

Evaluating the connection of drought indicators and drought impact

Clara Linés Díaz and Micha Werner

UNESCO-IHE, Department of Water Science and Engineering,
Delft, the Netherlands.

UNESCO-IHE
Institute for Water Education



Context

Exploring the use of drought impact information as reference to assess remote sensing data ability to provide early drought detection



Project objective:

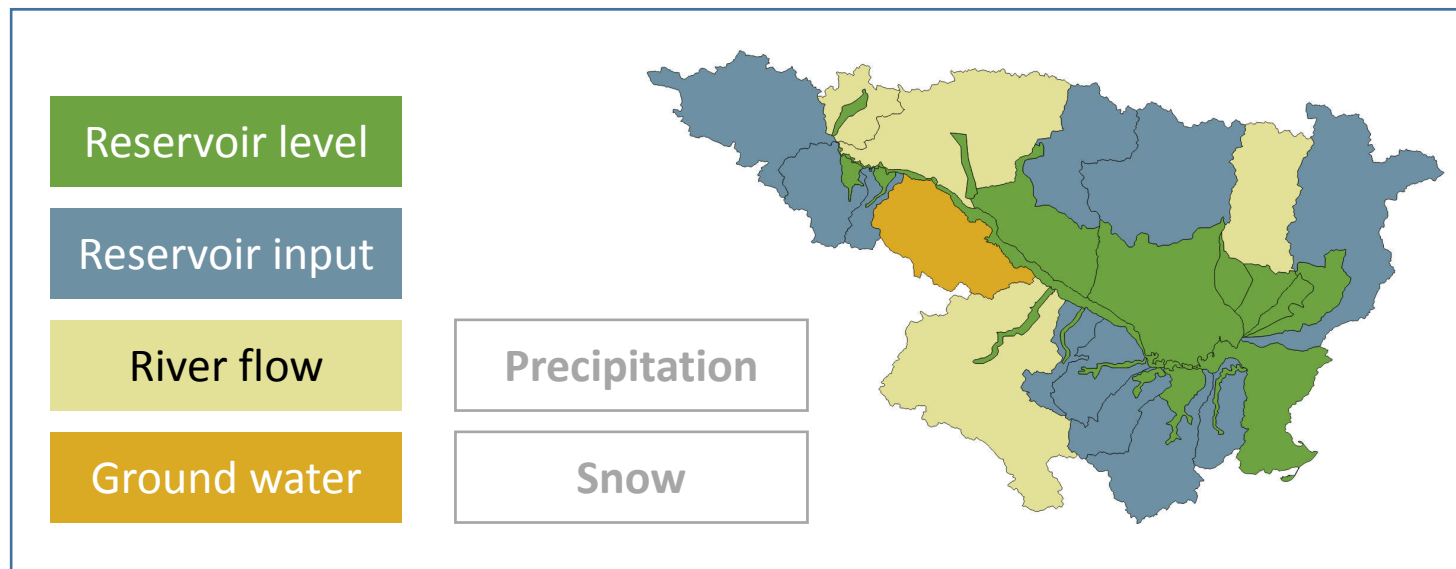
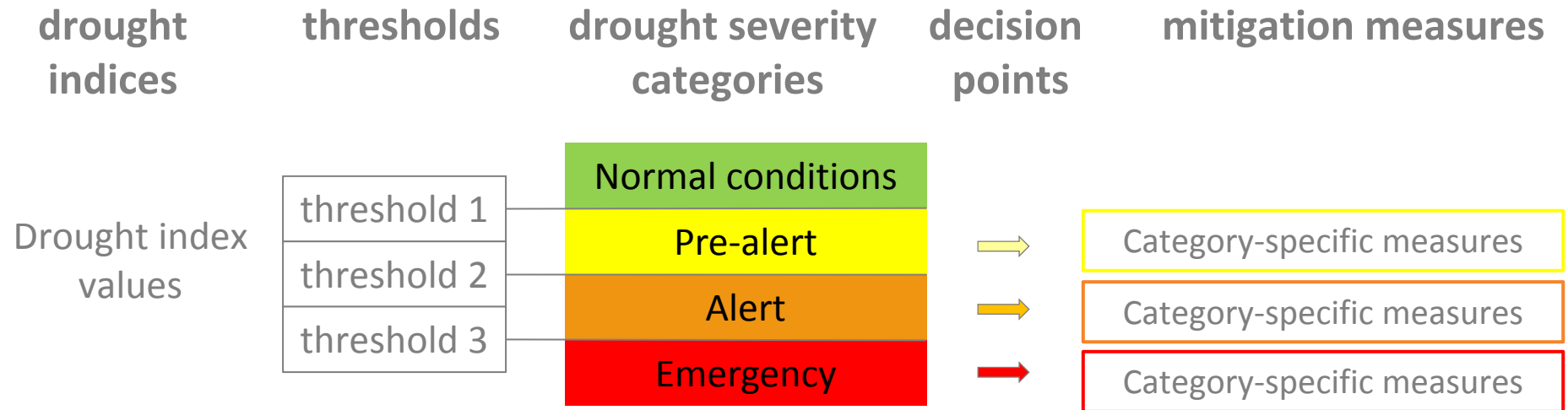
Integrate data available from earth observations, in-situ datasets and models to construct a consistent global water resources reanalysis dataset of at least 30 years.


WP2. Value of datasets and information for efficient decision making

- Analysis of information needs and gaps of water resources decisions
- Estimation of the value of improved data in informing the decisions

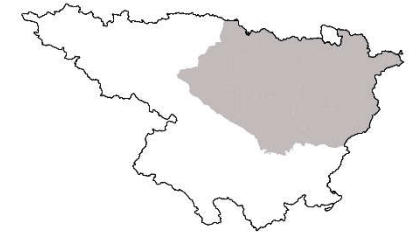
Value of remote sensing data in support of operational drought management decisions

Drought management decisions



- 
- The indicator should provide early detection of the conditions that will lead to drought impacts
 - Remote sensing products will have value if they are able to provide this information early enough to allow action to be taken.
 - Different types of water users are affected by different drought impacts and may require specific indicators.

Datasets



Drought characterization parameters

Precipitation

CHIRPS

Land surface temperature

MODIS

Surface soil moisture

CCI Combined product

Vegetation condition (NDVI)

MODIS

Evapotranspiration

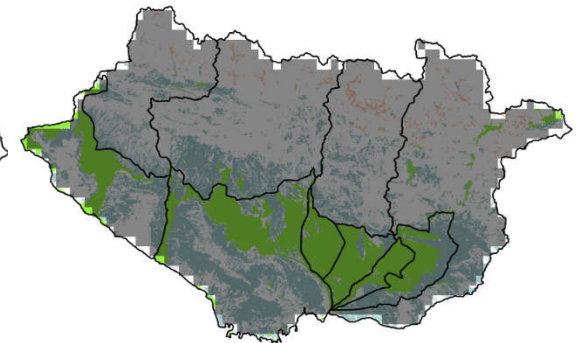
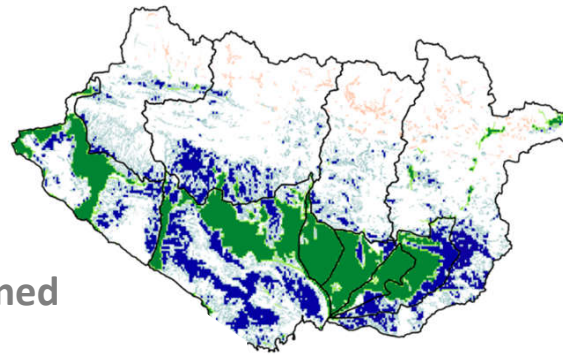
Ensemble product

Reservoir levels

In-situ stations

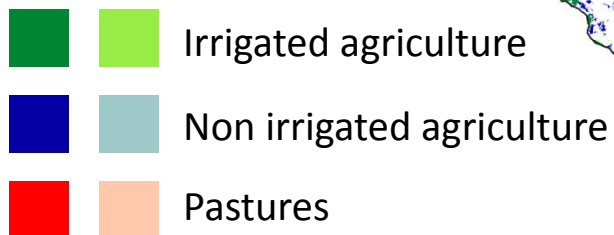
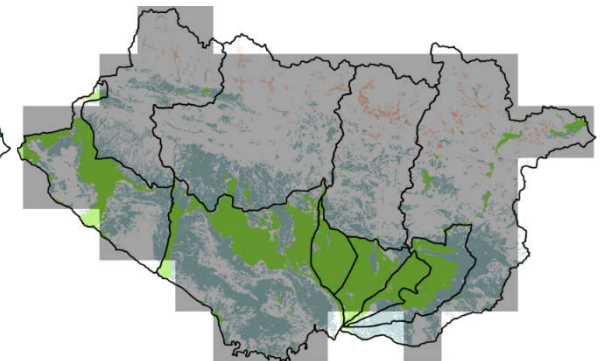
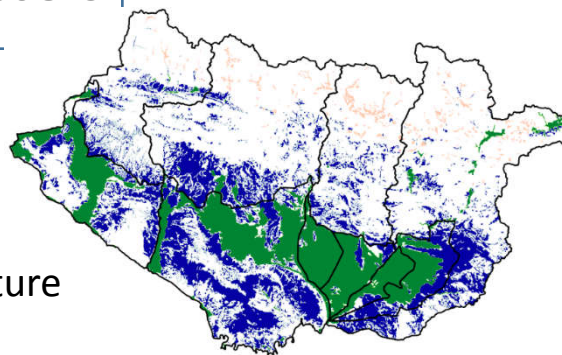
MODIS - 1km

CHIRPS - 0.05 deg

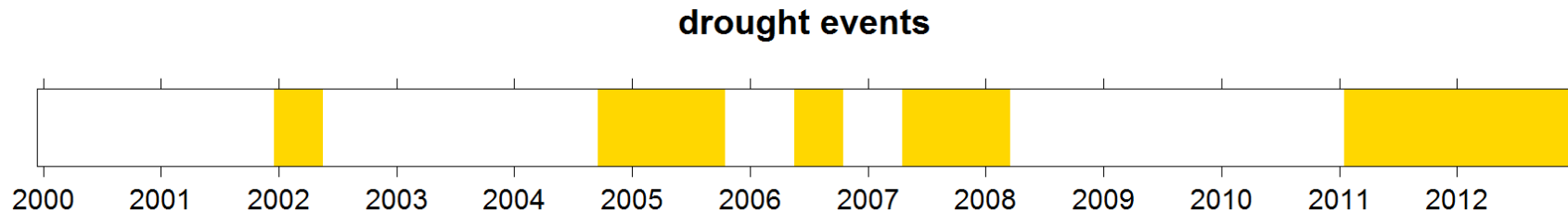


MODIS - 250m

CCI Surface Soil Moisture - 25km



Reference drought (impact) periods



ARAGÓN - BARDENAS SÓLO TIENE AGUA PARA REGAR ALGO MÁS DE UNA VEZ SUS 75.000 HECTÁREAS

La prolongada sequía causa ya estragos en el campo aragonés

27.03.2002 La ausencia prolongada de lluvias en Aragón, que se ha visto abocado a adoptar las siembras de la recién iniciada primavera. La

ECONOMÍA - REUNION DE LA MESA DE SEGUIMIENTO DE PRODUCCIONES AGRARIAS

La "preocupante" sequía en Aragón lleva a la DGA a adoptar medidas

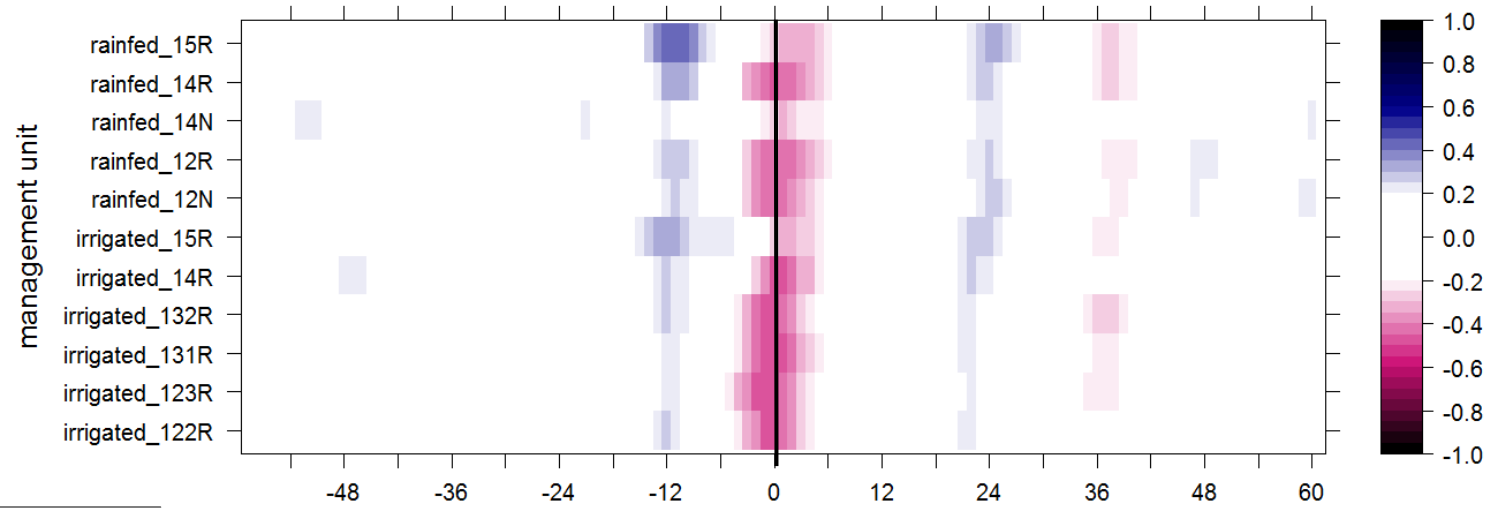
03.03.2005 El Ejecutivo cree que el 21% de las siembras de la recién iniciada primavera. La

ARAGÓN - POLÍTICA HIDRÁULICA LA ESCASEZ DE PRECIPITACIONES.

La CHE toma medidas ante la peor sequía de la última década

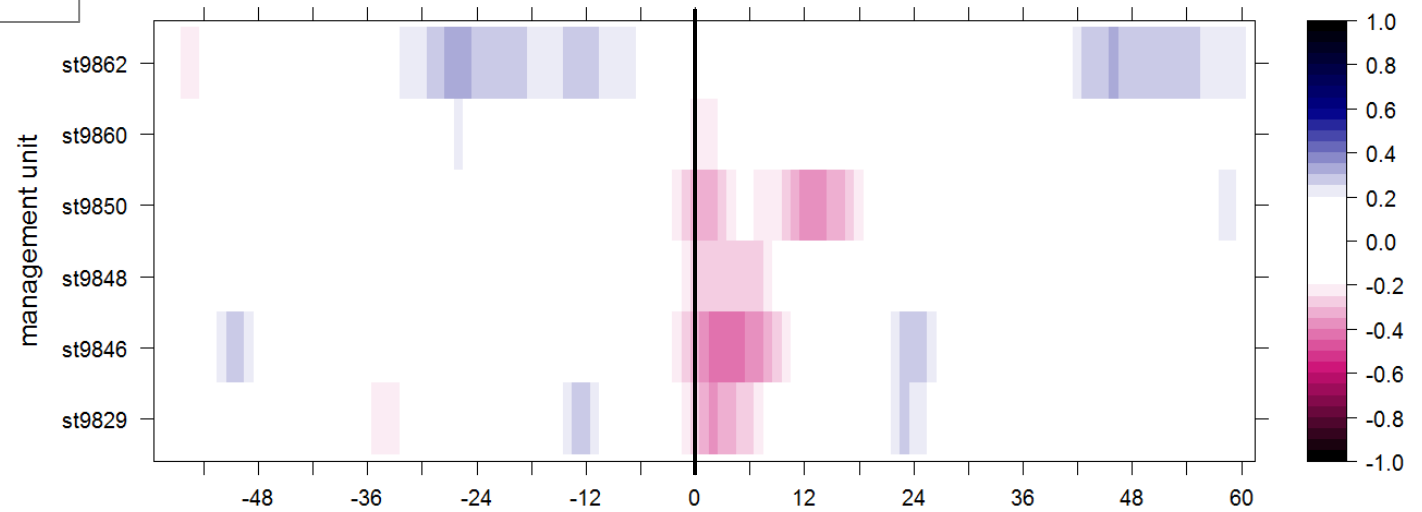
01.12.2007 El periodo de mayo a octubre ha sido el más árido de los últimos once años. Los cultivos se ven afectados, pero está asegurado el suministro de boca.

NDVI anomaly vs drought events

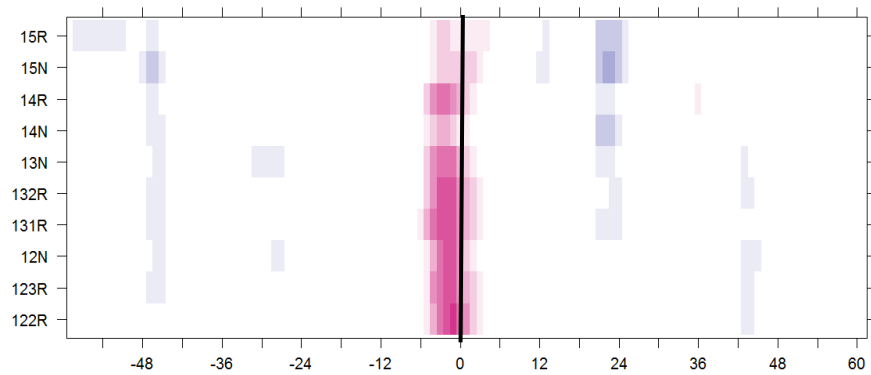


Cross-correlation of the remote sensing time series to the time line of drought events

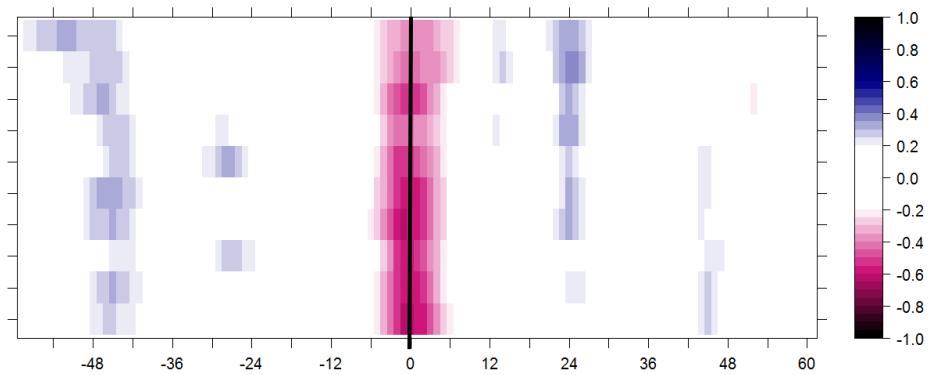
Reservoir level index vs drought events



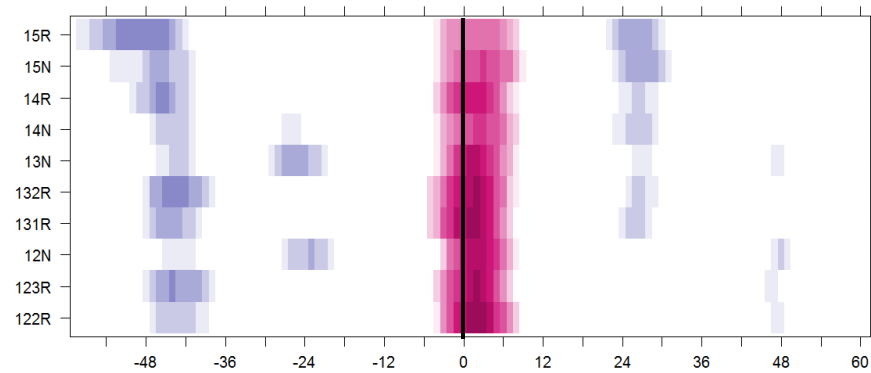
SPI3 vs drought events



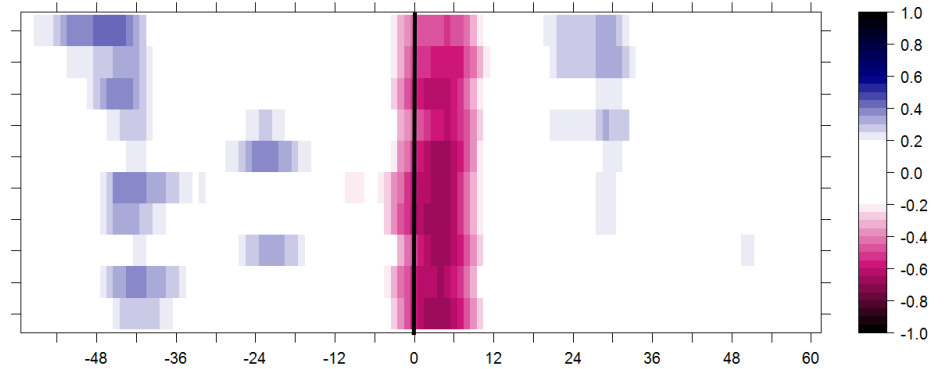
SPI6 vs drought events



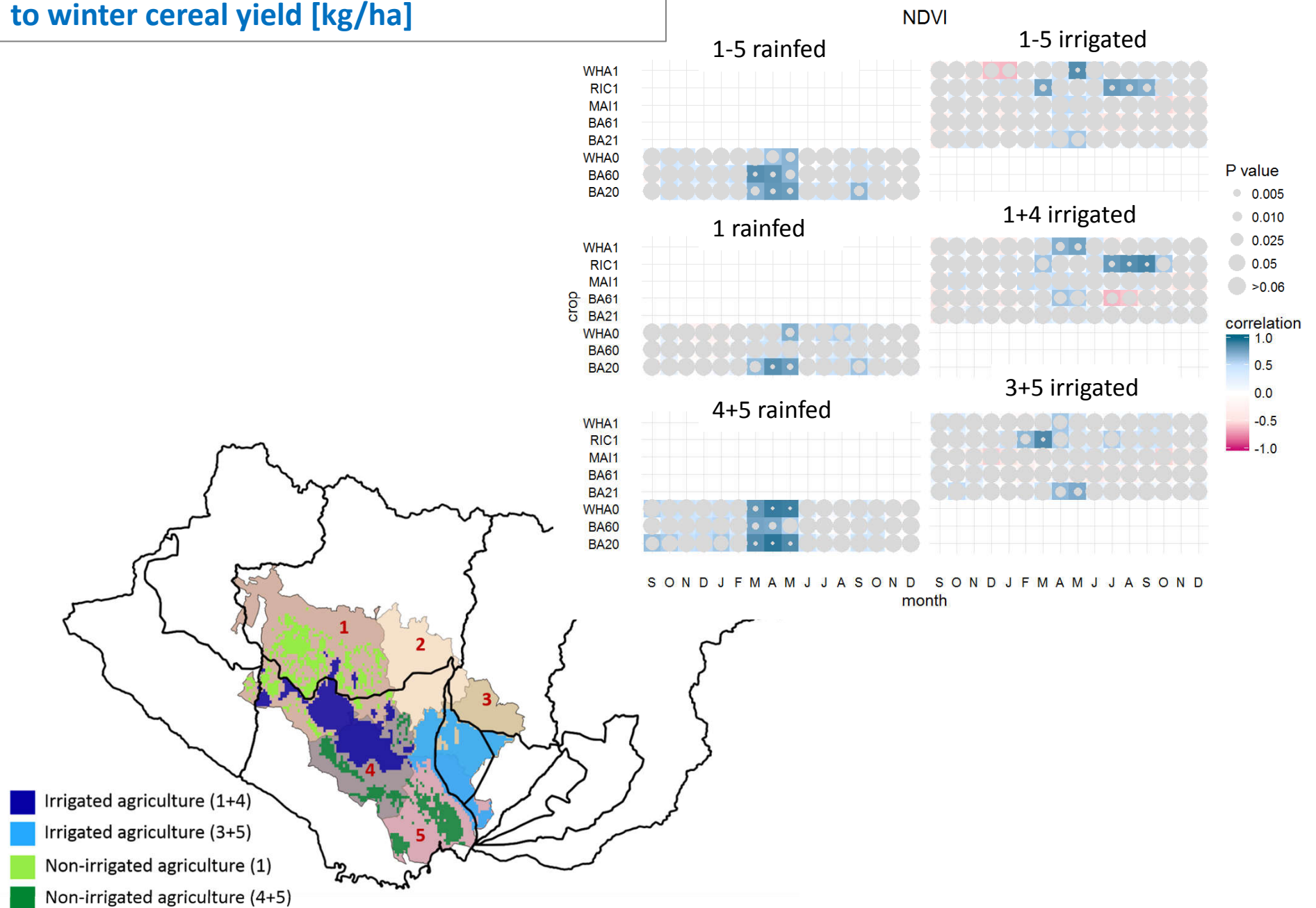
SPI9 vs drought events



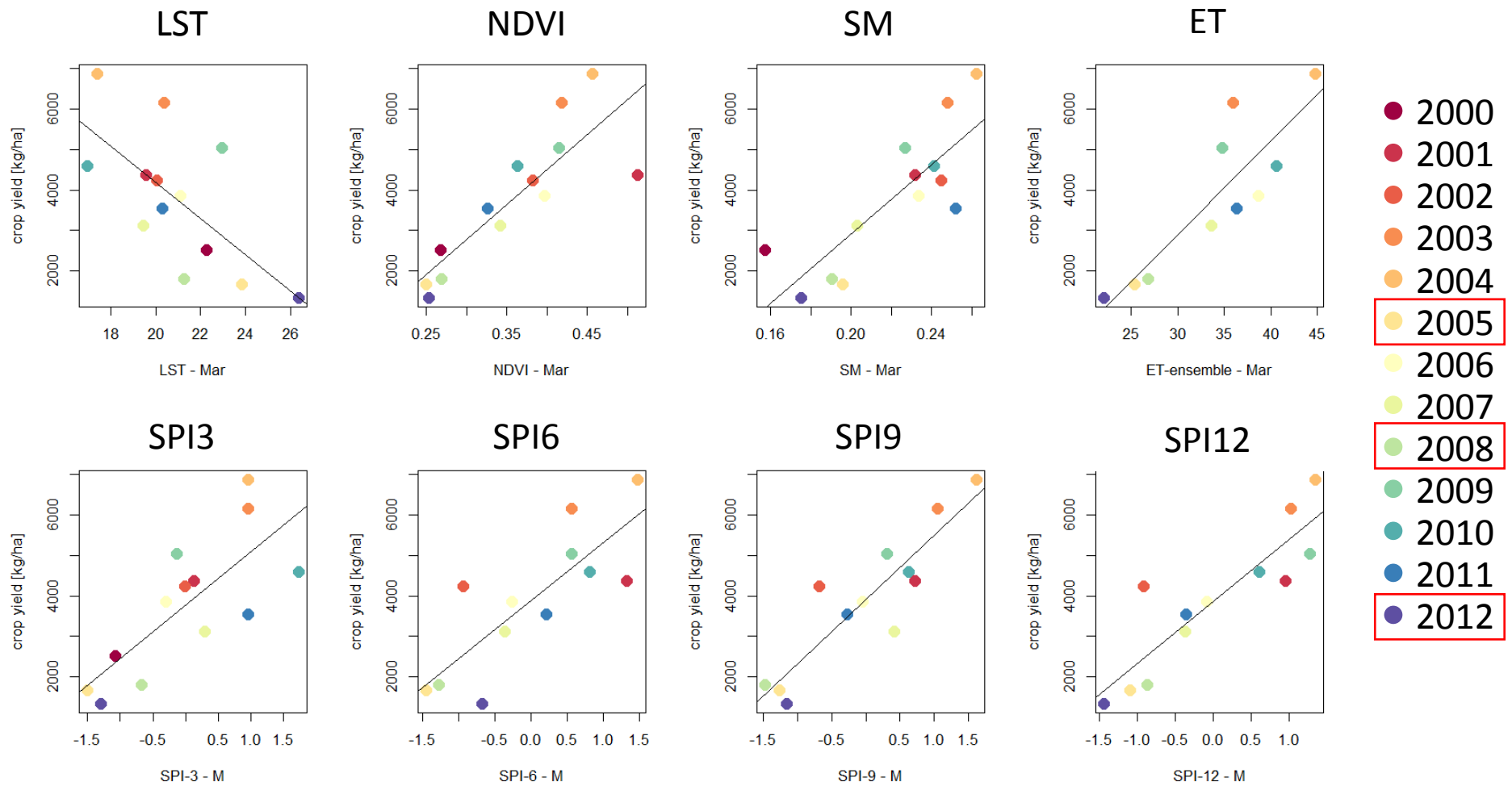
SPI12 vs drought events



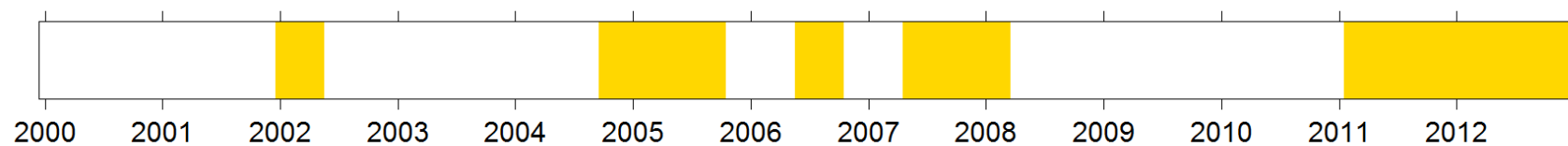
Correlation of the remote sensing time series to winter cereal yield [kg/ha]



Barley crop yield – Remote sensing variables (March, zone: 4+5 rainfed)



drought events





Thank you!

Clara Linés Díaz
c.lines@unesco-ihe.org