



Integrated study of biomass index in La Herreria (Sierra de Guadarrama)

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Introduction

Drought severity has many implications for society, including its impacts on the water supply, water pollution, reservoir management and ecosystem. There have been many attempts to characterize its severity, resulting in the numerous drought indices that have been developed (Niemeyer 2008).

The 'biomass index', based on satellite image derived Normalized Difference Vegetation Index (NDVI) has been used in several countries for pasture and forage crops for some years (Rao, 2010; Escribano-Rodriguez et al., 2014). NDVI generally provides a broad overview of the vegetation condition and spatial vegetation distribution in a region. Vegetative drought is closely related with weather impacts. However, in NDVI, the weather component gets subdued by the strong ecological component. Another vegetation index is Vegetation Condition Index (VCI) that separates the short-term weather-related NDVI fluctuations from the long-term ecosystem changes (Kogan, 1990). Therefore, while NDVI shows seasonal vegetation dynamics, VCI rescales vegetation dynamics between 0 and 100 to reflect relative changes in the vegetation condition from extremely bad to optimal (Kogan et al., 2003).

In Spain, the production of pasture, rangeland, and forages (12 million hectares) is covered by a specific insurance line, it is called number 133 for loss of pasture compensation. This insurance is established by monitoring ten-day composites NDVI measured by satellite over treeless pastures, using MODIS TERRA satellite. Coverage is available for breeding cows and brave bulls, sheep, goats and horses. ■

Goal

► The aim of this work is to attempt to relate Vegetation Indexes with Weather Indexes ■

References

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Methodology

Location ► Pasture area at La Herreria (Sierra de Guadarrama, Spain) has been delimited (Figure 1). ■

Data ► NDVI historical data are reconstructed based on remote sensing imaging MODIS, with 500x500m² resolution. From the closest meteorological station (Santolaria-Canales, 2015) records of weekly precipitation (PP), temperature (TEMP) and evapotranspiration (ETP) from 2001 till 2012 were obtained. ■

Indexes ► Standard Precipitation Index (SPI), Crop Moisture Index (CMI) (Palmer, 1968) and ETP-PP Ratio (EPR) are the weather indexes calculated. As vegetation indexes NDVI, VCI and NDVI Change Ratio to Median (RMNDVI) has been used. ■

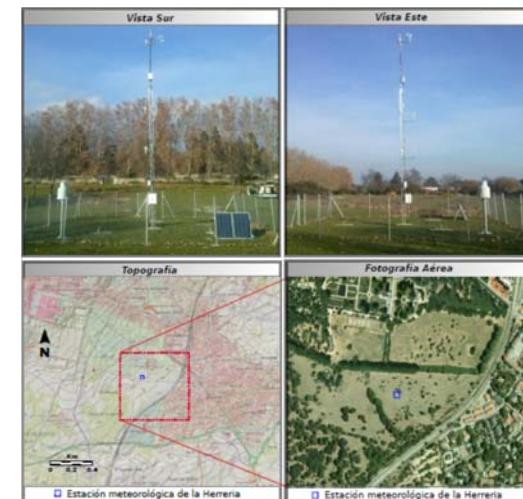
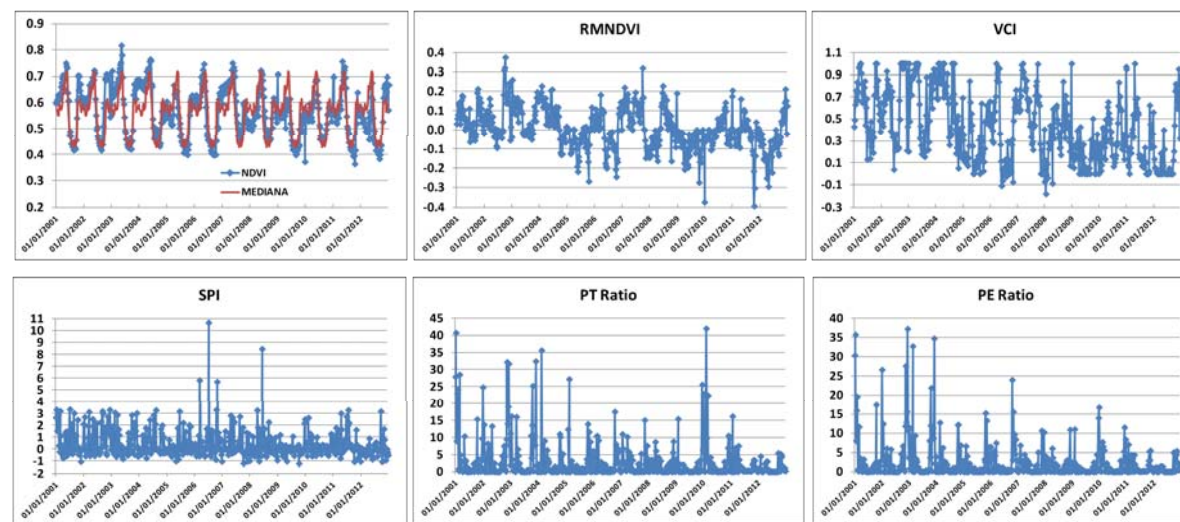


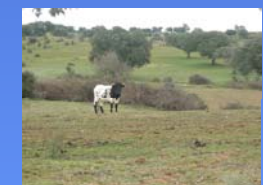
Figure 1. Station EG010 (La Herreria) belonging to GuMNet network. A view to the South and North (first row), Topographic map and areal photography.

Results



Remarks

- VCI presents more variance than RMNDVI ■
- SPI negative values are much more reduced than higher values ■
- PT and PE Ratios show the same problem than SPI ■



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