

UNIVERSIDAD POLITÉCNICA DE MADRID

ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE MONTES,
FORESTAL
Y DEL MEDIO NATURAL



GRADO EN INGENIERÍA FORESTAL

PROYECTO FIN DE GRADO

**EVALUACIÓN DE SERIES DE TIEMPO DE
NDVI DE SENTINEL-2 PARA ESTUDIOS DE
USOS DEL SUELO EN ZONAS FORESTALES
Y AGRÍCOLAS**

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Title: Assessment of Sentinel-2 NDVI time series to study land use in agricultural and forest areas

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Abstract

Remote sensing time series analyses is useful for the different land uses characterization because it provides high temporal frequency and spatially continuous data. The study objective was the crops identification and coniferous zones with a stable dynamic, the fallow lands and the land use change areas for the period 2015-2019 in Castilla y León, mainland Spain. For this, Sentinel-2 images with 10 meters spatial and 10 days temporal resolution are included. NDVI time series were constructed with the red and the near infrared reflectances values. These series were processed using different filters in order to obtain better quality time series. For the dynamic evaluation, the time series statistical analysis consisted on calculating the autocorrelation function. The short term, half year and year autocorrelation lags were integrated into a Random Forest classification algorithm in order to classify the territory base on the studied clases. The results were satisfactory with more than 75% overall accuracy and 0.45 Kappa coefficient. The best classified land uses were the herbaceous crops followed by the conifers due to their temporal regularity. The biggest errors were obtained for fallow areas and land use change zones due to their temporal variability because it can not be captured in 3 years short period by the autocorrelation function. In the near future, it is expected that the results will improve since there will be longer time series that better reflect the different covers temporal variability.