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

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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 this work a pasture area at La Herreria (Sierra de Guadarrama, Spain) has been delimited. Then, 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, temperature and evapotranspiration from 2001 till 2012 were obtained.

Standard Precipitation Index (SPI), Crop Moisture Index (CMI) (Palmer, 1968) and Evapotranspiration-Precipitation Ratio (EPR) are calculated in an attempt to relate them to several vegetation indexes: NDVI, VCI and NDVI Change Ratio to Median (RMNDVI). The results are discussed in the context of pasture index insurance.

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