# Assessing the Influence of Precipitation Variability on the Vegetation Dynamics of the Mediterranean Rangelands using NDVI and Machine Learning

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Mitigating the vulnerability of Mediterranean rangelands against degradation is limited by our ability to understand and accurately characterize those impacts in space and time. The Normalized Difference Vegetation Index (NDVI) is a radiometric measure of the photosynthetically active radiation absorbed by green vegetation canopy chlorophyll and is therefore a good surrogate measure of vegetation dynamics. On the other hand, meteorological indices such as the drought assessing Standardised Precipitation Index (SPI) are can be easily estimated from historical and projected datasets at the global scale. This work investigates the potential of driving Random Forest (RF) models with meteorological indices to approximate NDVI-based vegetation dynamics. A sufficiently large number of RF models are trained using random subsets of the dataset as predictors, in a bootstrapping approach to account for the uncertainty introduced by the subset selection. The updated E-OBS-v13.1 dataset of the ENSEMBLES EU FP6 program provides observed monthly meteorological input to estimate SPI over the Mediterranean rangelands. RF models are trained to depict vegetation dynamics using the latest version (3g.v1) of the third generation GIMMS NDVI generated from NOAA's Advanced Very High Resolution Radiometer (AVHRR) sensors. Analysis is conducted for the period 1981-2015 at a gridded spatial resolution of 25 km. Preliminary results demonstrate the potential of machine learning algorithms to effectively mimic the underlying physical relationship of drought and Earth Observation vegetation indices to provide estimates based on precipitation variability.