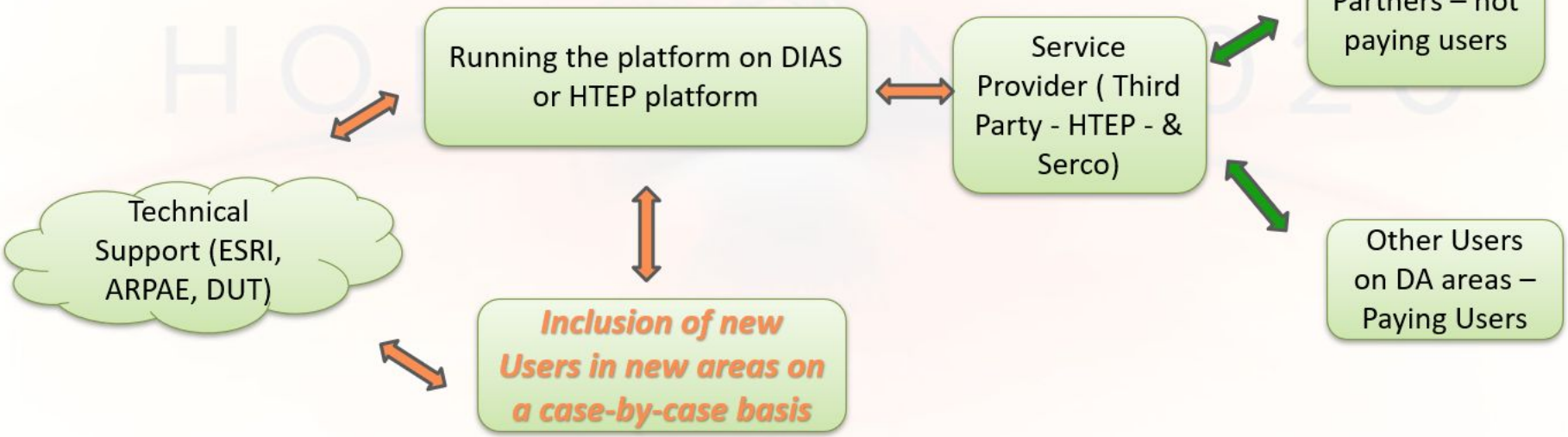
MOSES products and services



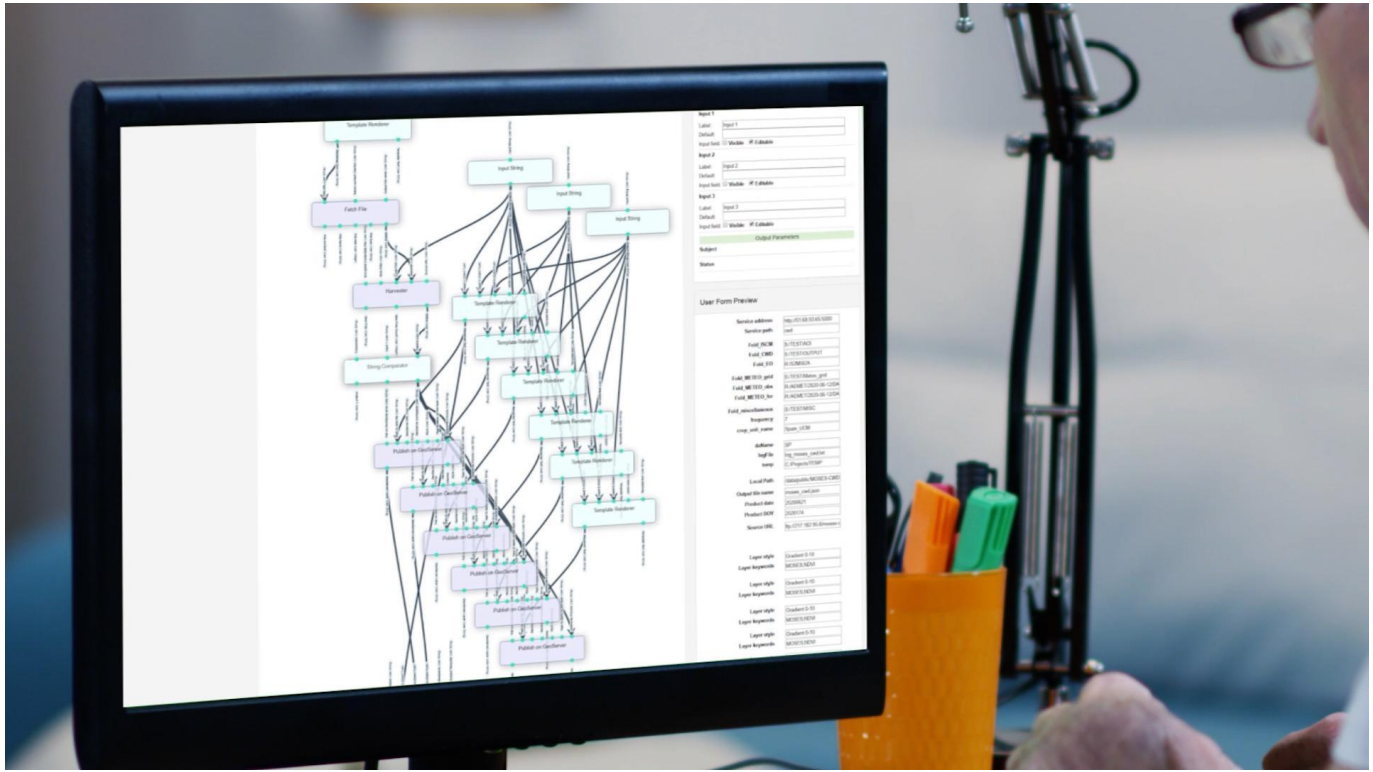
MOSES on a virtual machine

Perspective – MOSES Service Through Other Funded Projects => HTEP

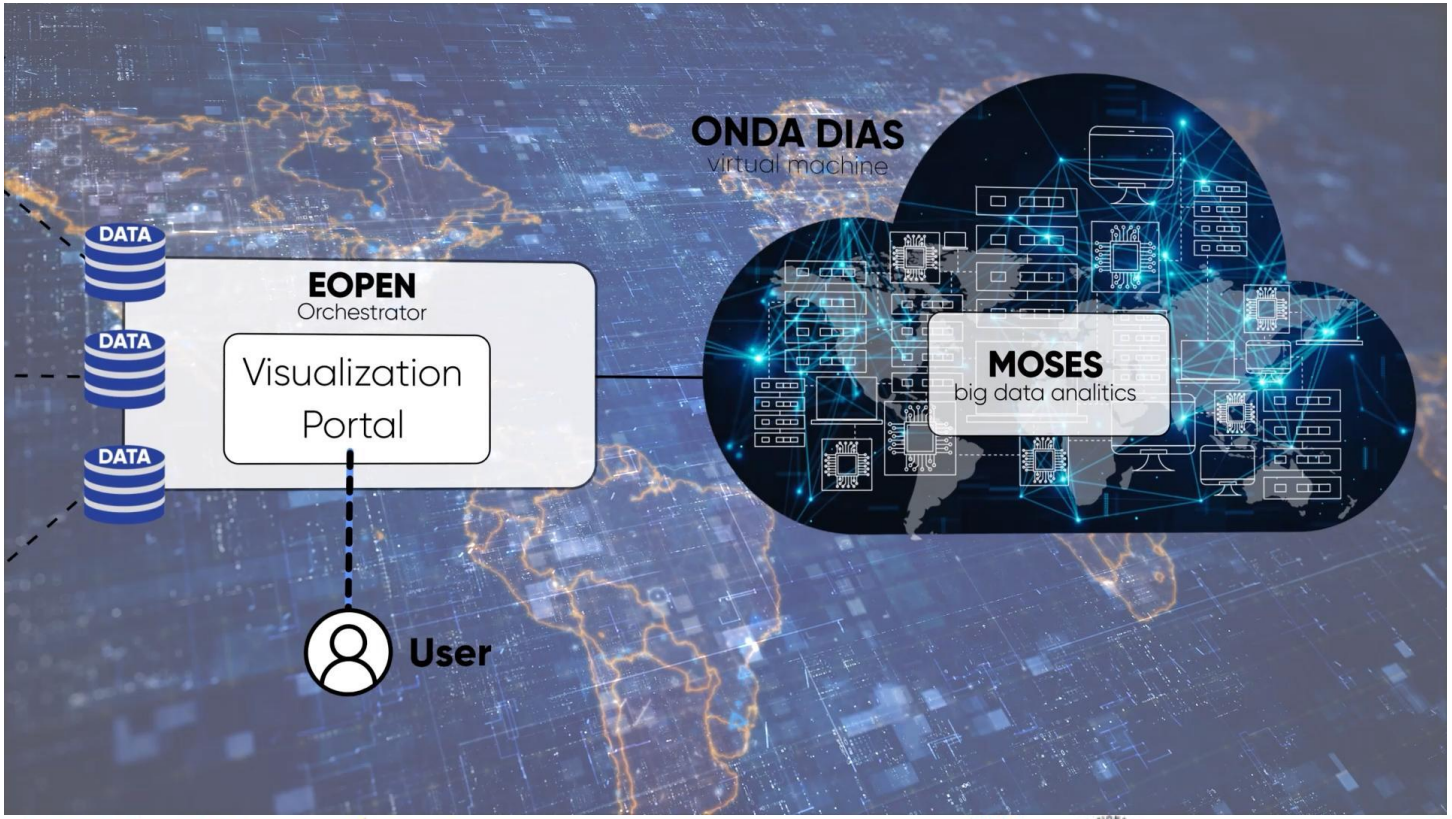
- *HTEP customized applications improve and complement MOSES service;*
- *Joining a community allows sharing up-to-date methods and tools*



MOSES on a virtual machine



MOSES on a virtual machine



Concluding remarks

- Platforms developed to support specific applications vs. Google Earth Engine
- Remote access to data and algorithms
- Validation of algorithms
- Quality assurance
- Well documented procedures

IV CONGRESO INTERNACIONAL

AGUA PARA EL FUTURO

¡Gracias!

"Massimo Menenti"

IRRIGACIÓN
Agua que da vida

MENDOZA GOBIERNO