

**Poster #31**

**Spatiotemporal Variation in Recent (2002-2015) Browning and Greening Trends in the Arctic-Boreal Region of Western North America: Regional Differences, Post-Fire Trends, and Time-Series Effects**  
**TES Early Career Award**

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Climate-induced changes in northern landscapes are well-documented in field and remote sensing studies, with predominant Boreal browning related to temperature-induced drought stress and insect infestation, and Arctic greening resulting from warmer and longer growing seasons. These trends have implications for the magnitude and direction of feedbacks to the regional carbon cycle and global climate systems. However, the patterns are highly variable depending upon the time increment examined; each increment depicts various ecological effects driven by climate variability. Accurate interpretation of overall, long term trends hinges on aggregate understanding of short-term fluctuations effected by diverse drivers. To better assess recent trends in browning and greening, we evaluated spatiotemporal patterns in remotely sensed vegetation indices in the Arctic and Boreal regions of western North America using time-series MODIS (MCD43B4 NBAR 1-km resolution) data for the growing season (May 17-Sept 6) 2002-2015. We calculated the annual maximum Normalized Difference Vegetation Index, as well as Tasseled Cap Greenness, Brightness, and Wetness. Recent trends were identified using the Theil-Sen slope estimation method with Mann-Kendall significance test. Marked differences separate Arctic and Boreal trends, including post-fire greening trends. While Arctic regions tend toward consistent, gradual greening related to warmer and longer growing seasons, unburned Boreal regions reflect a slight browning trend with much more stochastic variability tied with climate directly (warming, water stress) and indirectly via climate-influenced disturbance events (wildfire, insect outbreaks). A previously unreported, significant recent browning trend was also discovered at the southern end of the Arctic biome, possibly linked with shifting seasonality and early dissipation of annual sea ice. Effectively linking future regional-scale ecosystem responses with different scenarios of climate change will rely upon more detailed synthesis of these drivers and effects.