GMES / Copernicus

GMES

Monitoraggio globale per l' ambiente
e la sicurezza:

Servizio Europeo (sensori/piattaforme Europee)

Dati / immaggini / prodotti basici sullo stato

(1995) 2005-

GMES / Copernicus

GMES 2014

Cosa ci da?

Dati / immaggini / prodotti basici sullo stato della superficie terrestre – Geoland 1-2,

Acqua?

Energia?

GMES / Copernicus

GMES/Copernicus 2014

Entrata in fase operazionale

Il segmento spaziale si fa adulto:
fa l'ingresso (?) Sentinel

Le applicazioni operzionali non ancora
Acqua?.... forse si
Energia?...??

3 800 MEUR per 7 anni

GMES / Copernicus

Copernicus 2014
sfruttiamo….

Fase di definizione/sviluppo di servizi potenzialmente interessanti per un futuro operazionale:

White paper e studio iniziale
"Copernicus per il monitoraggio di aree irrigate e dei prelievi (non-autorizzati)

Chi paga?

GMES / Copernicus

Copernicus 2014

SIRIUS è uno dei candidati principali

Lunga serie di progetti europei e nazionali

1º Storia di successo (acuifero salvato)

2º "Don Quijote de la Mancha" (cambio a energia rinnovabile dificilissimo)

The SIRIUS legacy

SIRIUS

a GMES/Copernicus service
for Agricultural Water Management:

a suite of 3 interconnected services
ranging from
river-basin/country to irrigation scheme/aquifer to farm
embedded in
participatory users community &
sustainable governance enabling environment

SIRIUS

Sustainable **I**rrigation water management
and **R**iver-basin governance:
Implementing **U**ser-driven **S**ervices

01/10/2010 – 30/09/2013
18 partners from 12 countries and 4 continents
coordinated by Universidad de Castilla-La Mancha
Anna Osann & Alfonso Calera

Total cost: 2.934.817 €
EU Contribution: 2.499.997 €

EO for Sustainable Food Production - 1

Space-assisted services for Sustainable Irrigation:

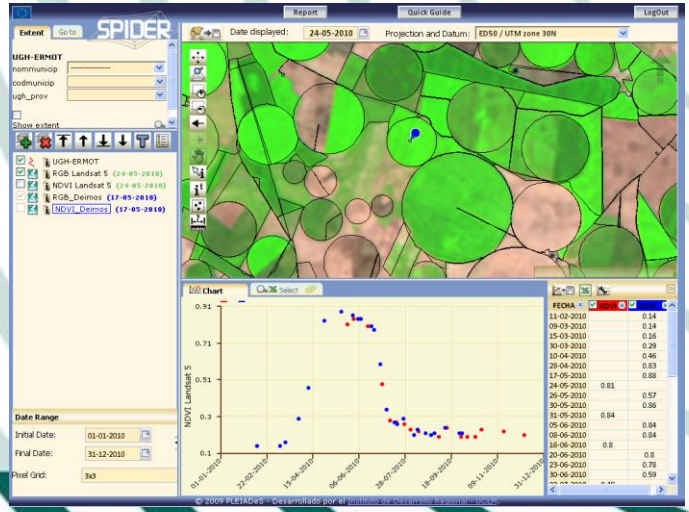
Efficient & effective water resources governance in water-scarce environments

Implemented in 8 pilot areas on 4 continents (18 partners)

Tools & instruments for implementation of WFD & Sustainable Development Strategy (SDS):
*** water use monitoring, * water saving,**
*** enabling true participation/collaboration**

SPIDER webGIS + ppgis + + multi-sensor constellation + + water footprint:

Service to water managers at farm, irrigation scheme, aquifer, river-basin



www.sirius-gmes.es

Space-assisted services for Sustainable Irrigation

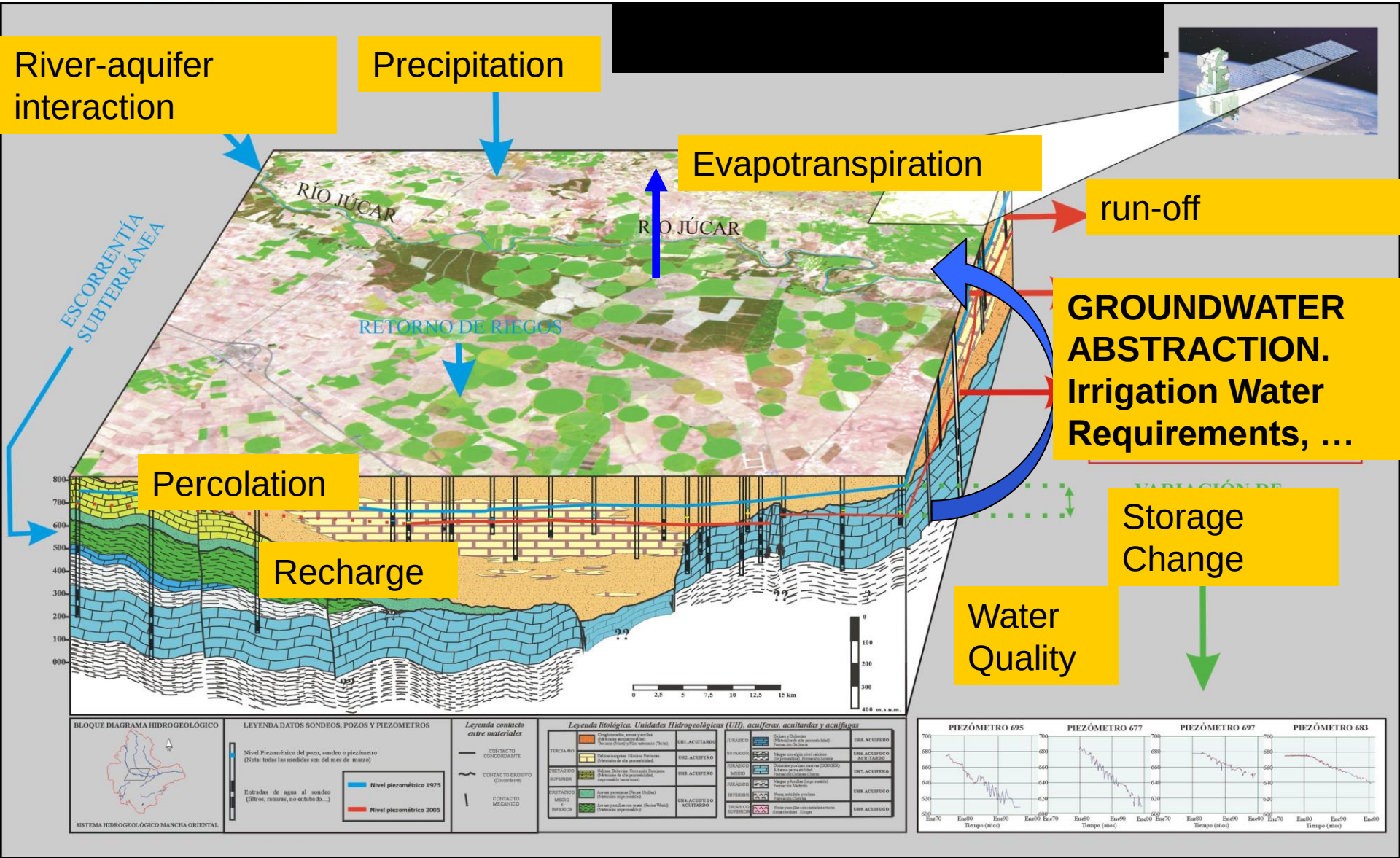
SIRIUS has developed and implemented satellite-assisted services for efficient water resources governance in support of food production in water-scarce environments

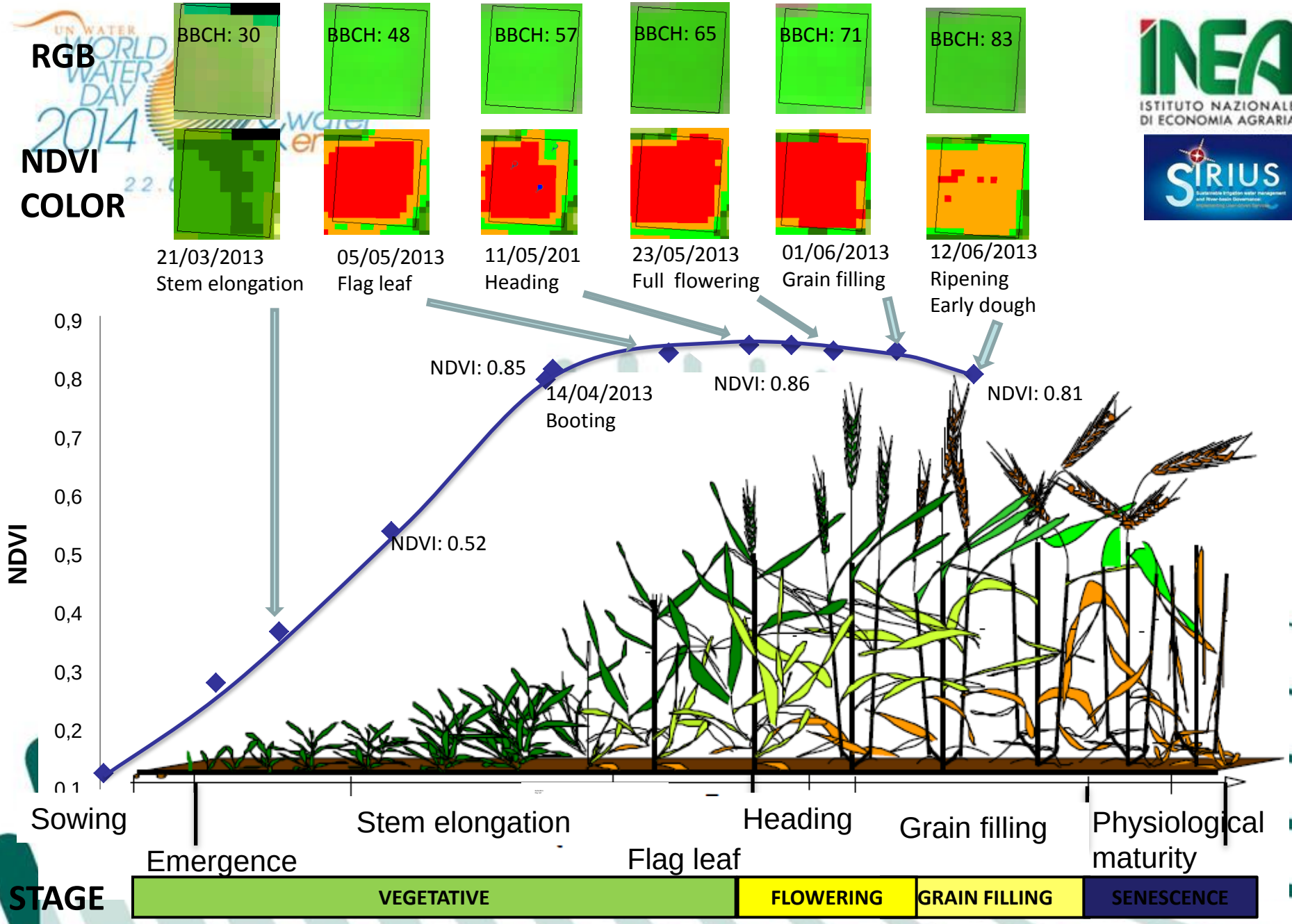
GMES/Copernicus (pan-European)

business (downstream)

SIRIUS

Satellite-Assisted Distributed Soil Water Balance





TRACKING PHENOLOGY THROUGH NDVI FOR IRRIGATED WHEAT

Users

Services

Implementation

Policies & impact

Business

Sustainable future

SIRIUS Users

SIRIUS users are **water managers** of

Water Users Association:

monitor irrigation water consumption

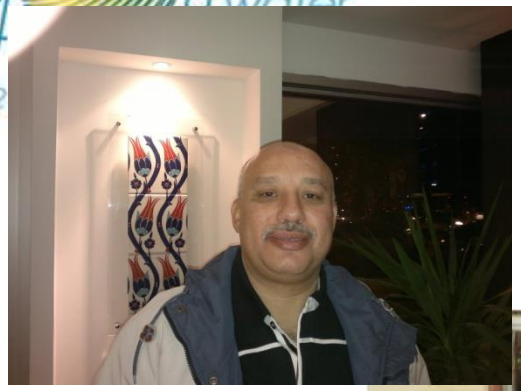
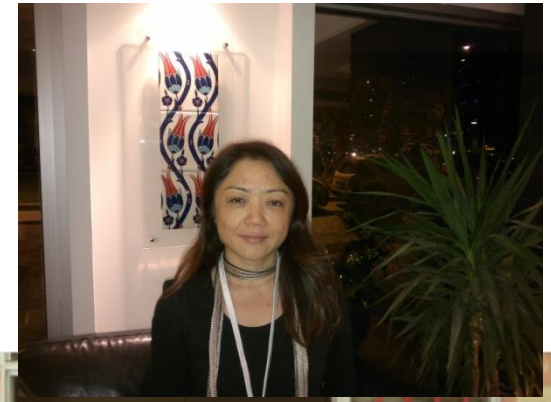
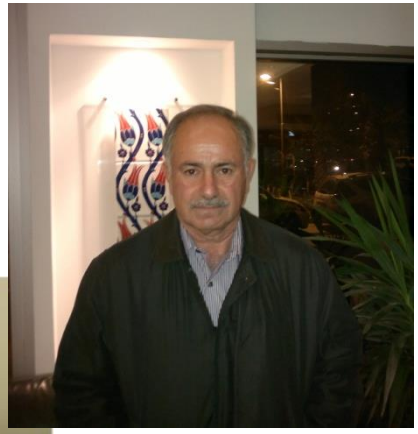
River-basin authority:

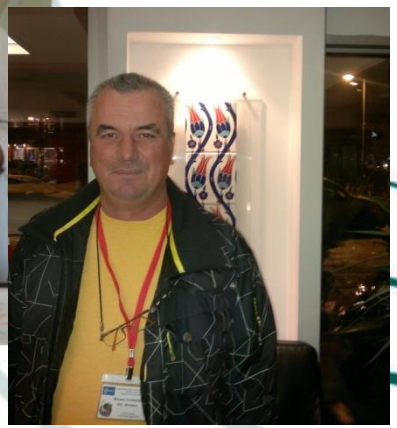
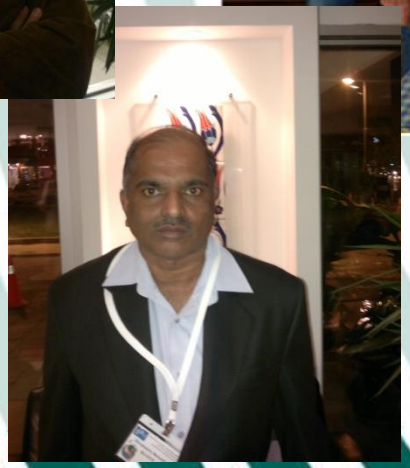
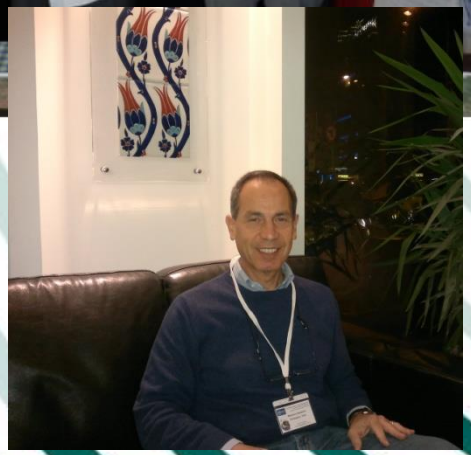
hydrologic planning, drought management

Farm holding:

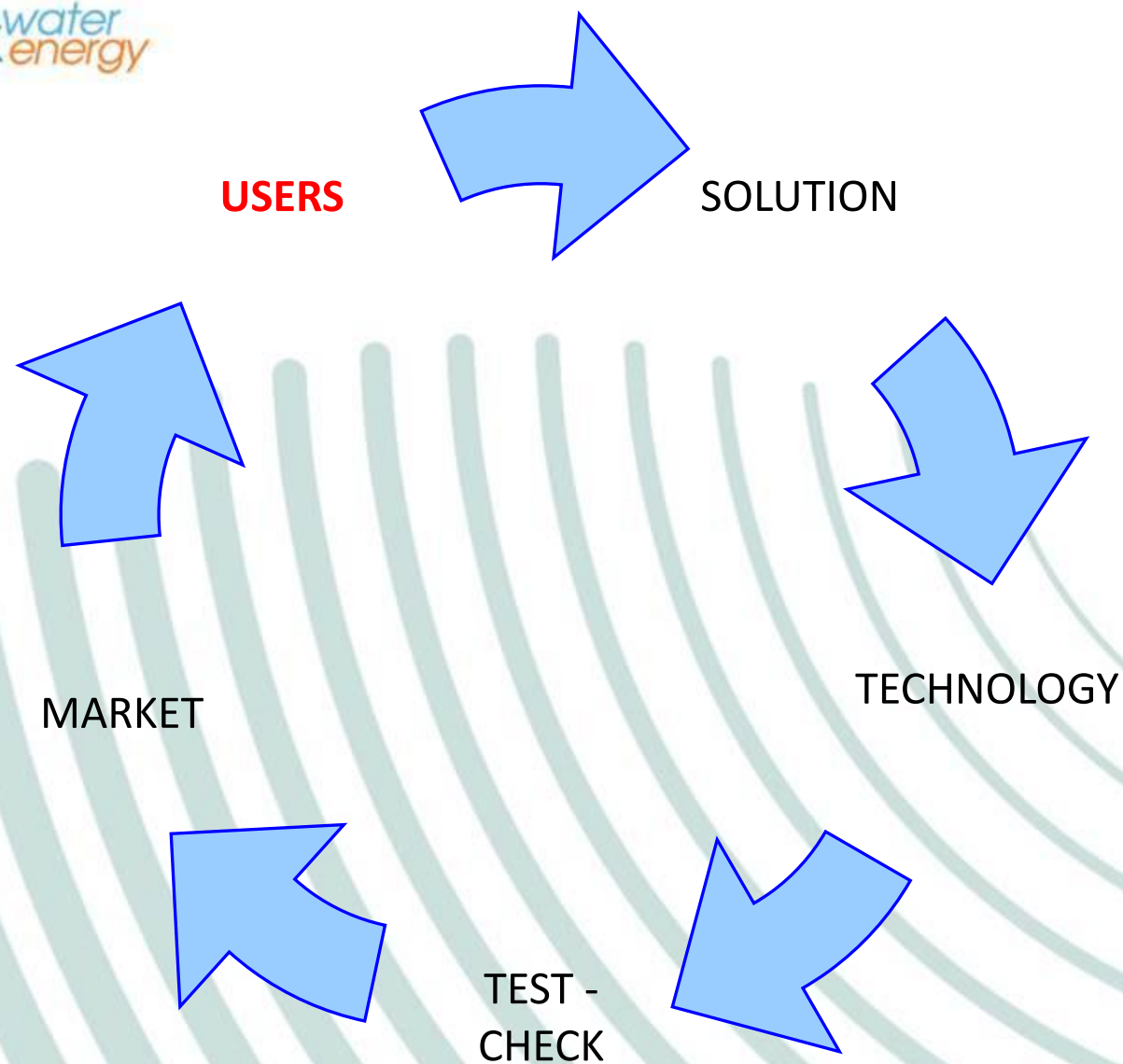
fine-tune irrigation applications;fertilizer / yield

Faces of Core Users

The SIRIUS way



SIRIUS Services

Earth Observation and webGIS for River Basin Governance

INTEGRATED IRRIGATION WATER MANAGEMENT SERVICE (IWMS):

Crop inventory
Mapping Crop Water Consumption
Mapping Irrigation Water Requirements
Mapping Fertilizer and Yield

INTEGRATED FARM ADVISORY SERVICE (IFAS)

INTEGRATED DROUGHT MANAGEMENT SERVICE (IDMS)

Users and Service Providers are linked through SPIDER webGIS

SPIDER- the Core of SIRIUS services

UN WATER WORLD WATER DAY 2014 & water energy

22.03.2014

INEA ISTITUTO NAZIONALE DI ECONOMIA AGRARIA

System of Participatory Information, Decision-Support, and Expert knowledge for River-basin management SPIDER

PLEIADES SPIDER

SIRIUS

SIRIUS Services: a toolset package

EO:

L8, F2, Deimos, Spot, Rapid-eye, Sentinel-2

User community participatory process –

ppgis, e-ppgis

SPIDER

Non-EO;

Multi-media

Sustainability assessment framework & toolset

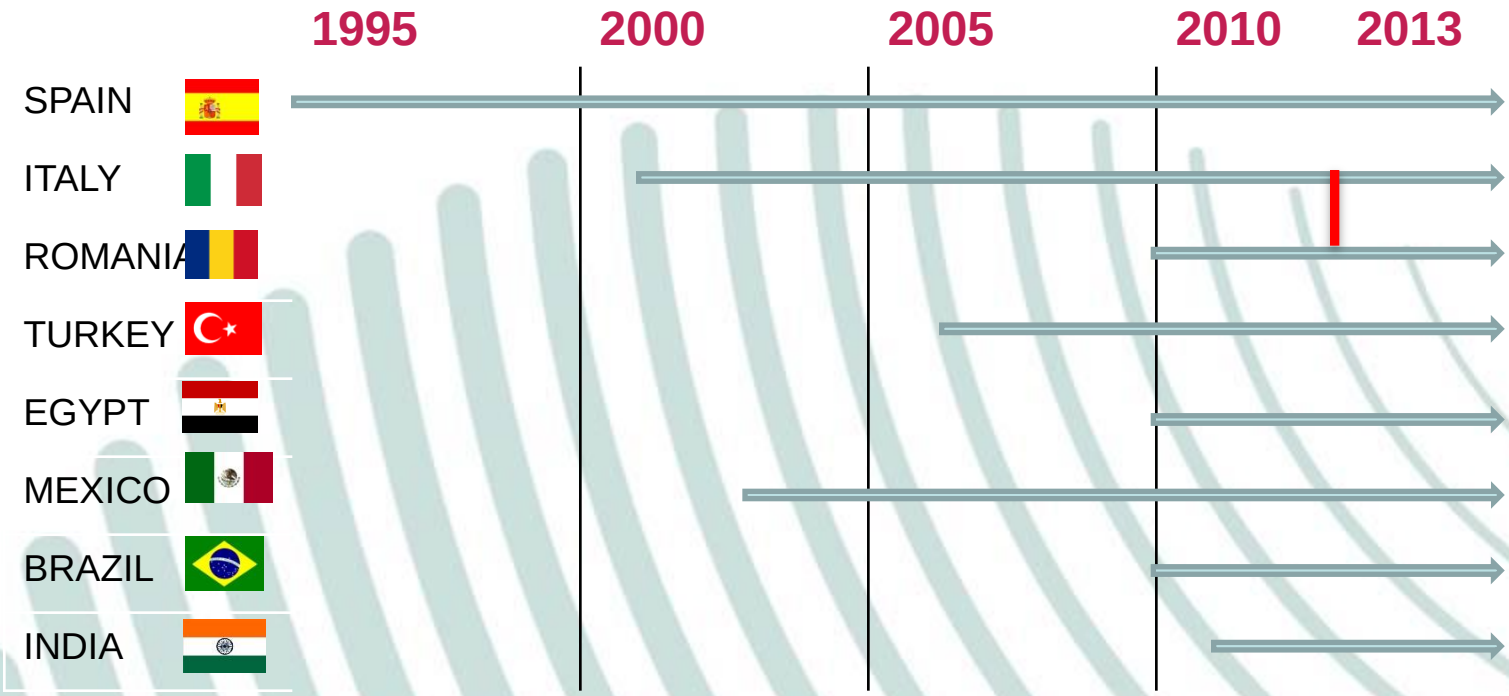
Implementation

implementation in 8 pilot areas

8 Work packages

Implementation in pilot areas

History in pilots



EO for Sustainable Food Production - 2

Space-assisted services for Sustainable Irrigation:

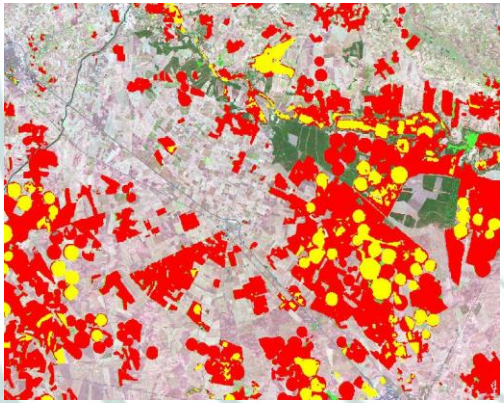
Violations of abstraction law/regulations at 2 levels:

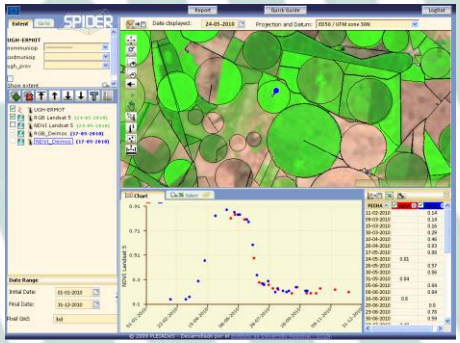
→ EO tools recognized in Court sentences ←

(Example La Mancha, Spain)

New abstractions (violate national Water Law): new wells &/or irrigating beyond irrigable areas.

EO tool: Annual map of irrigated areas





Farms using more water than allocated in annual exploitation plan of aquifer (violate regional hydrological planning of Irrigation Association).

EO tool: web-GIS monitoring water consumption

www.sirius-gmes.es

Sustainable implementation

A new era has dawned with Landsat 8

Counting on / hoping for Sentinel-2

Mutual learning accelarates uptake

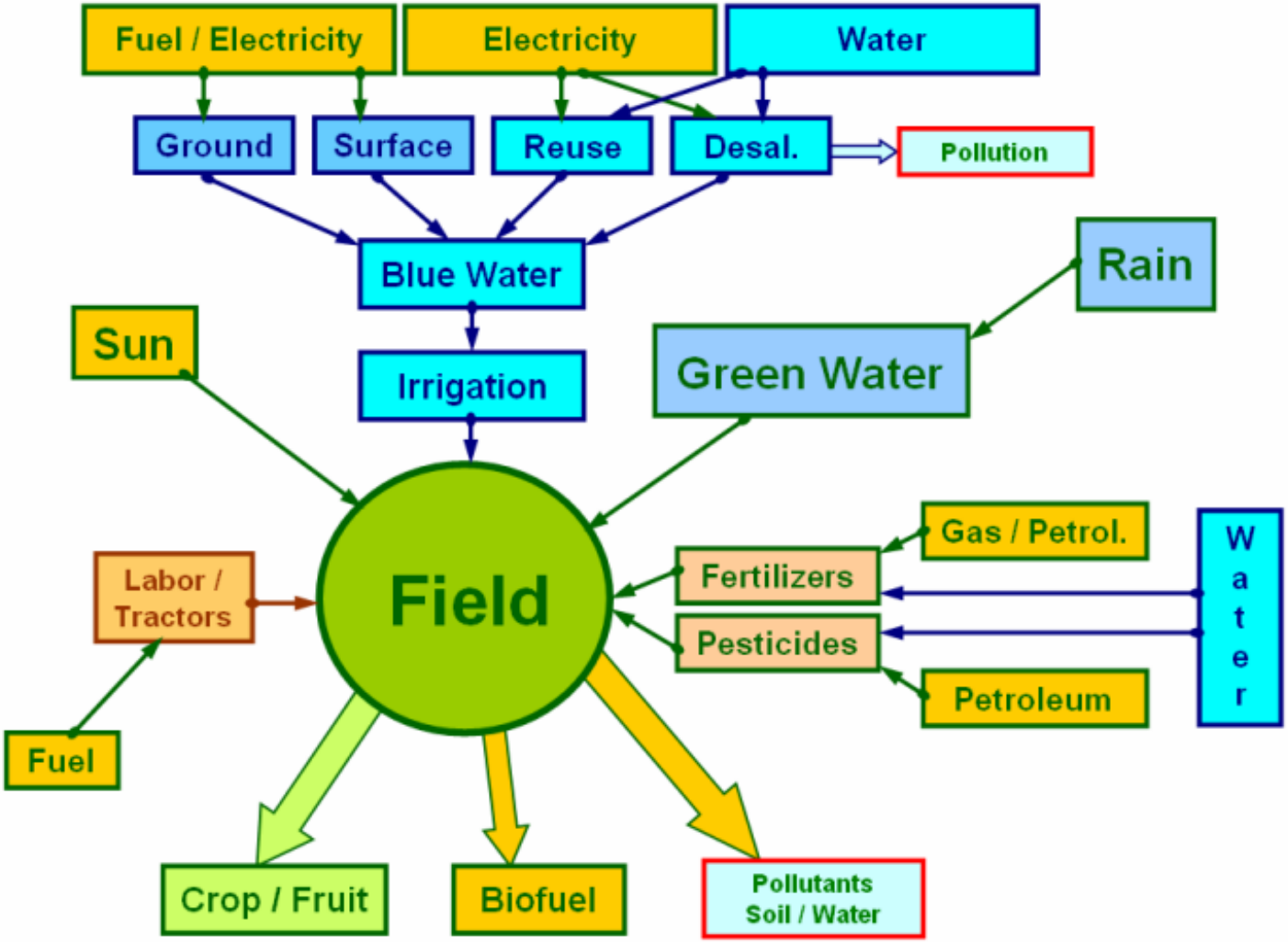
In the spirit of the ancient Andean tradition:

Pachamama raymi competition

Everybody wins

First winner: "the best"
All other winners: learning from "the best"

Acqua – energia - agricoltura



Impact of W&E savings policies - 1

Measure	Policy / legis-lation	Save water / energy	Impact on water / energy
"Irrigation modernization" Gravity → pressurized (some drip)	NIP	Less water ~4% of total national*); ~30% of total in modernized area**)	Less energy for pumping ~4% / 30%, respectively (assumed directly proportional)
		More energy ~7% of total national***) (for pumping); up to100% of total in modernized area**)	Impact on total energy needs to be assessed; drip irrigation provides opportunity for fertilizer reduction (saving fossil energy)

Conclusioni

Copernicus 2014 opportunità grande,
depende delle politiche

SIRIUS gestione irrigua operazionale,
servizio alle aziende

Acqua-energia e un **tri**nomio:

Acqua – energia – alimentazione

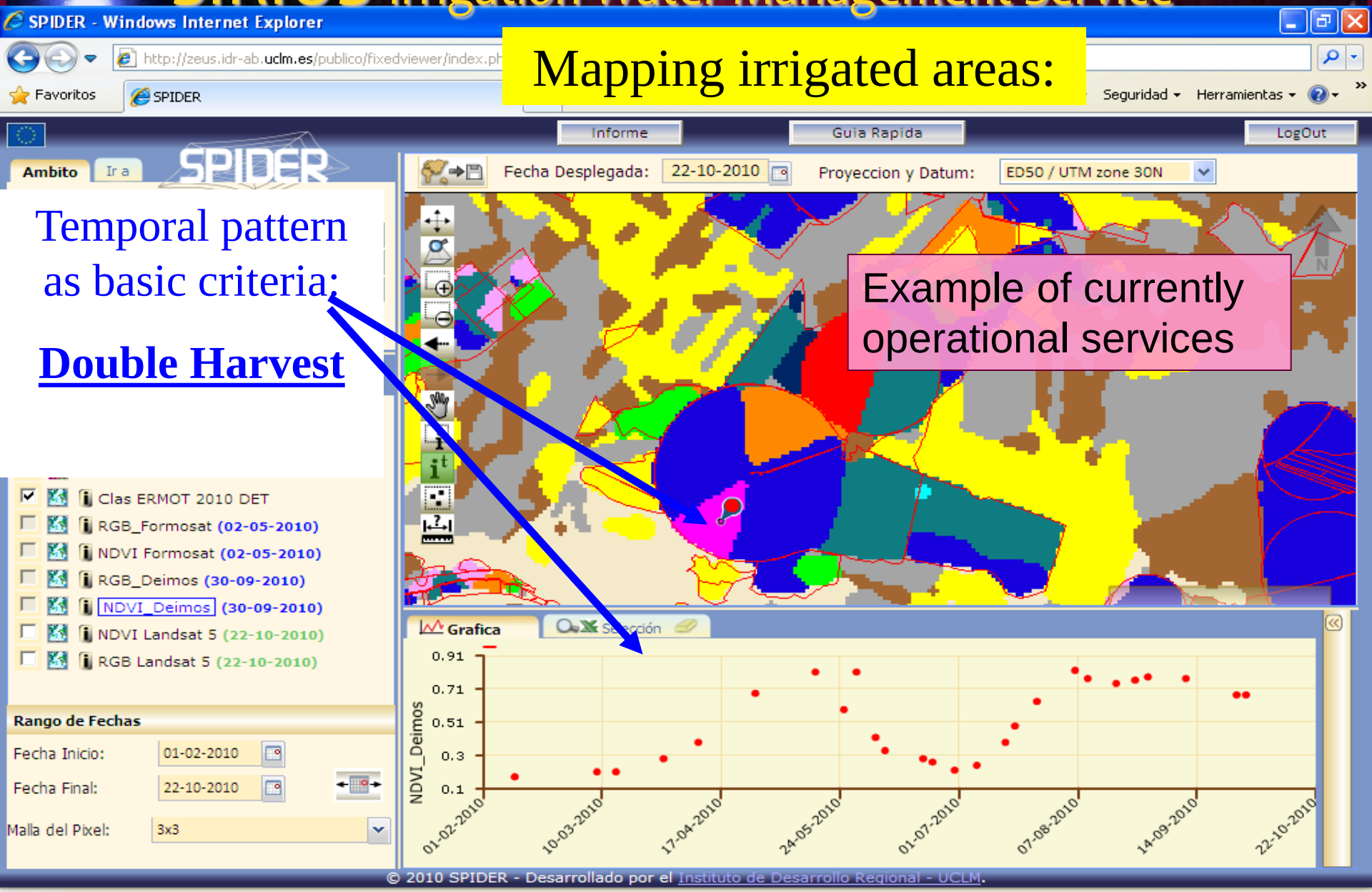
SIRIUS Irrigation Water Management Service

Mapping irrigated areas:

Temporal pattern as basic criteria:

Double Harvest

Example of currently operational services

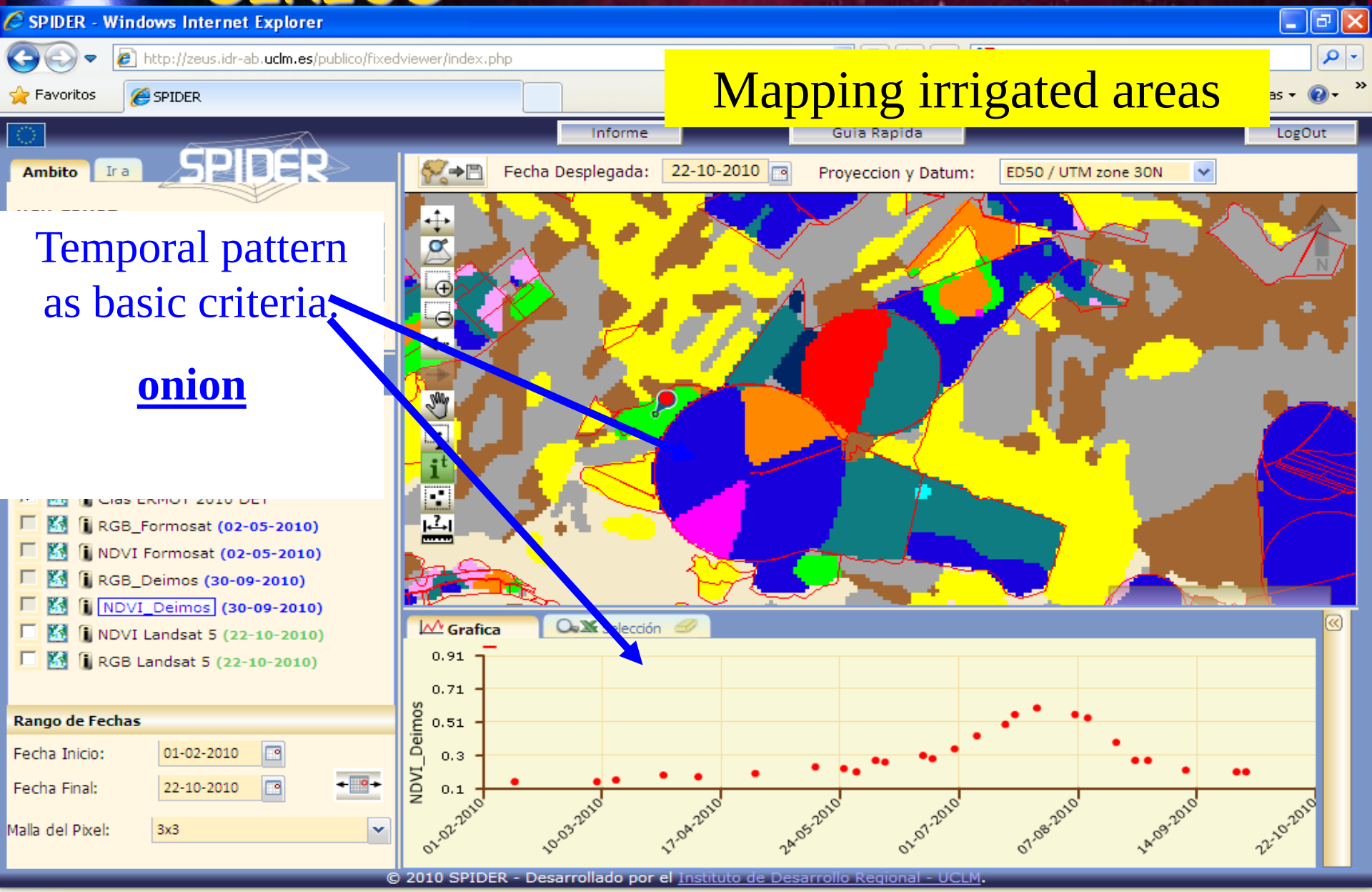


SIRIUS

Mapping irrigated areas

Temporal pattern as basic criteria

onion

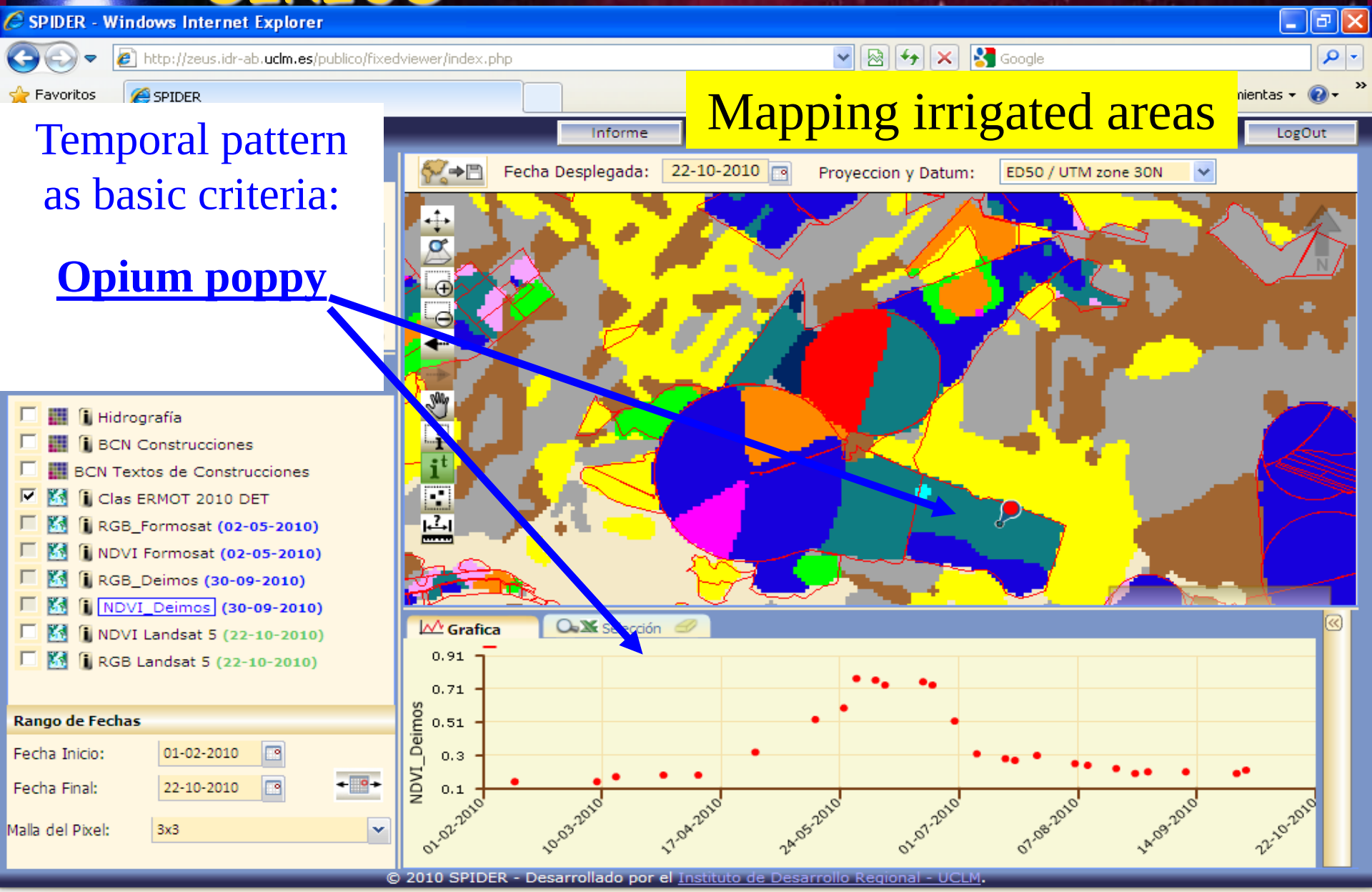


SIRIUS

Mapping irrigated areas

Temporal pattern as basic criteria:

Opium poppy

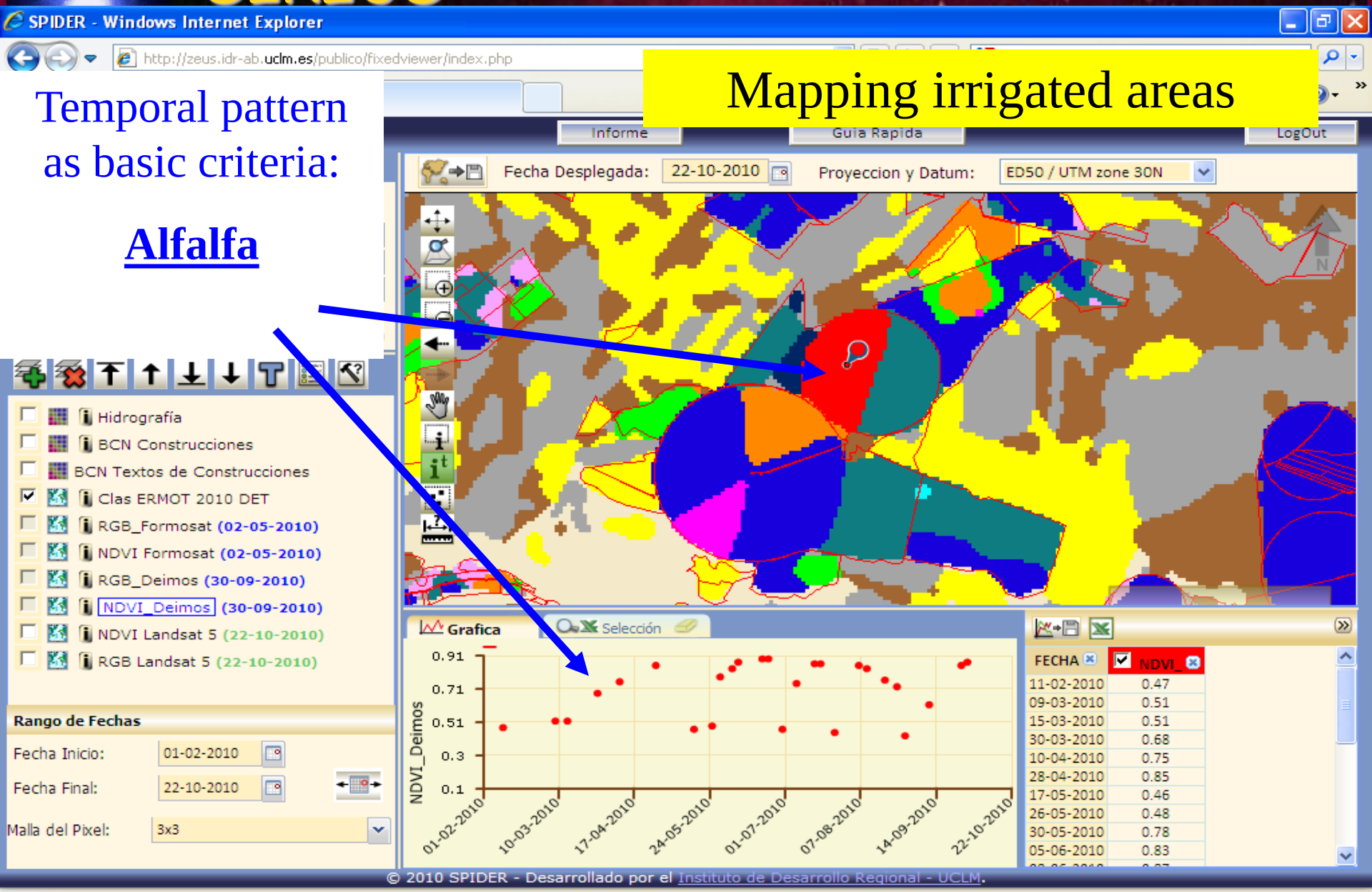


SIRIUS

Mapping irrigated areas

Temporal pattern as basic criteria:

Alfalfa



Mancha Oriental Aquifer Jucar River Basin SPAIN

ERMOT 2010

Legend:

Blue: Spring

Orange: Summer

Red : Alfalfa, Double harvest

Yellow: Vineyard, Olive

Main characteristics

100,000 ha irrigated **groundwater**

2,700 Water Management Unit

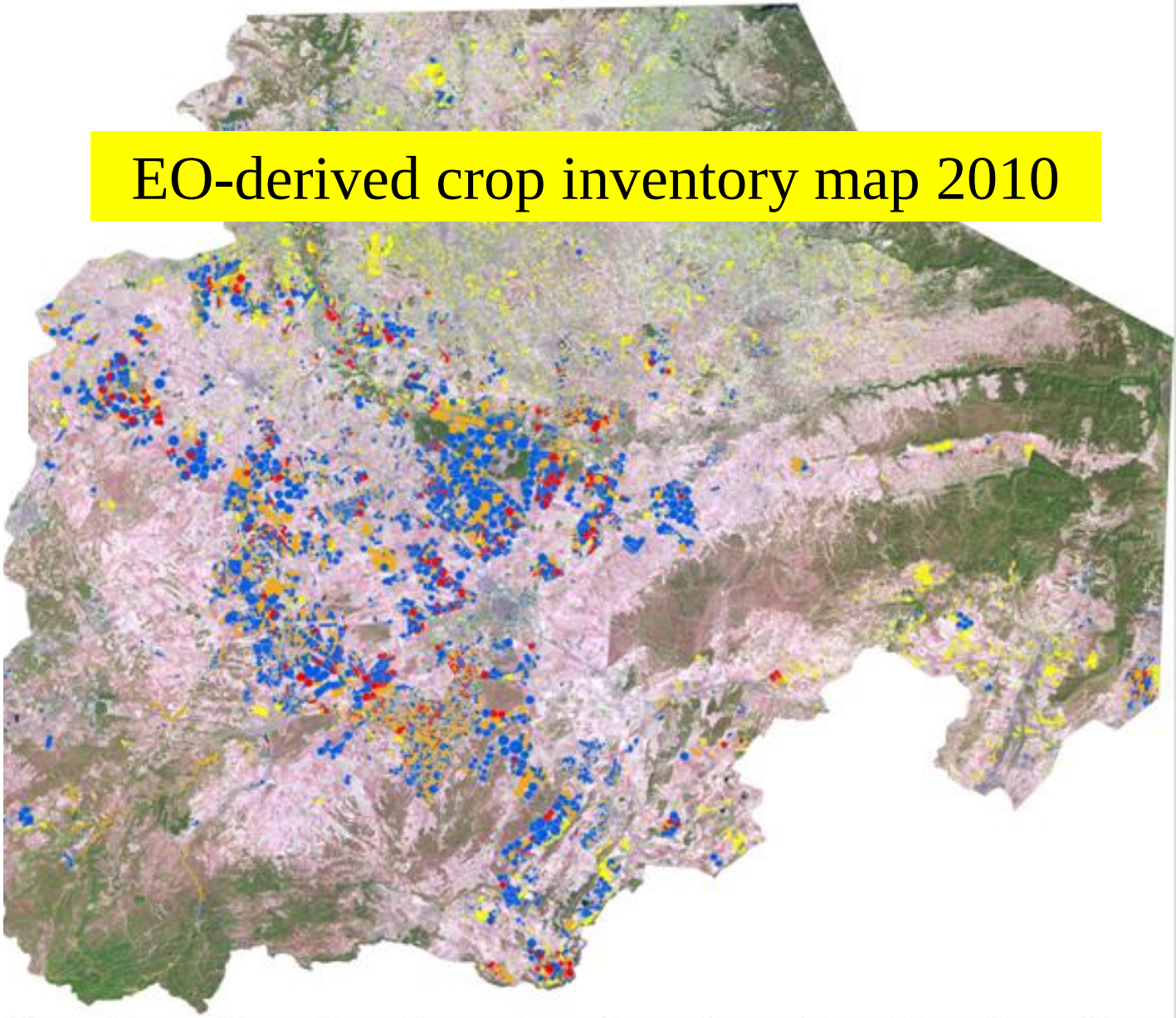
275,000 inhabitants

1,000,000 ha

Semi-arid climate

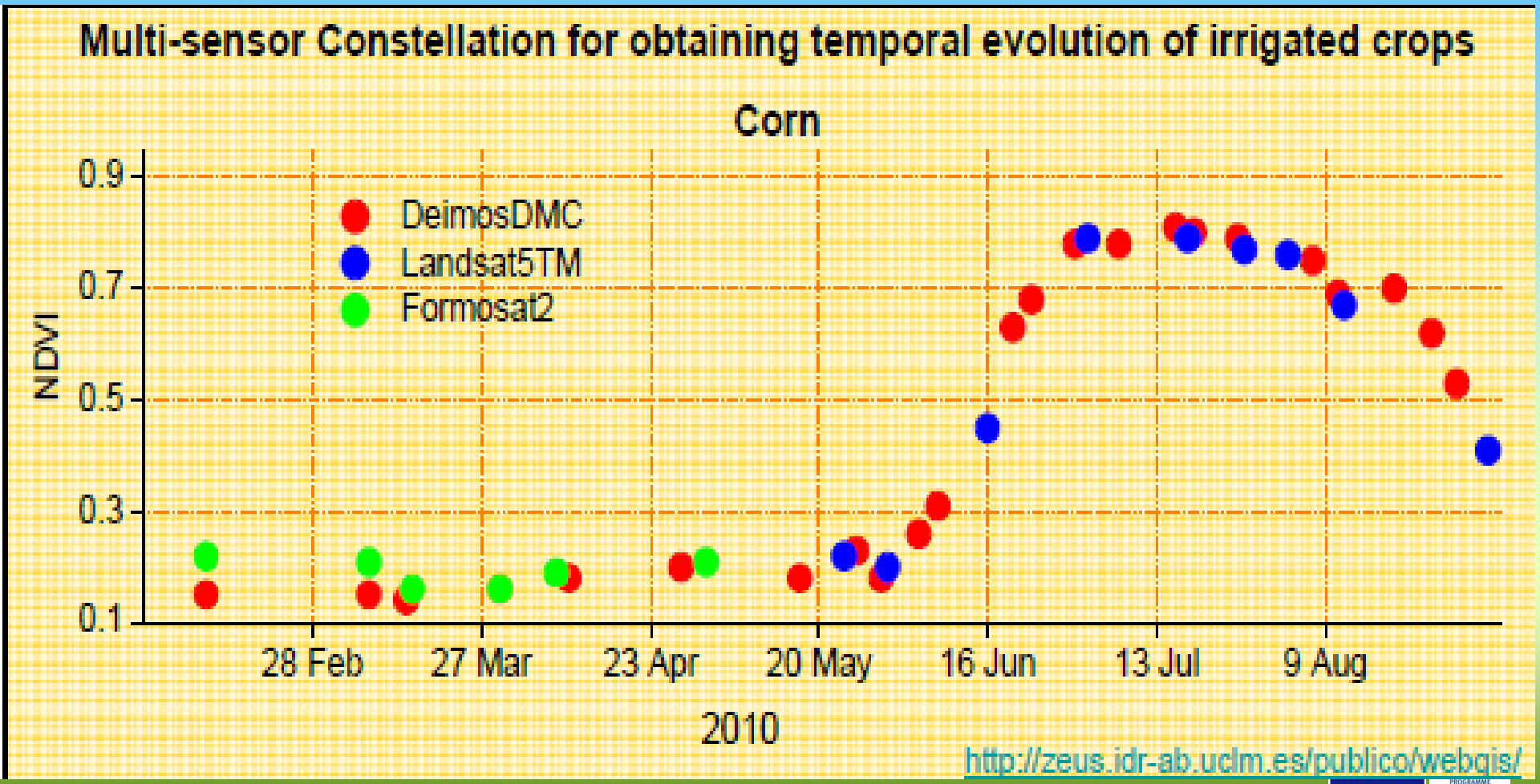
350 mm/year

Multiple pressures



SIRIUS

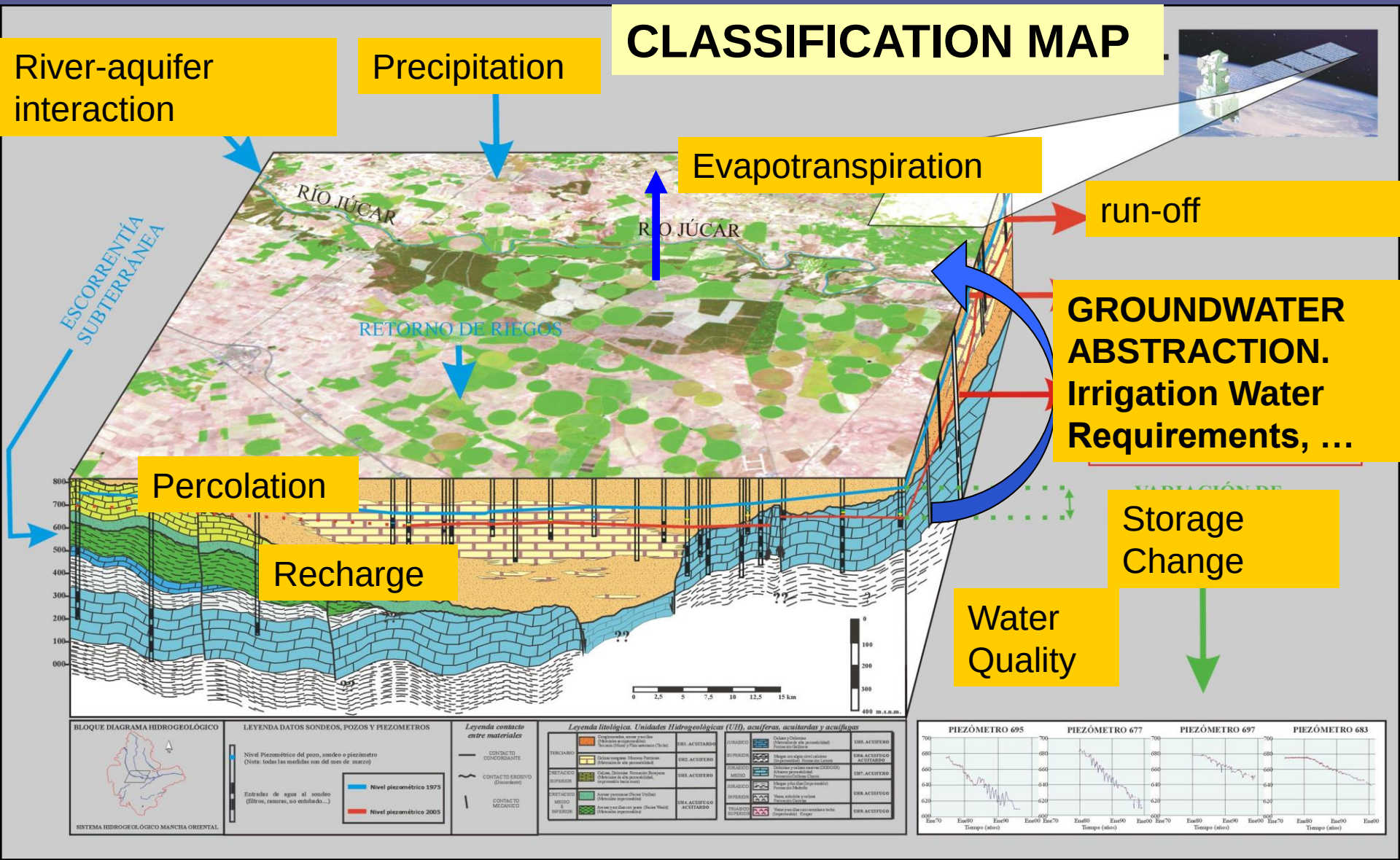
The concept of multisensor constellation: Solving the problem of the Vulnerability of space segment to provide time series of high spatial resolution imagery



SIRIUS

Satellite-Assisted Distributed Soil Water Balance

CLASSIFICATION MAP



SIRIUS sustainable implementation

Court sentences

Procedimiento Ordinario - 000603/2007
N.I.G.: 46250-33-3-2006-0014737

ADMINISTRACION DE JUSTICIA

TRIBUNAL SUPERIOR DE JUSTICIA DE LA COMUNIDAD VALENCIANA
SALA DE LO CONTENCIOSO-ADMINISTRATIVO
SECCION SEGUNDA

MINISTERIO DE JUSTICIA
ABOGACIA DEL ESTADO
VALENCIA
19 ENE. 2010
TRIBUNALES

Ilmos. Sres:	
Presidente:	
D. MIGUEL SOLER MARGARIT	S E N T E N C I A
Magistrados:	
D. JUAN CLIMENT BARBERA	
D. RAFAEL S. MANZANA LAGUARDA	NUMERO 1623/09

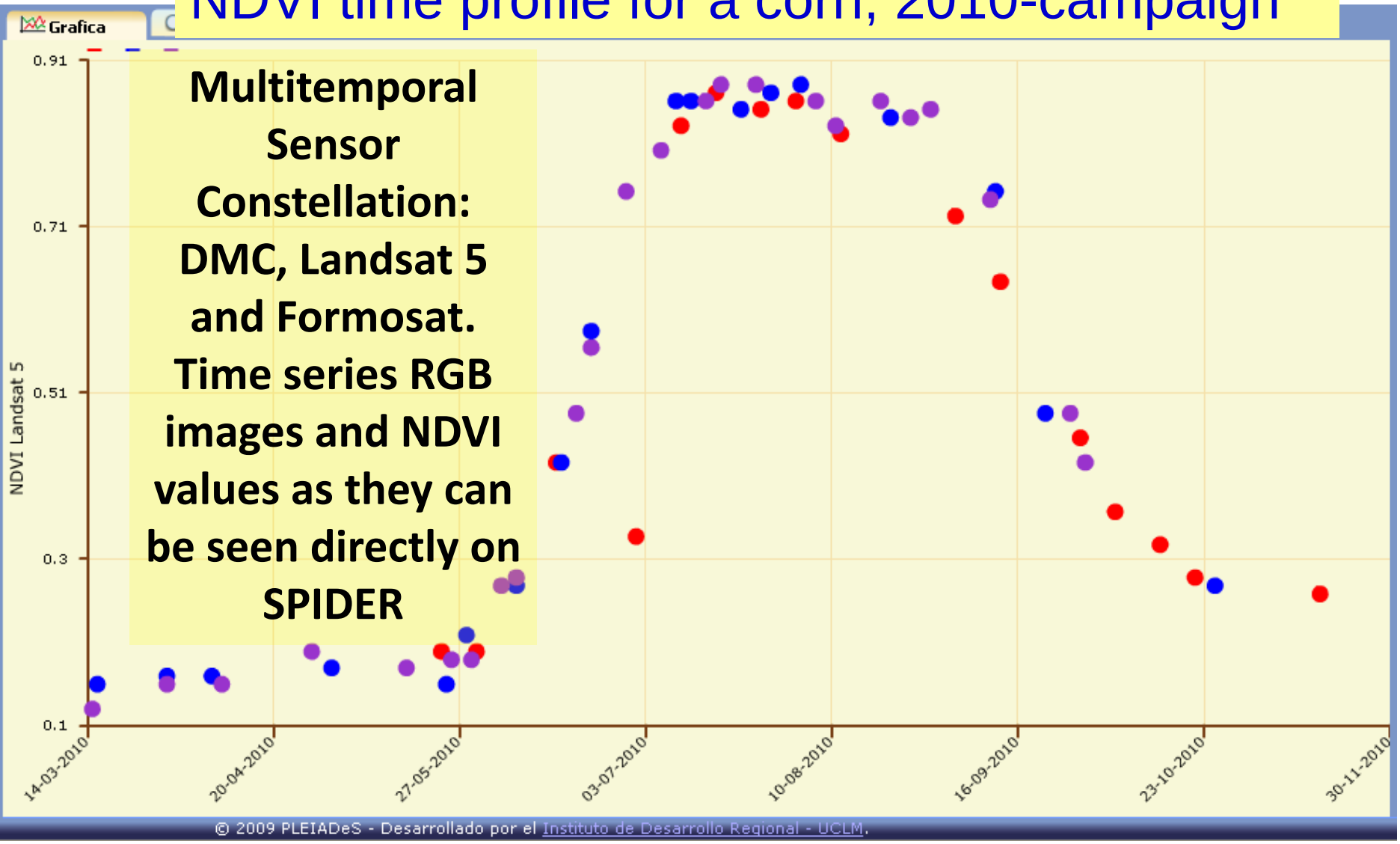
En la Ciudad de Valencia, a catorce de diciembre de dos mil nueve.-

VISTO, por la Sección Segunda de este Tribunal, el presente Recurso Contencioso-Administrativo num. 603/07, promovido por D. GASPAR y D. PEDRO JULIAN

Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat

DMC time series imagery describing temporal evolution of corn for the 2010-campaign as it can be seen on SPIDER. Images and graphics are captured directly from the SPIDER screen

NDVI time profile for a corn, 2010-campaign



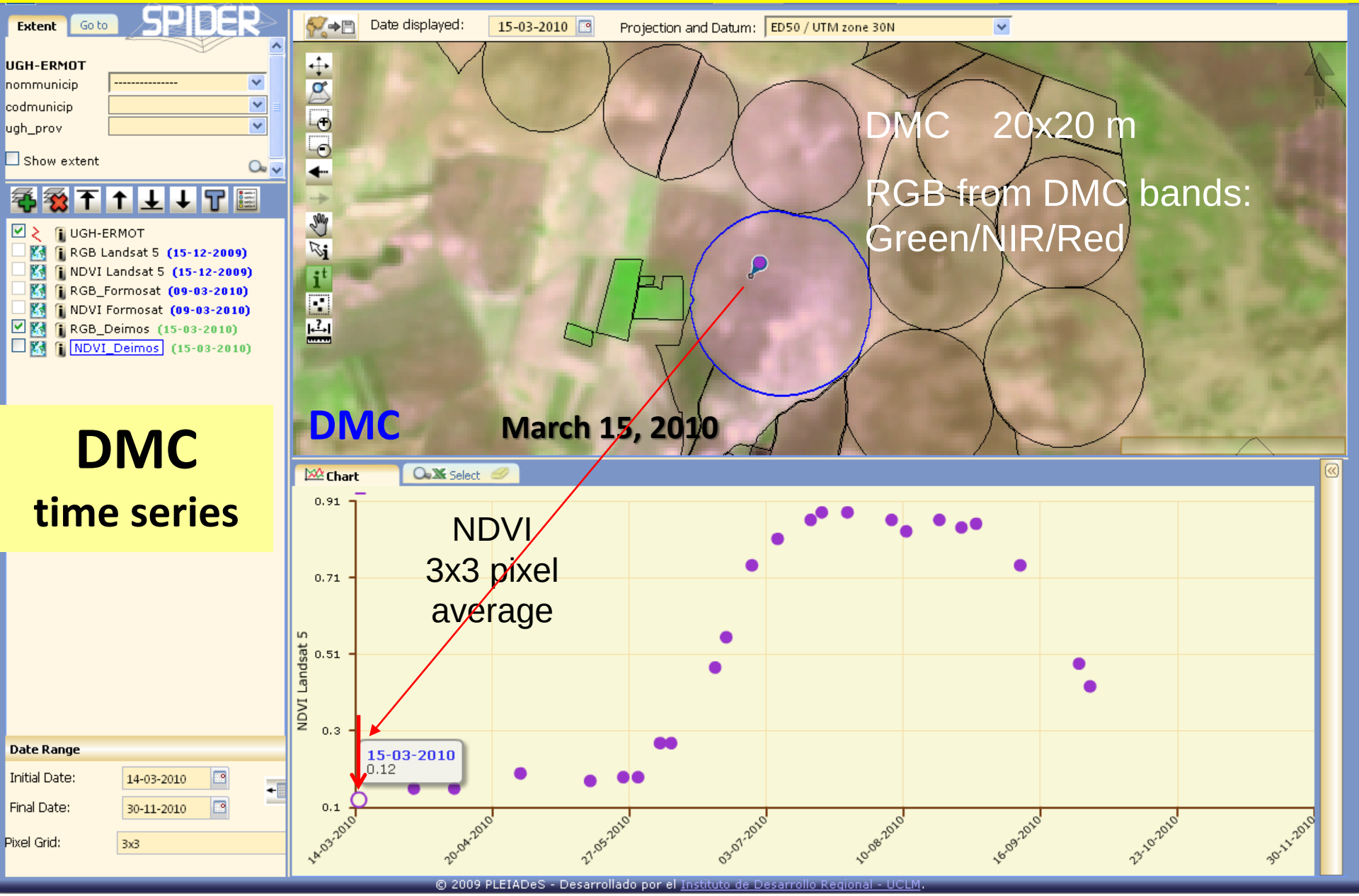
Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat. Time series RGB images and NDVI values as they can be seen directly on SPIDER

- **DMC**
- **LANDSAT 5**
- **FORMOSAT**

Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat

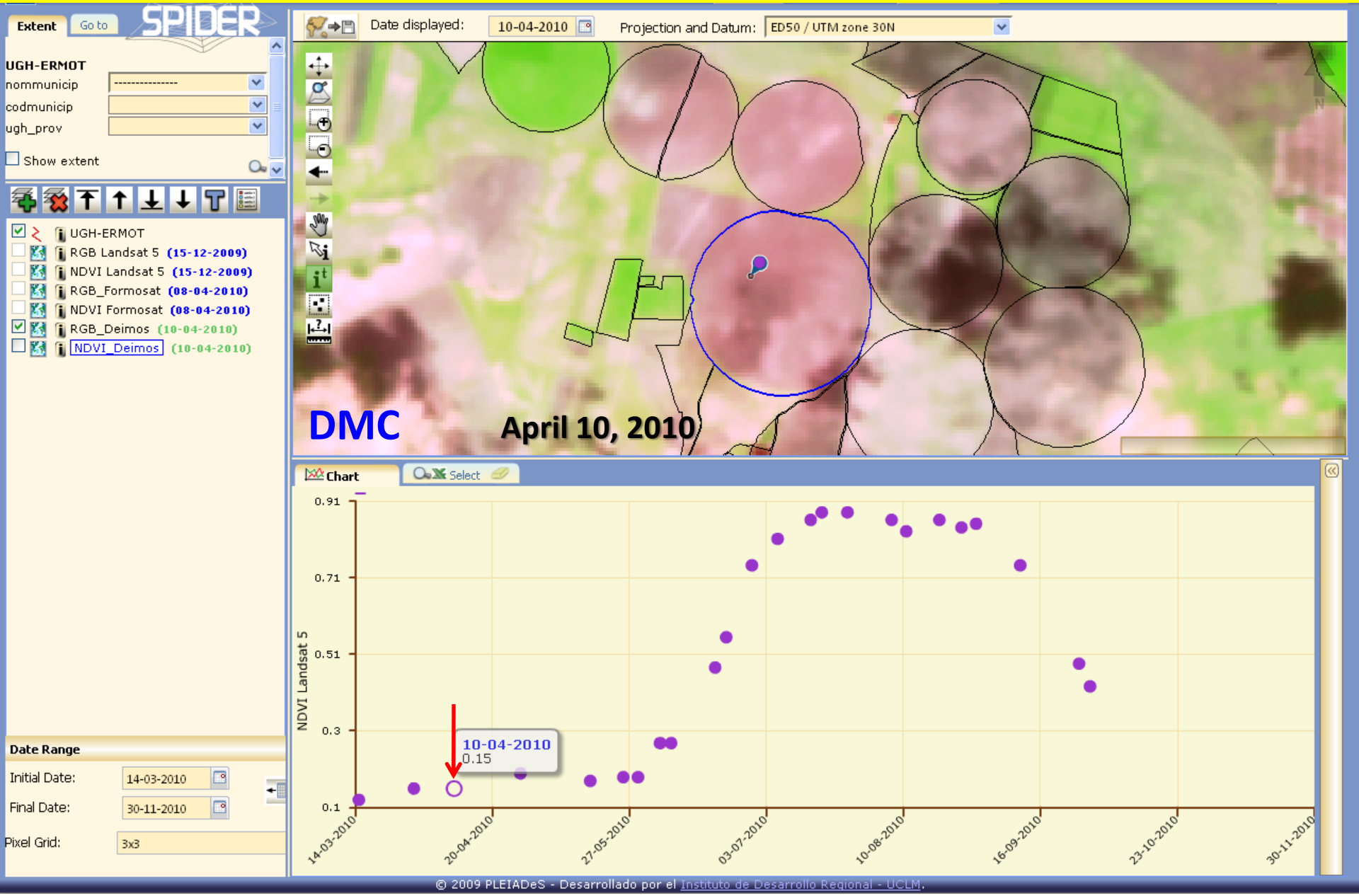
DMC time series imagery describing temporal evolution of corn for the 2010-campaign as it can be seen on SPIDER. Images and graphics are captured directly from the SPIDER screen

Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat

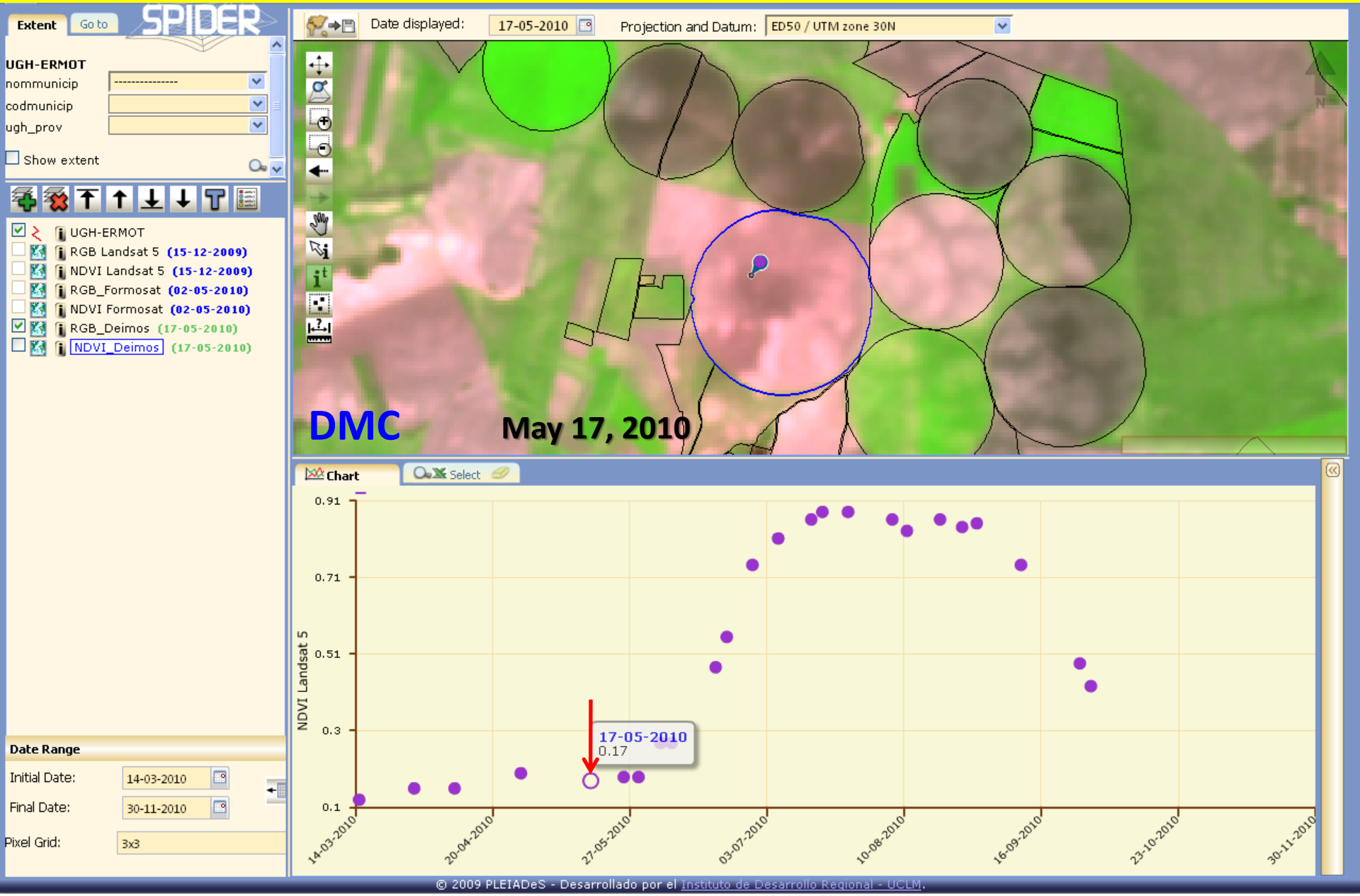


DMC
time series

Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



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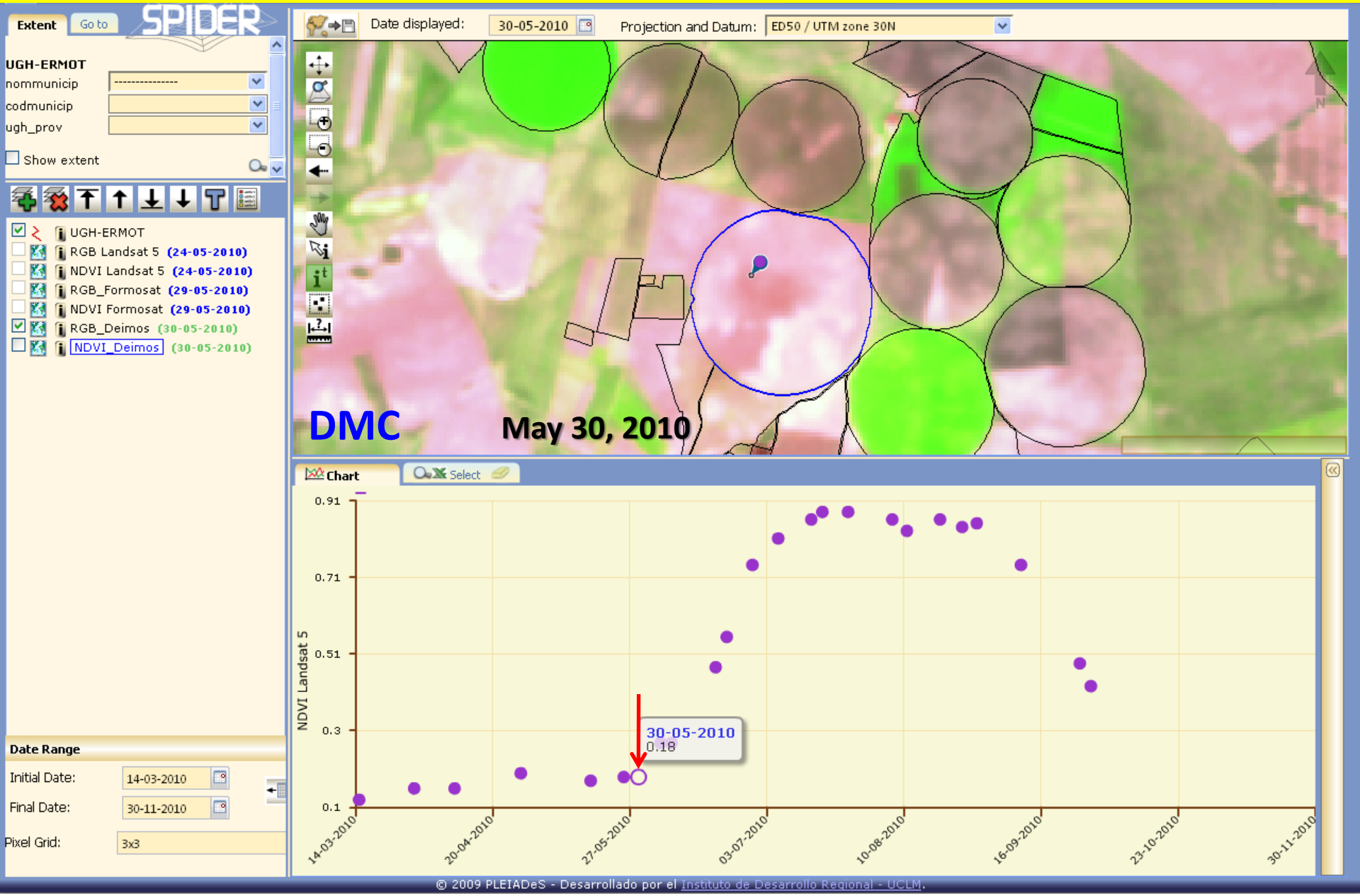

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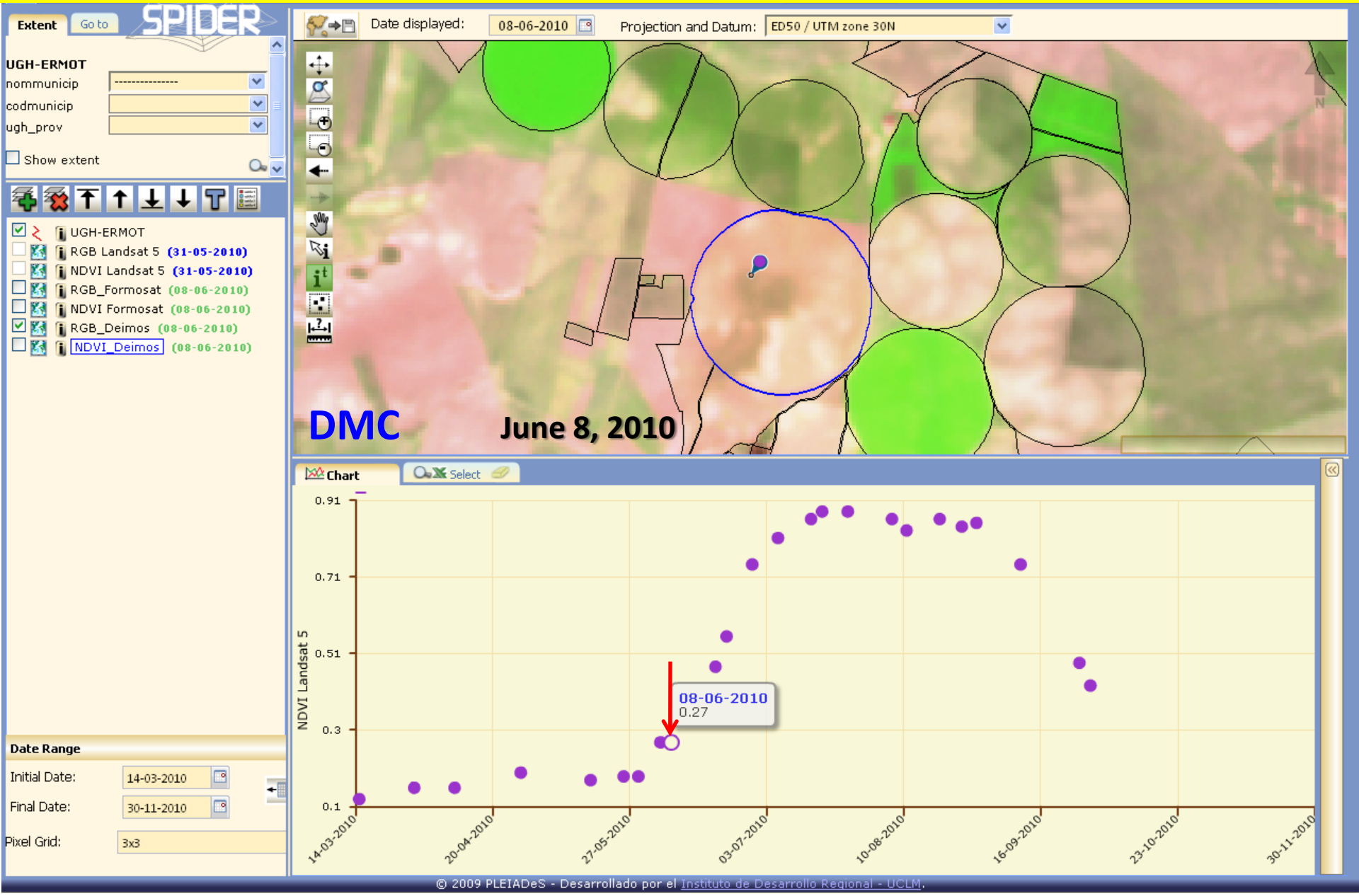

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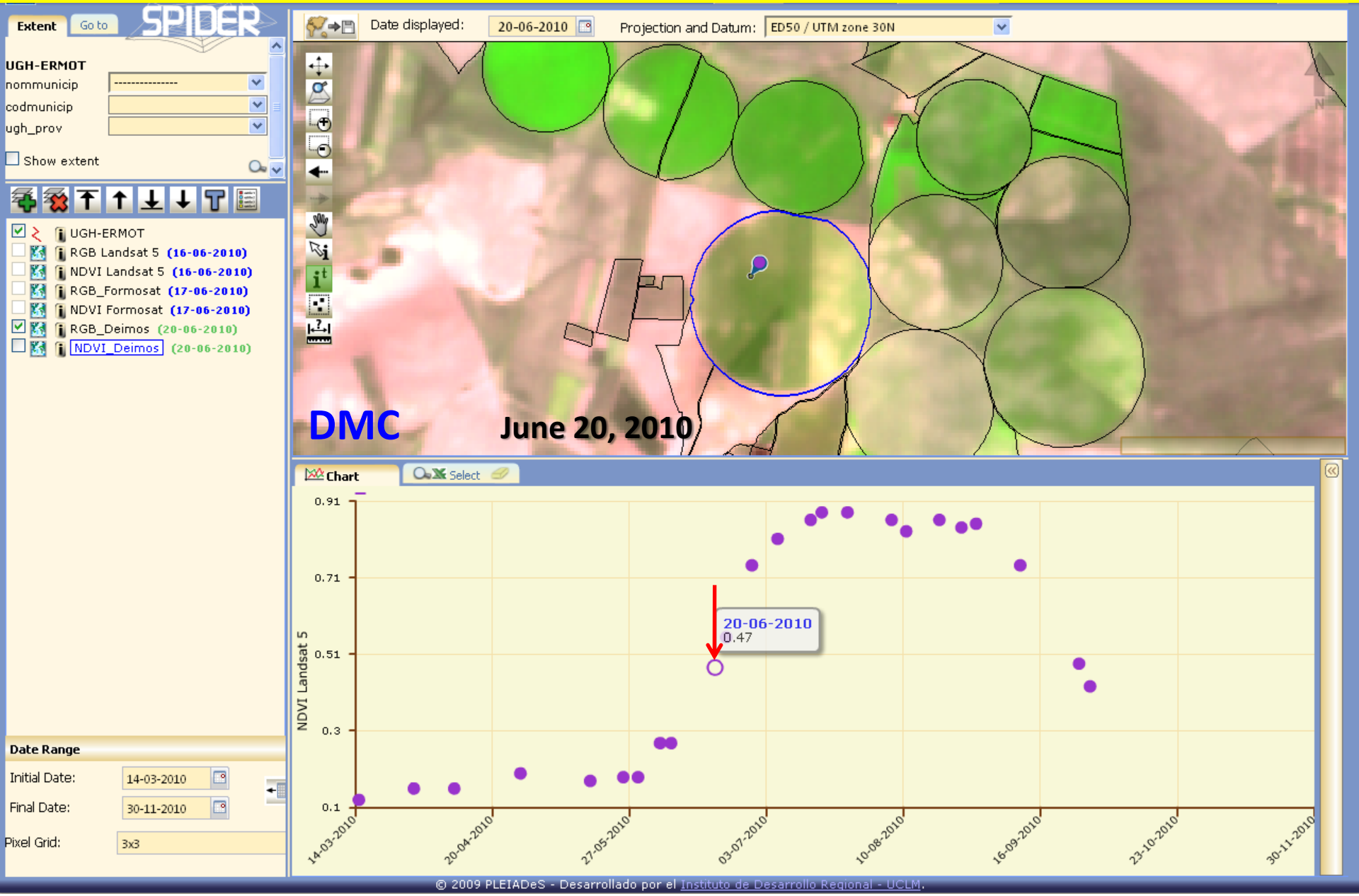

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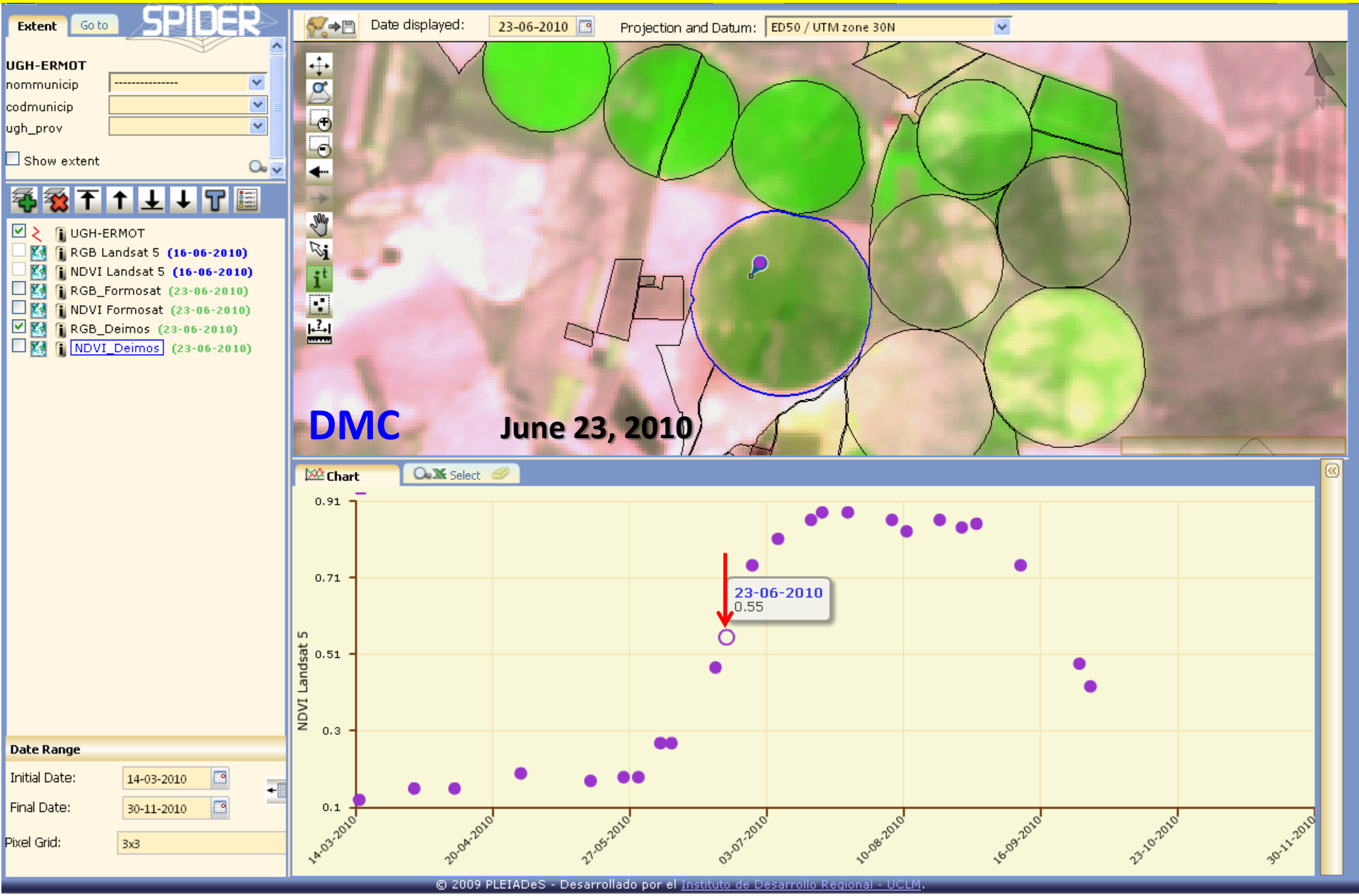
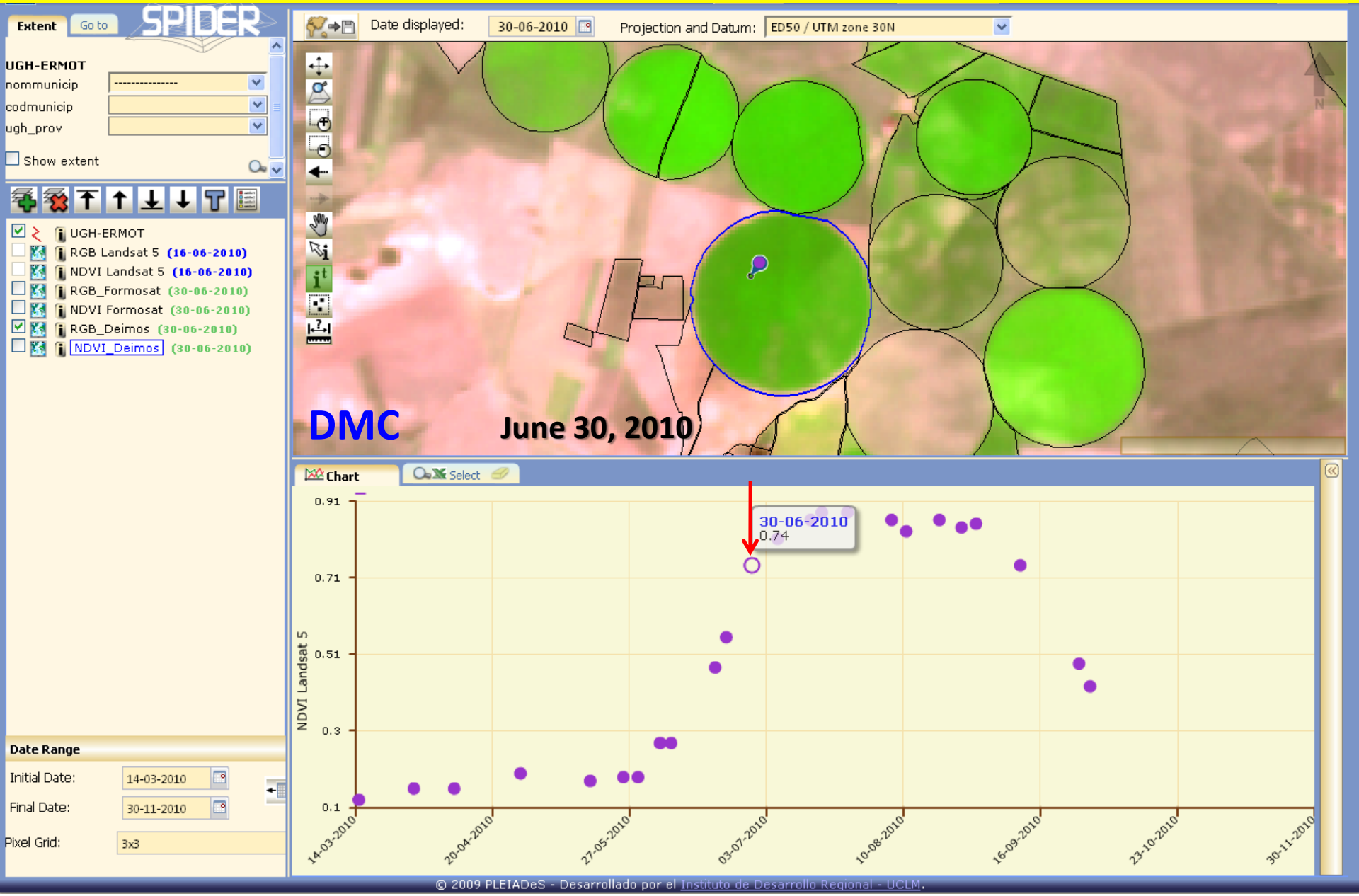


Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



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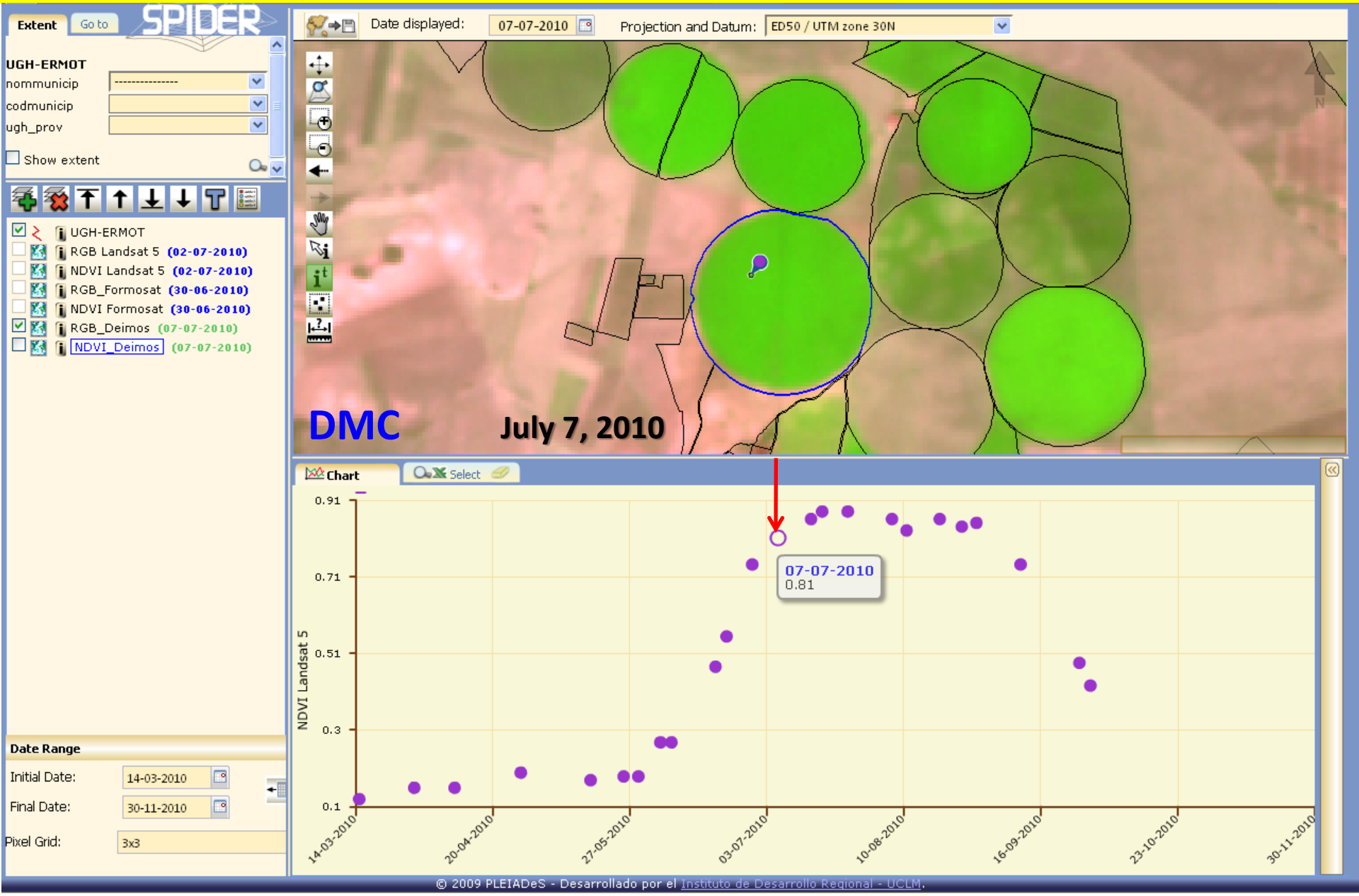

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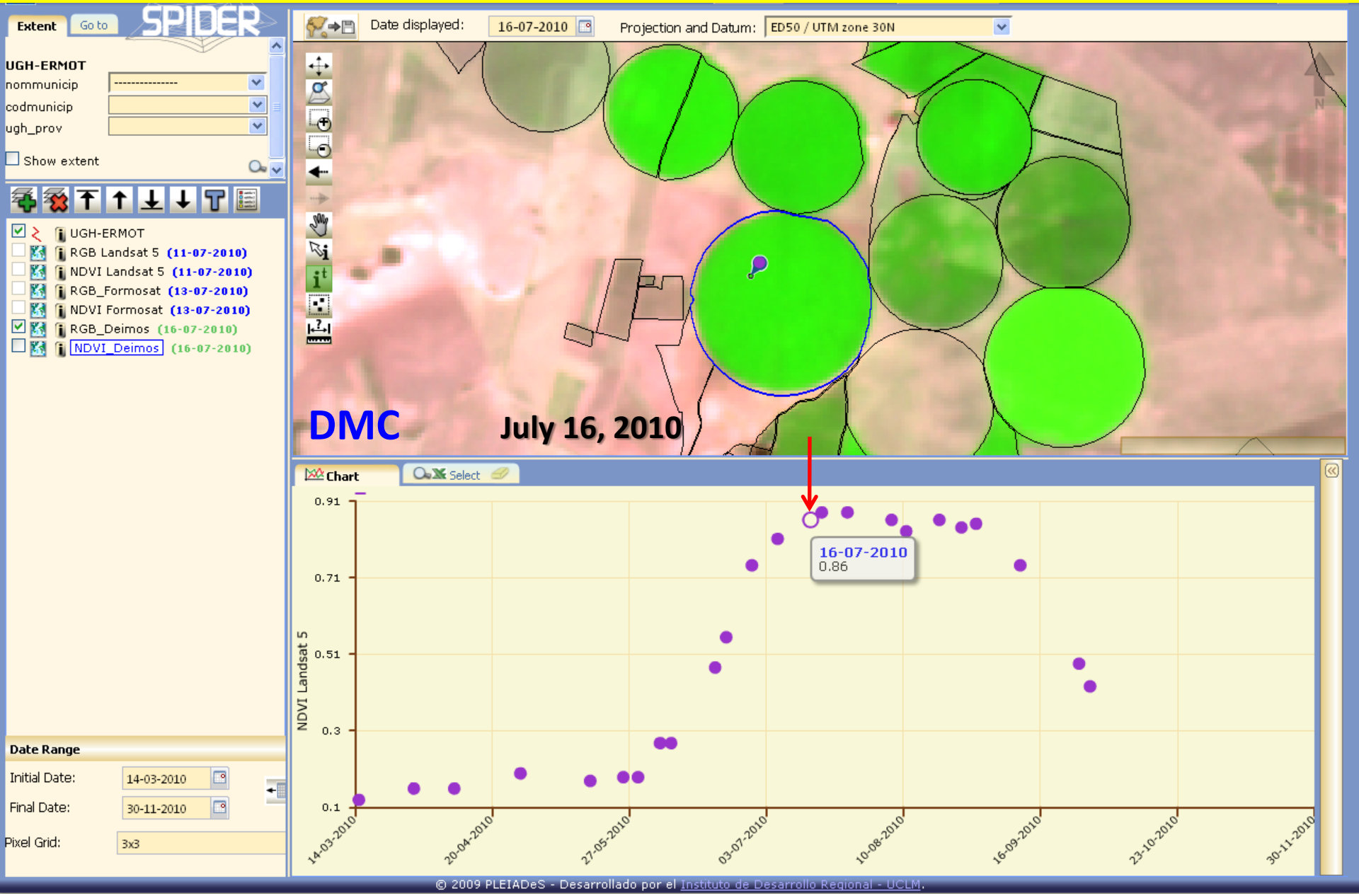

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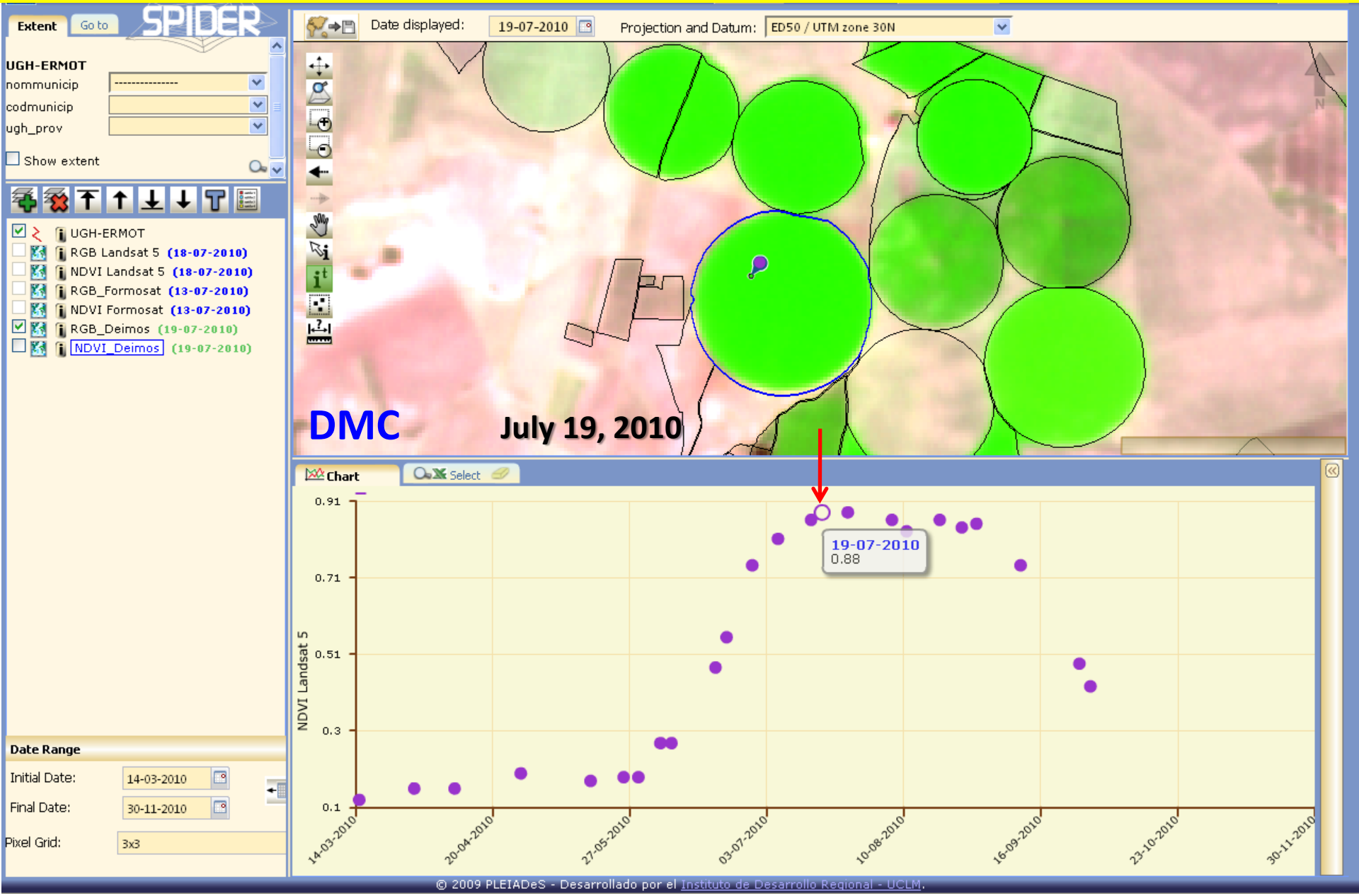

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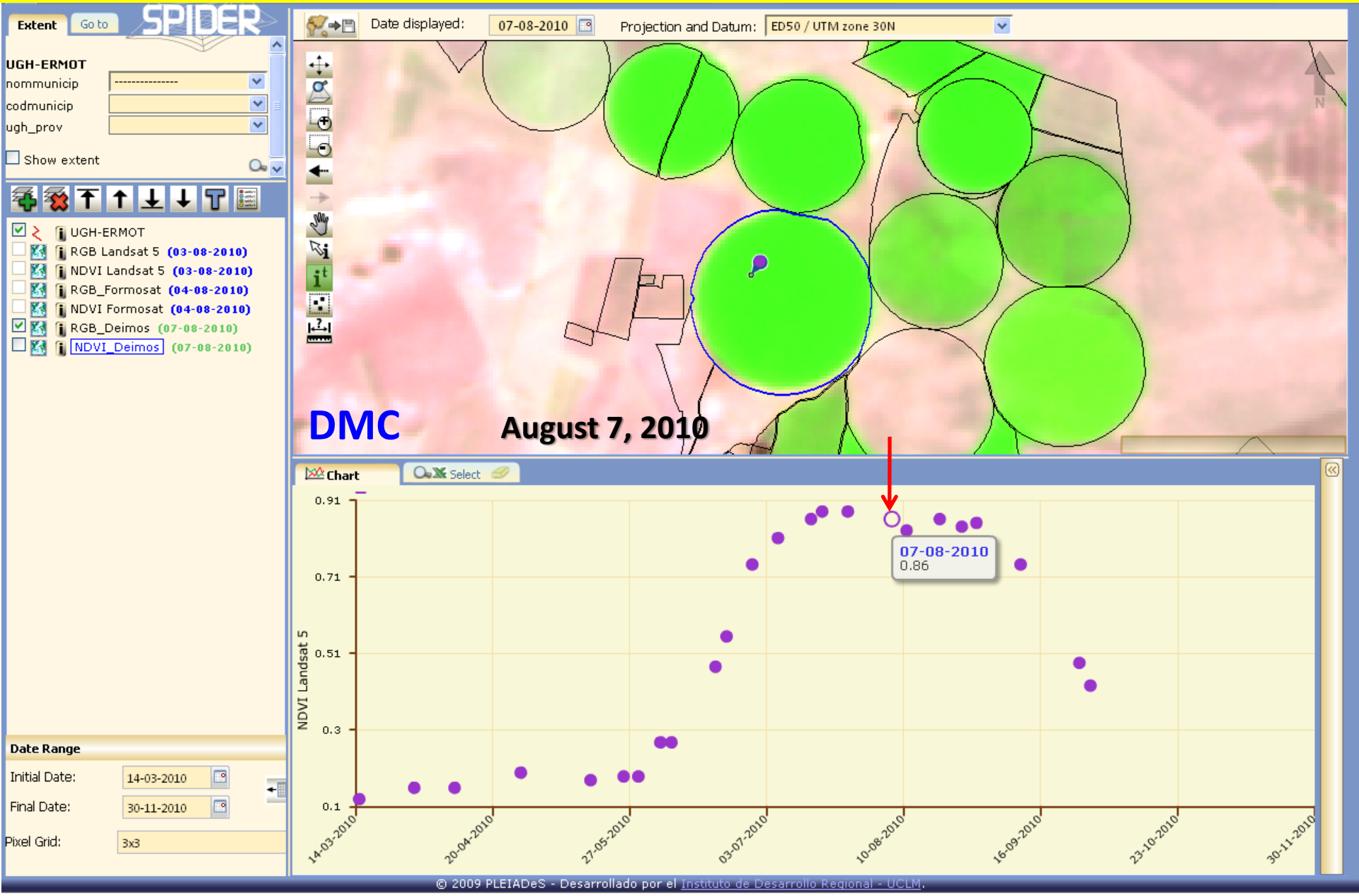

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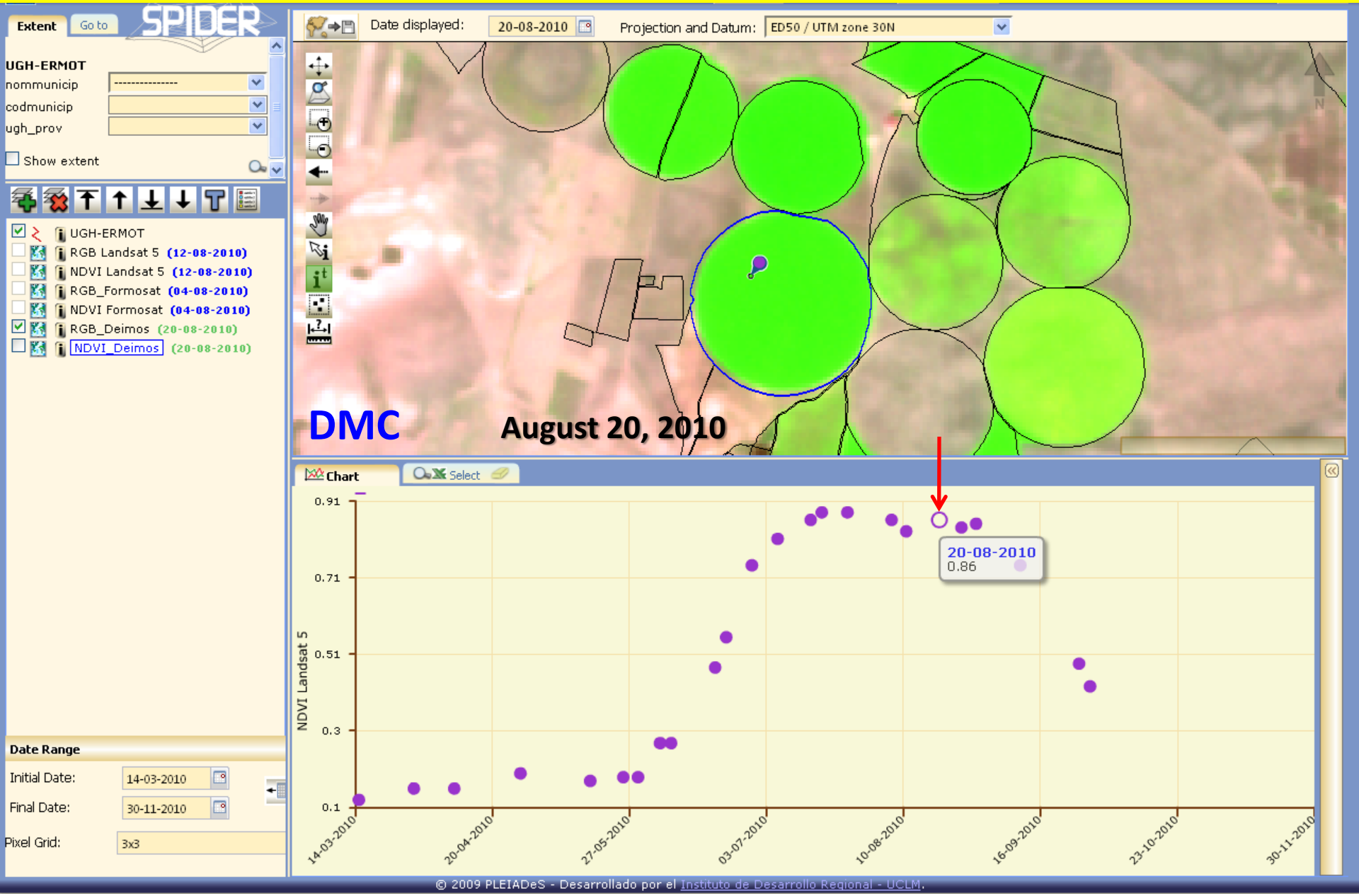

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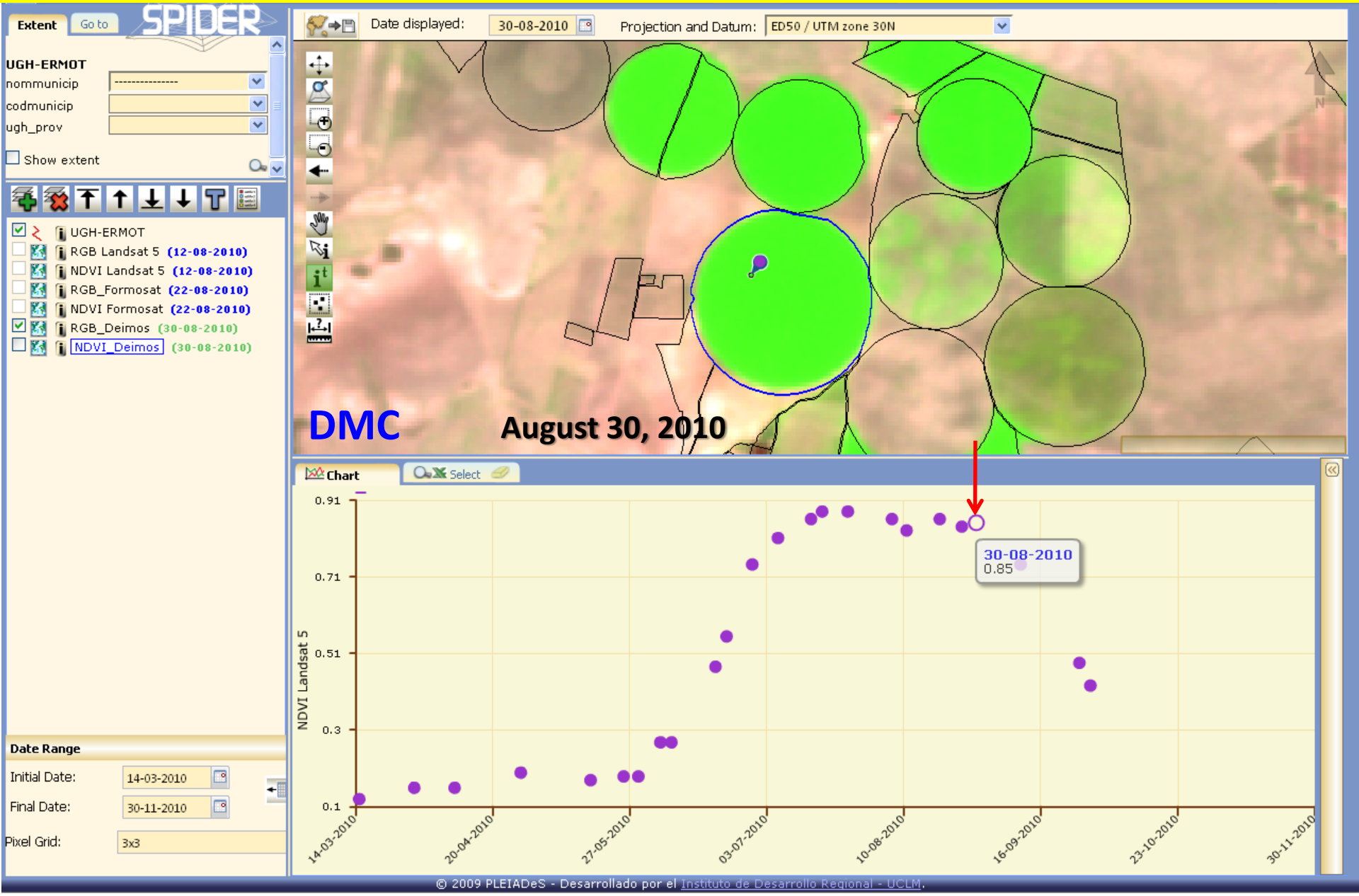

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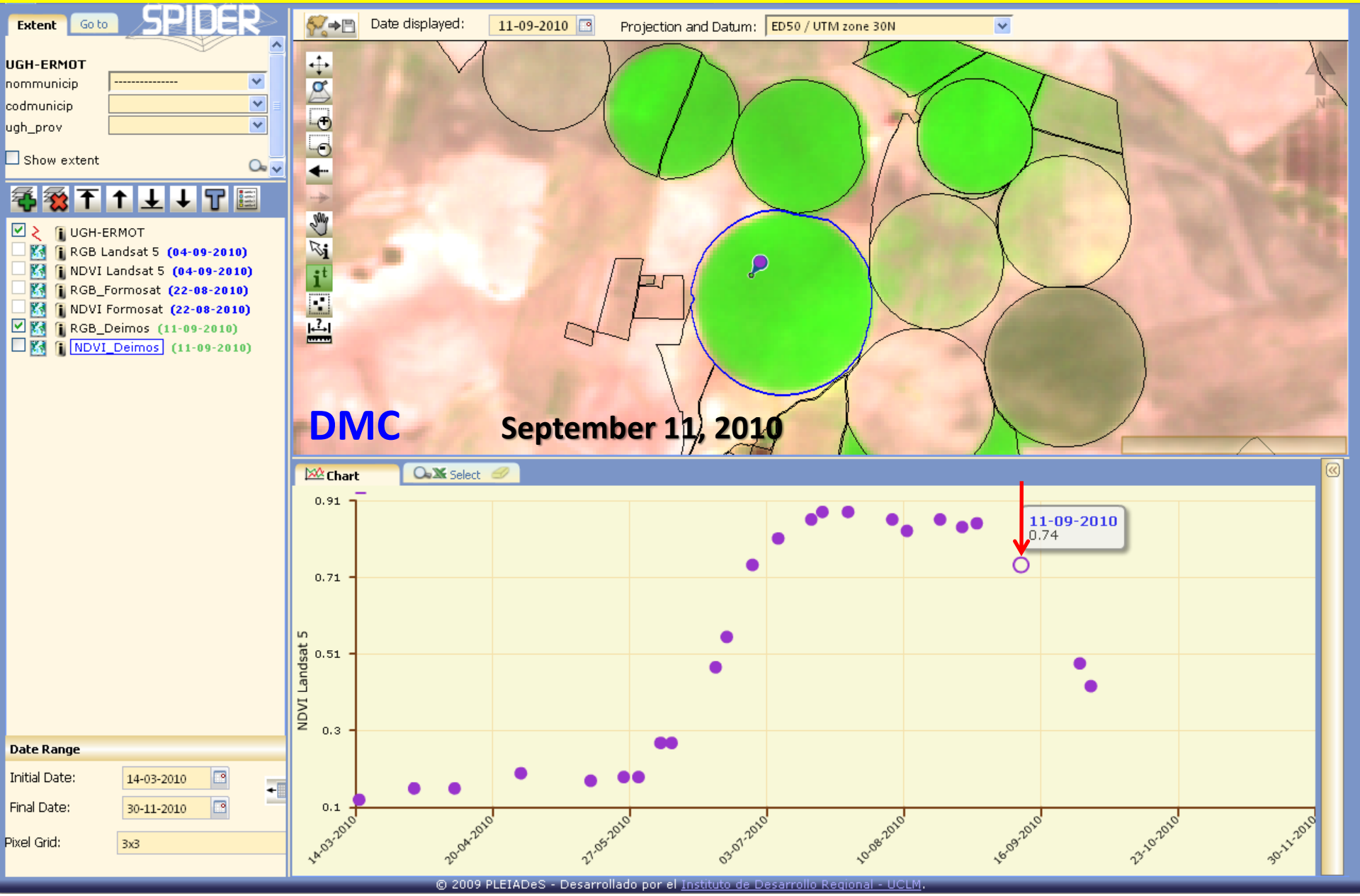

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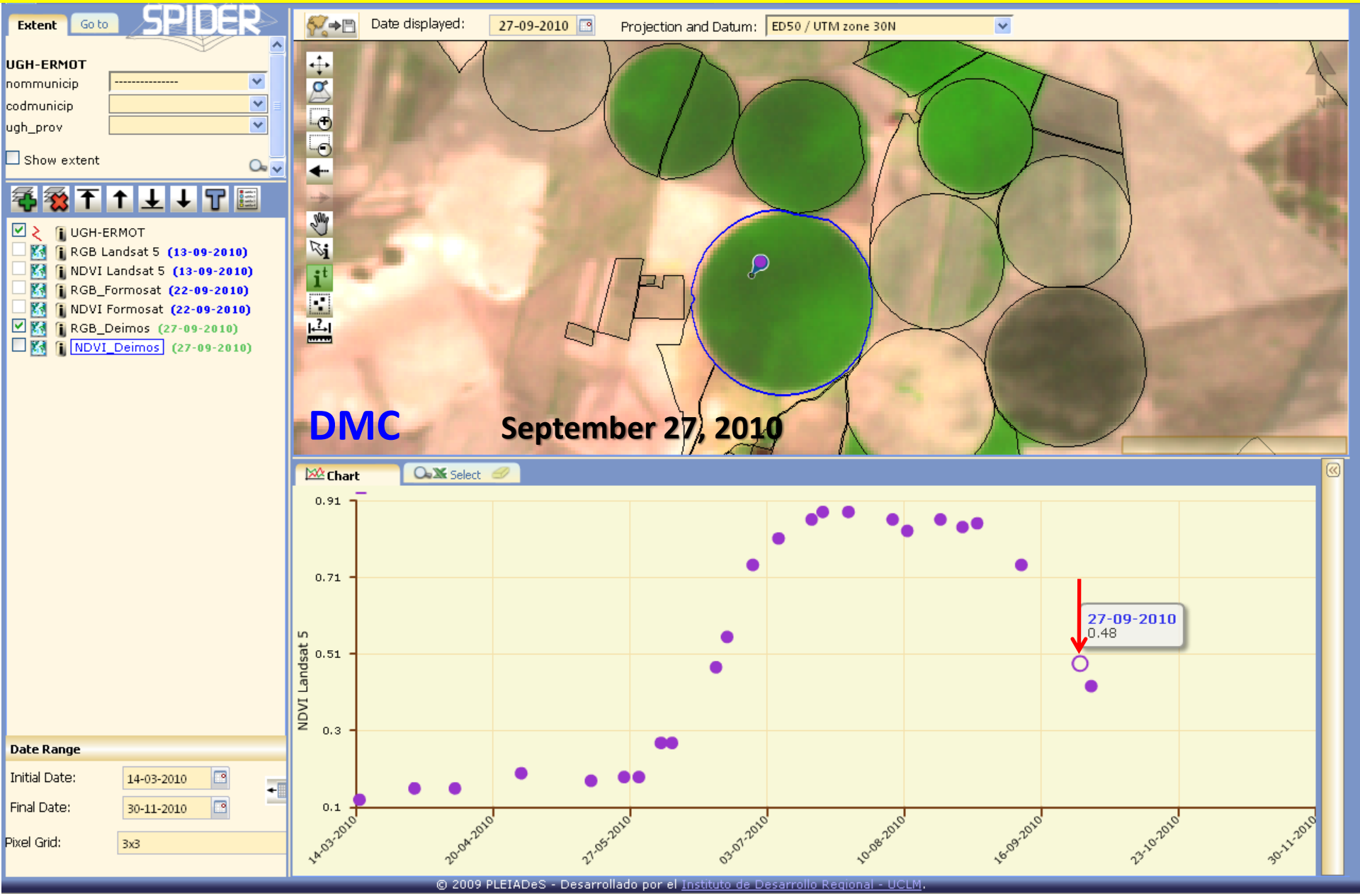

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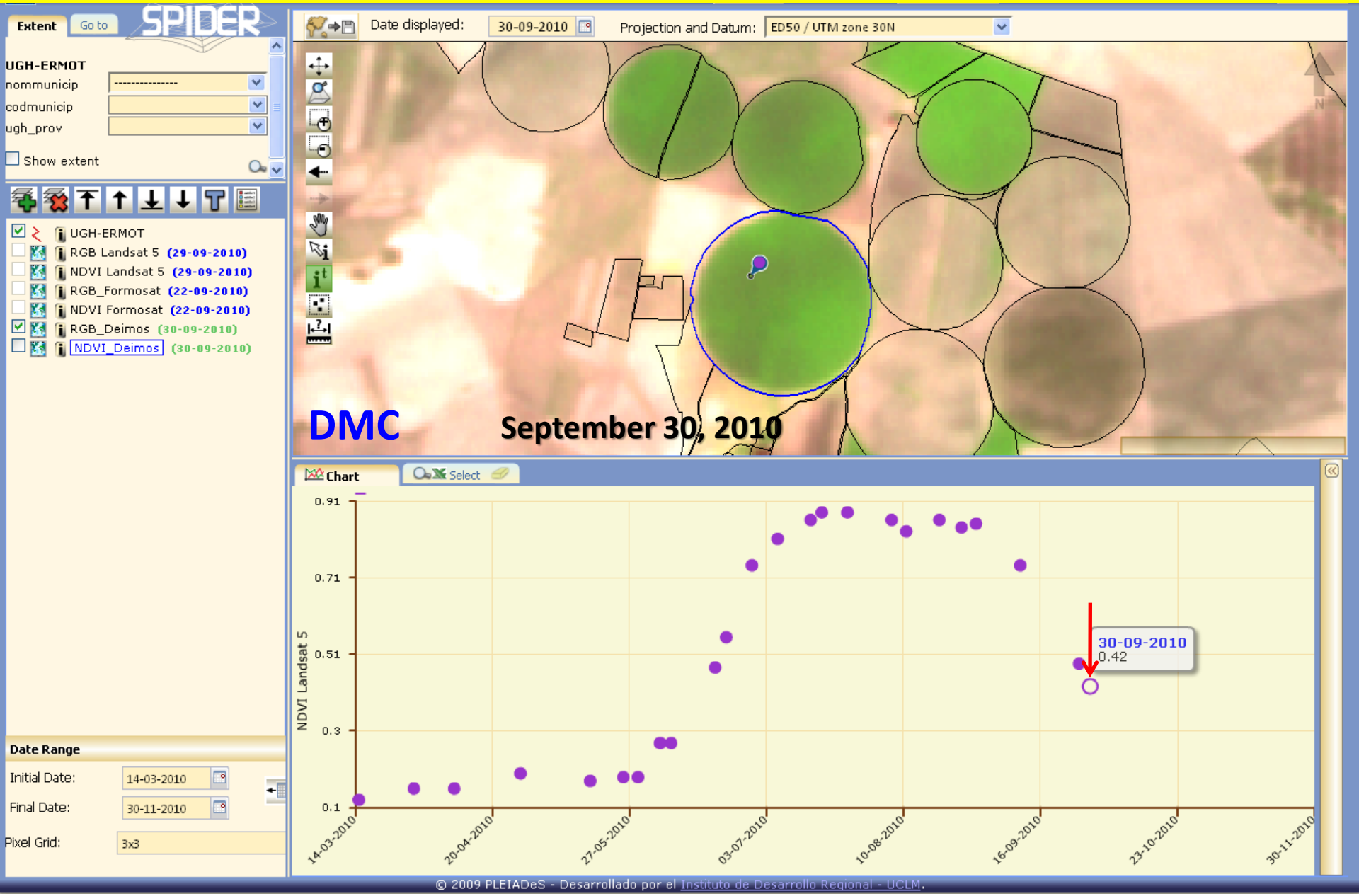
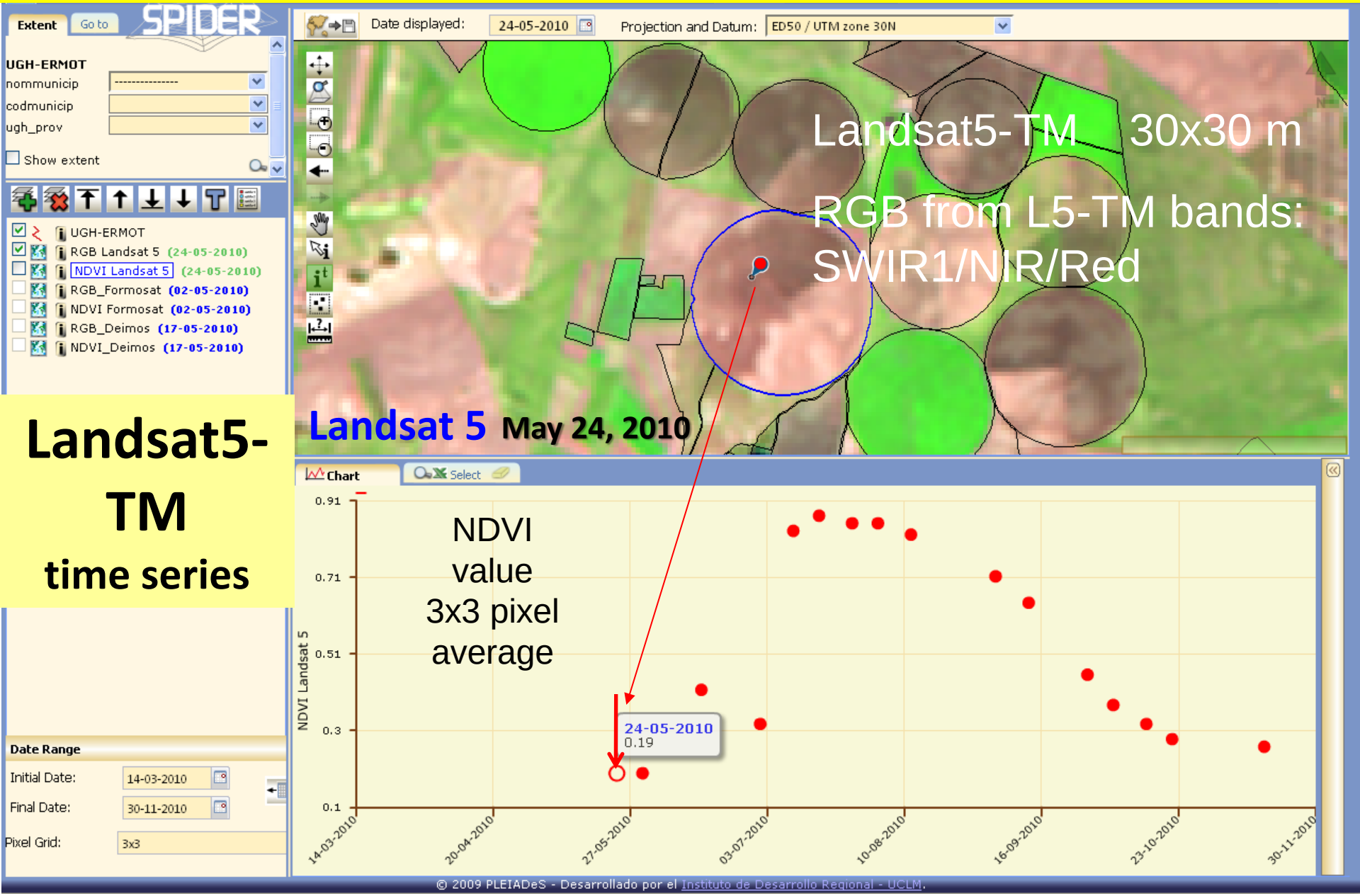


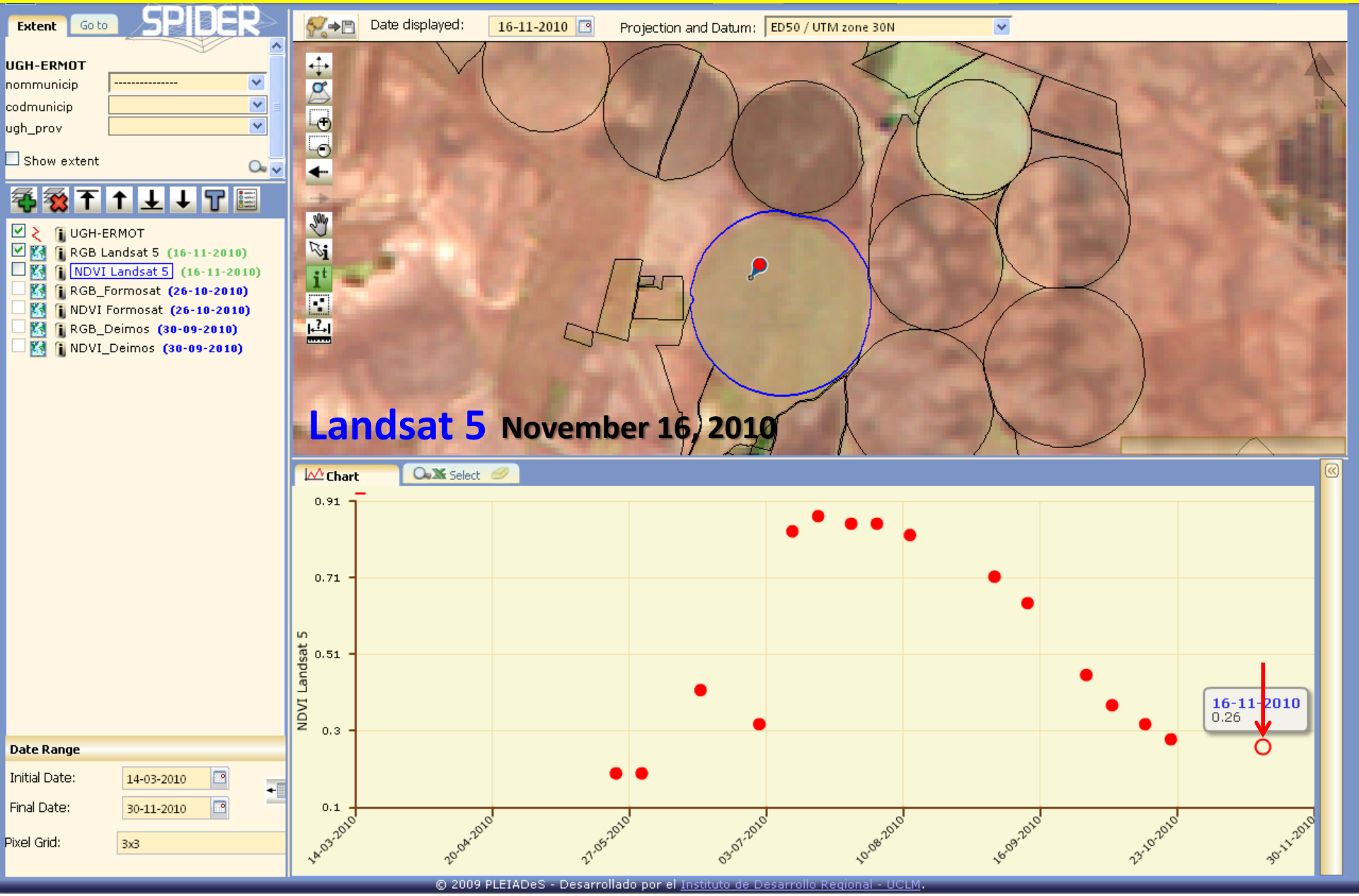
Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat

<u>Landsat5-TM time series imagery</u>
describing temporal evolution
of corn for the 2010-campaign
as it can be seen on SPIDER.
Images and graphics
are captured directly from the SPIDER
screen

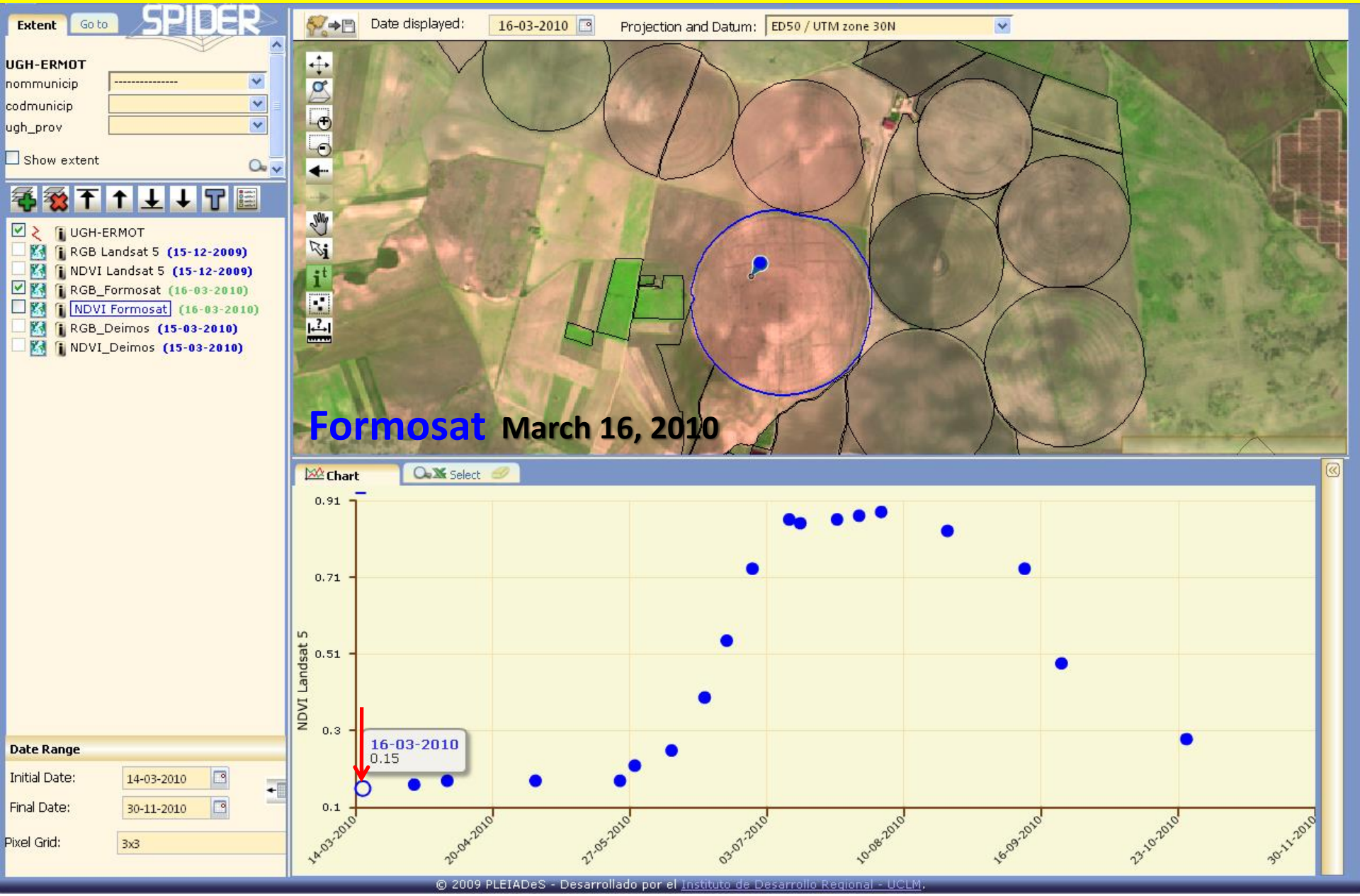
Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



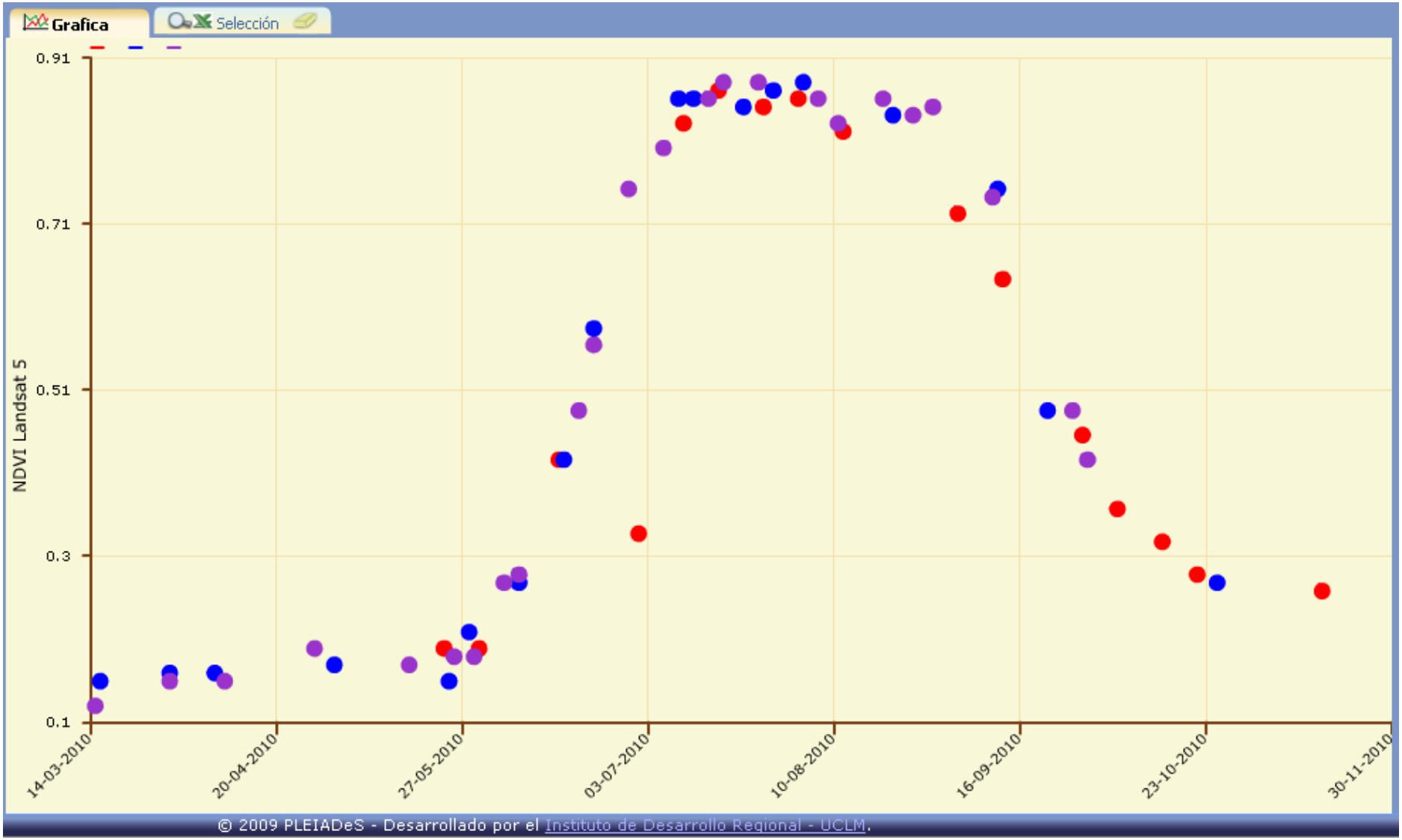
Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



Multitemporal Sensor Constellation: DMC, Landsat 5 and Formosat



● DMC ● LANDSAT 5 ● FORMOSAT