

NH1.5

Hazard Risk Management in Agriculture and Agroecosystems

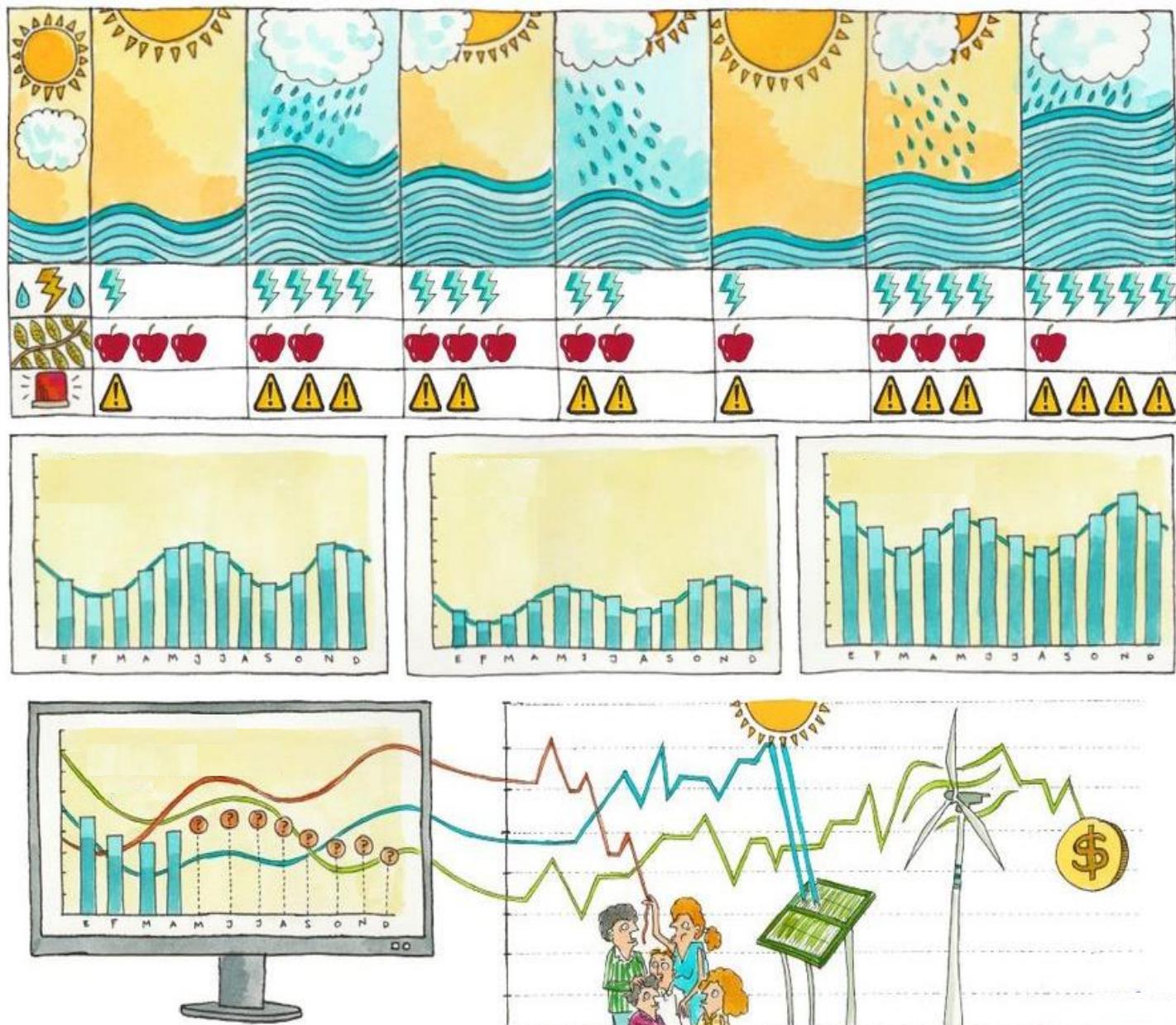


Joint multifractal approach
to characterize nonlinear
relationships of climate and
cereal growth in semiarid

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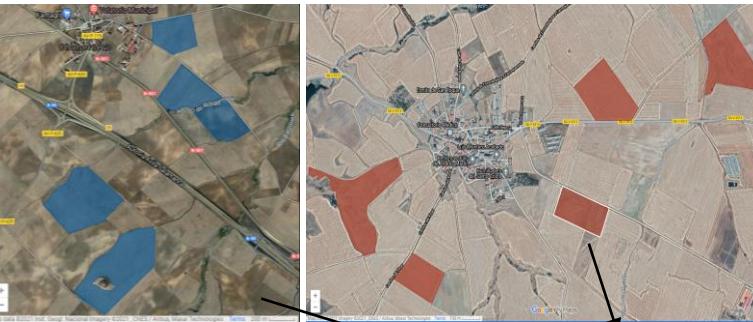
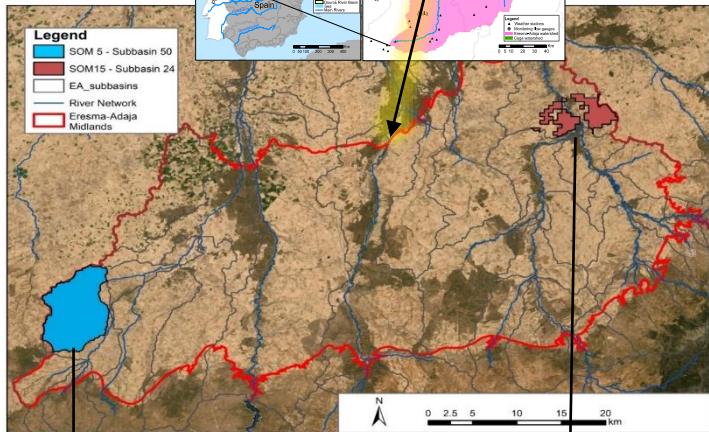
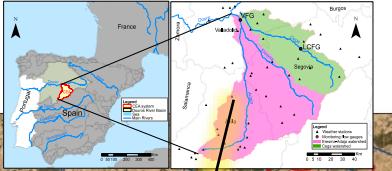
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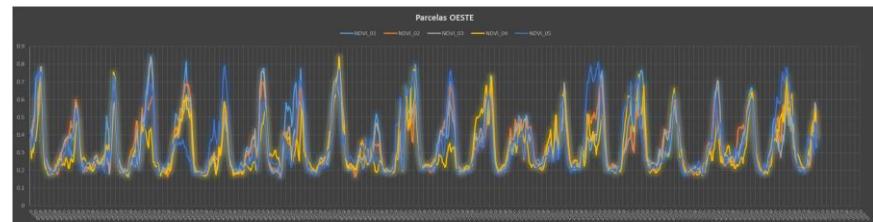
Source: iGotta Ingeniería

Area of study

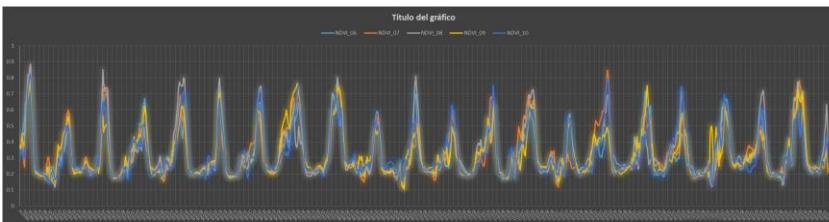


SOM Unit	SOM_05	SOM15
Slope [%]	1-16	1-17
Altitude [MASL]	925-1050	888-912
Clay [%]	29 (5.2)	4 (3)
Sand [%]	56 (4.6)	84 (3.9)
Silt [%]	14 (4.4)	12 (3.5)
Organic Matter [%]	0.9 (0.10)	1.7 (0.15)
Bulk density [g/cm³]	1420 (145)	1839 (129)
Carbon content [%]	0.5 (0.08)	1.0 (0.09)
Available water content [mm H ₂ O]	10.1 (0.7)	5.8 (0.7)
Hydraulic Conductivity [mm/hr]	150 (88)	2890 (981)
Soil moist albedo [ratio]	0.08 (0.010)	0.03 (0.005)
Effective Soil depth [mm]	1100	825

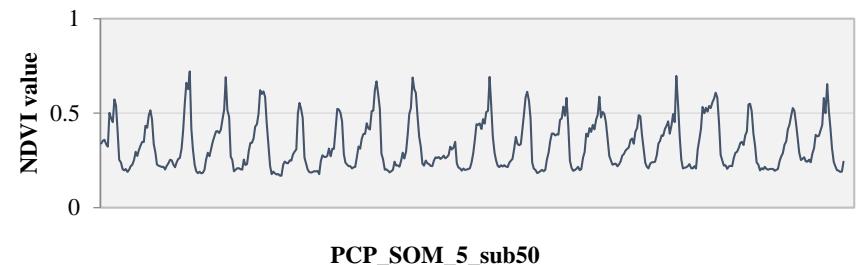
20 years NDVI series



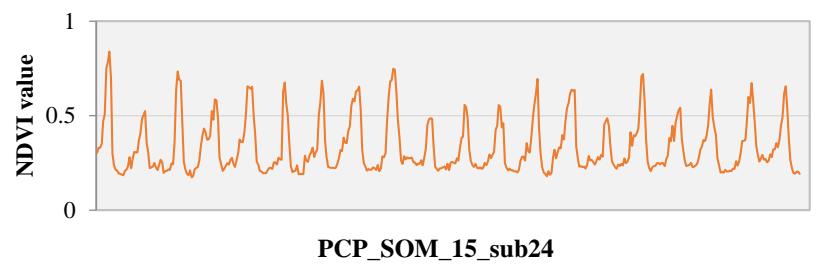
SOM5_average



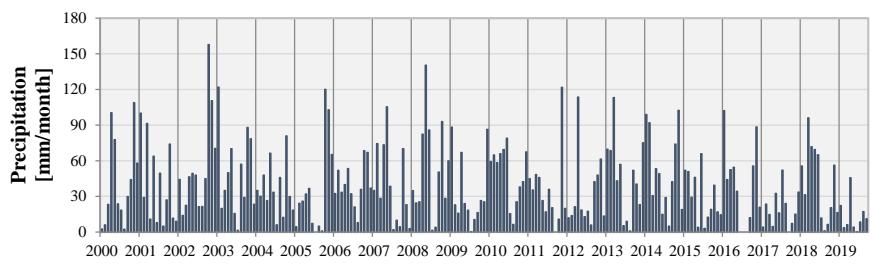
SOM15_average



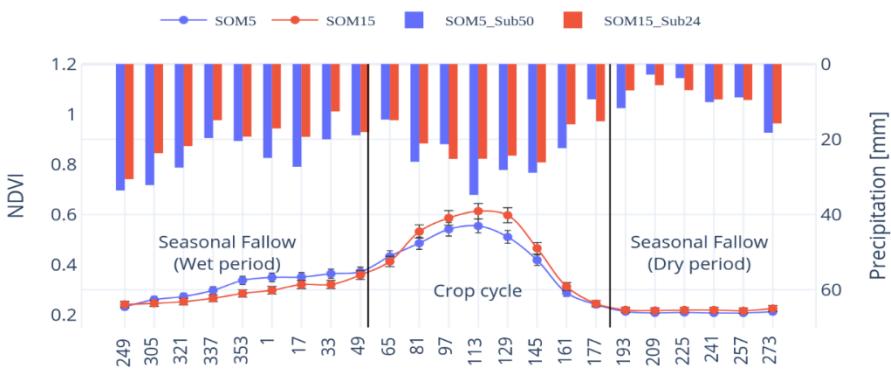
PCP_SOM_5_sub50



PCP_SOM_15_sub24

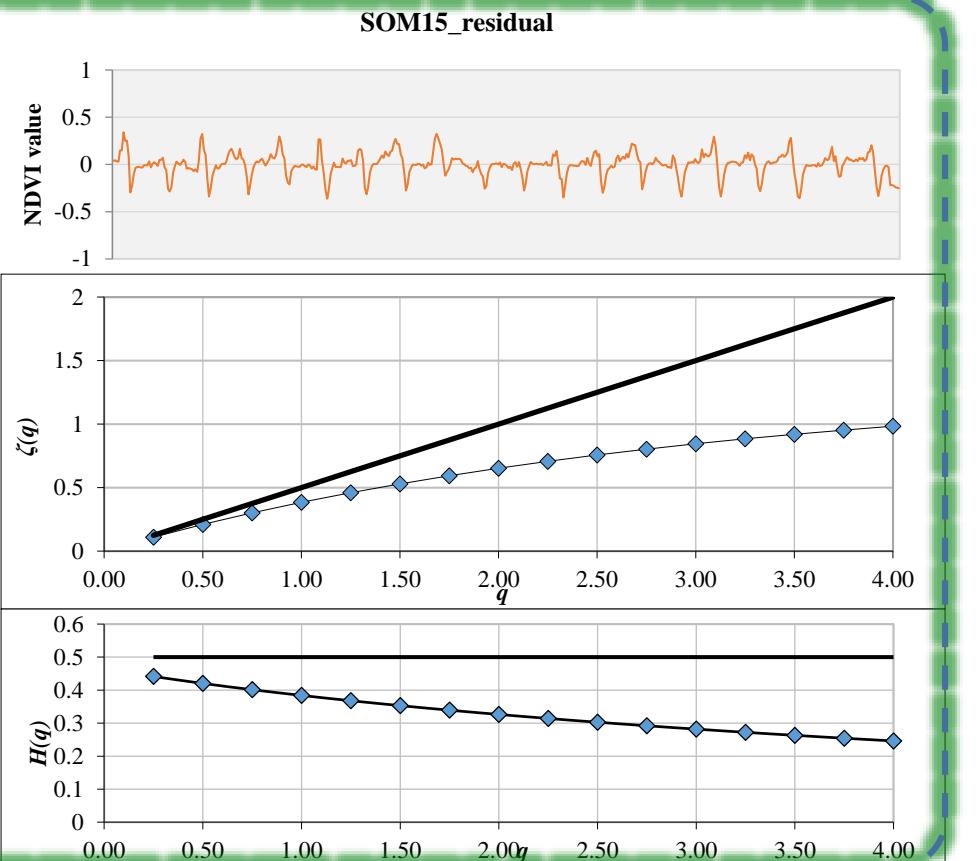
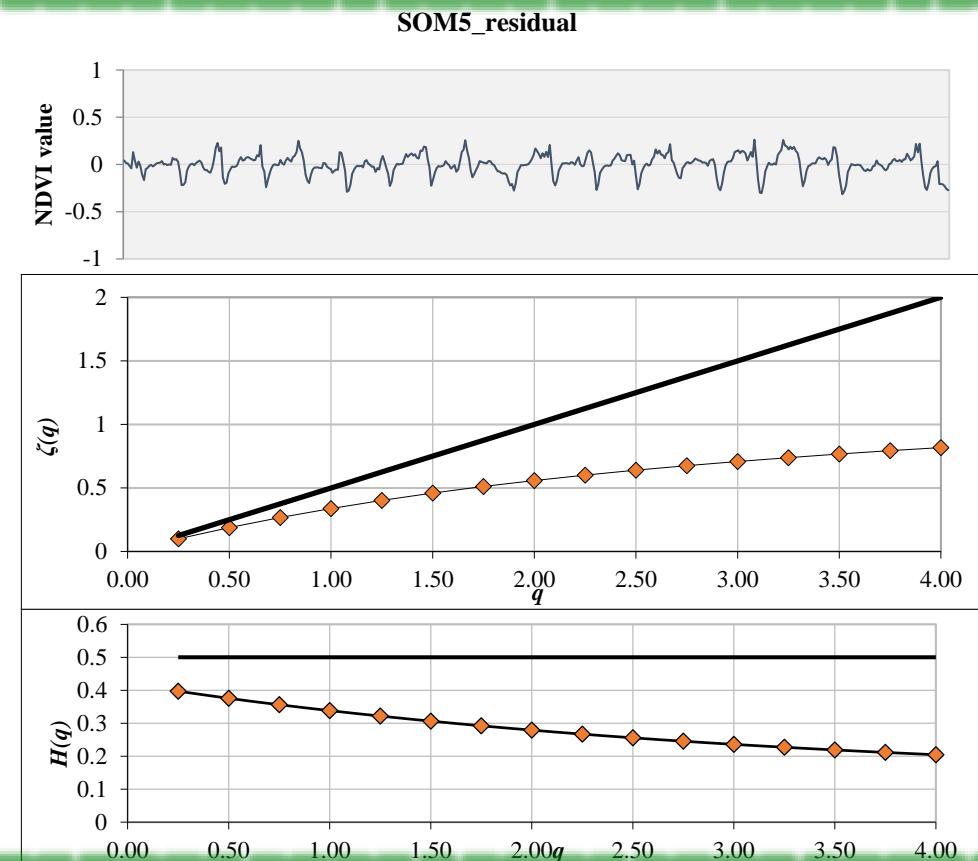


NDVI_SOM5_SOM15

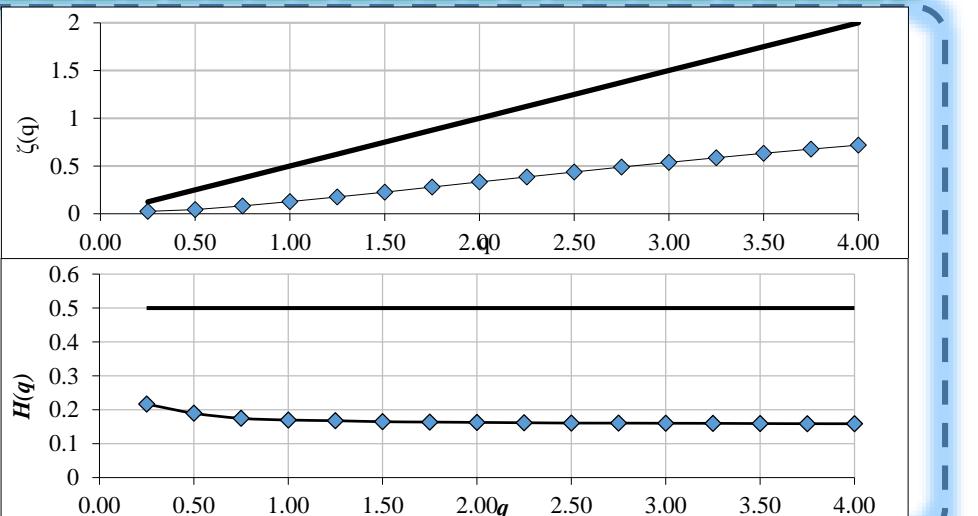
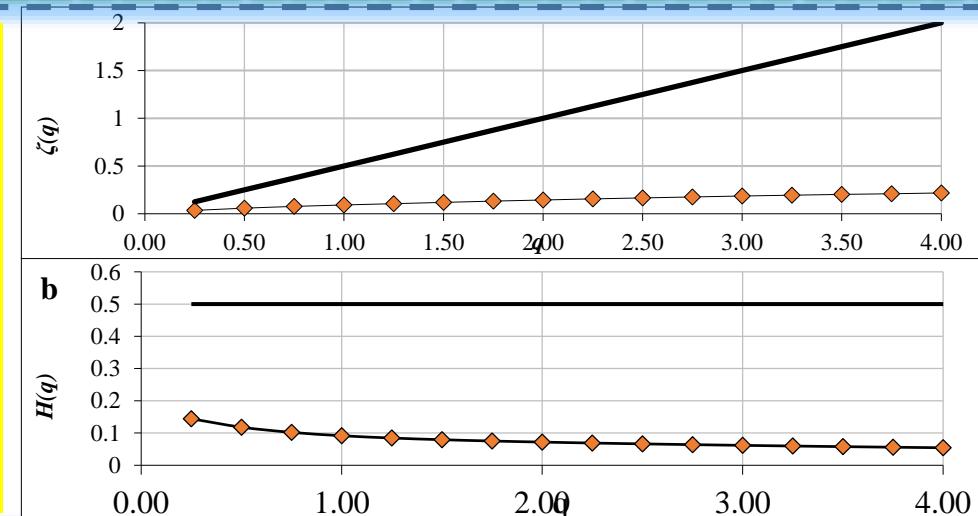


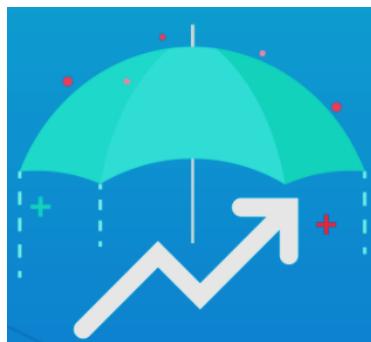


GSF by NDVI residual series



GSF by Precipitation r.s.





Conclusions

The results presenting in this work reinforce the idea that the knowledge of vegetation patterns through NDVI and climate spatial variability is a key component to understand rainfed farming systems in central Spain. The conclusions of this study are:

- I. Data from Earth Observation and weather data serve to characterize nonlinear relationships of cereal growth in central Spain.
- II. Precipitation series show antipersistent characteristics and fractal properties between zones while NDVI show trending behavior but shifted between analyzed zones.
- III. **The dynamics of vegetation indices also provide more information when annual patterns are extracted from the series, exhibiting fractal properties probably from rainfall pattern of each zone.**
- IV. Soil and atmosphere are dynamic systems varying with vegetation cover. NDVI was identified as one measurement of these interactions as a complex system. For this reason, the use of soil units that recover multiple soil properties from soil units provides some insights for **soil reflectance feedback to perform the understanding of NDVI antipersistent noise in rainfed crops.**



Thanks



Ana Maria Tarquis  



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