AGU 100 ADVANCING EARTH AND SPACE SCIENCE | FALL MEETING
Washington, D.C. | 10–14 Dec 2018

B51H-2038: Vegetation change detection in southern California solar energy developments

Friday, 14 December 2018
08:00 - 12:20
Walter E Washington Convention Center - Hall A-C (Poster Hall)

Change detection from satellite sensor vegetation indices (VIs) presents an opportunity to monitor trends and disturbances at the regional scale for southern California's Mojave and Lower Colorado Deserts. Renewable energy sites are being constructed in this region on public lands under the Bureau of Land Management (BLM). We have developed a framework for VI change detection over the past two decades, with initial focus on three sites, Joshua Tree National Park, Mojave National Preserve, and a proximal group of Development Focus Areas (DFAs), for comparison between protected and development-targeted lands. Three Terra MODIS VIs (normalized difference [NDVI], enhanced [EVI], soil-adjusted [SAVI]) were evaluated in the Breaks for Additive Season and Trend (BFAST) setting for the regional MODIS 250-m resolution grid to estimate significant time series shifts (breakpoints) from February 2000 to May 2018. All three VIs tended to detect the maximum number of breakpoints at a grid location, but cross-correlations with precipitation and comparison with timing of wildfire burns near the study sites for breakpoint density (proportion of area with a breakpoint) showed that NDVI had the strongest response to these major disturbances, supporting its use for subsequent analysis. Time series of NDVI breakpoint change densities for individual solar energy sites did not have a consistent vegetation response following construction. Bootstrapping showed that the DFAs had significantly larger kurtosis and variance in the positive NDVI breakpoint distribution than did the protected sites, but there was no significant difference in the negative distribution for all three sites. The inconsistent post-construction NDVI signal and the large number of breakpoints overall suggested that the largest changes in vegetation cover density were tied to seasonal precipitation amounts. The distributional results indicated that existing site-specific conditions were the main control on VI responses, given the history of human disturbances in the DFAs. Although the results do not support persis
tent VI disturbances resulting from recent solar energy development, continued monitoring and examination of other ecological variables and surface temperatures will be vital to the long-term protection of this desert environment.

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