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Soil Moisture Variability as a Driver of Vegetation Dynamics in the Mediterranean Rangelands

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The protection of Mediterranean rangelands against natural and human induced degradation is limited by our ability to understand and model the underlying dynamics in space and time. Since the advent of mutli-spectral satellite imagery, vegetation dynamics has been successfully monitored by radiometric measures of the green vegetation canopy chlorophyll and leaf area. The potential of meteorological variables and indices to explain current and future rangeland vegetation dynamics using remote sensing and empirical models has recently been investigated by Daliakopoulos et al. (2017) and Daliakopoulos and Tsanis (2017). Here we investigate the potential of driving Random Forest (RF) models with remote sensing soil moisture to approximate NDVI-based vegetation dynamics. To account for uncertainty, a bootstrapping approach is used to train a sufficient number of RF models using random subsets of the dataset. The Soil Moisture CCI dataset, one of the most integral and consistent global soil moisture datasets based on active and passive microwave sensors, along with observed monthly meteorological variables and indices from the E-OBS-v13.1 dataset, are used as predictors. Vegetation dynamics is depicted using the latest version (3g.v1) of the GIMMS NDVI dataset. Analysis is conducted for the period 1981-2015 at a spatial resolution of 25 km. Preliminary results show the potential of machine learning to capture the underlying relationship of soil moisture and vegetation dynamics to provide insight of rangeland health based on soil moisture variability.

References

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