POSTER #1

Assessing Summer Drought over Oklahoma Mesonet Sites with the MODIS Land Surface Water Index

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Agricultural drought, a common phenomenon in most parts of the world, is one of the most challenging natural hazards to monitor effectively. Land surface water index (LSWI), calculated as a normalized ratio between near infra-red (NIR) and short wave infra-red (SWIR), is sensitive to vegetation and soil water content. This study examined the potential of a LSWI- based drought monitoring algorithm to assess summer drought over 113 Oklahoma Mesonet stations comprising various land cover and soil types in Oklahoma. Drought duration in a year was determined by the number of days with LSWI < 0 (DNLSWI) during summer months (Jun-Aug). Summer rainfall anomalies and LSWI anomalies followed a similar seasonal dynamics and showed strong correlations (R2= 0.62 – 0.73) during drought years (2001, 2006, 2011, and 2012). The DNLSWI tracked the East-West gradient of summer rainfall in Oklahoma. Drought intensity increased with increasing duration of DNLSWI, and the intensity increased rapidly when DNLSWI was more than 48 days. The comparison between LSWI and the US Drought Monitor (USDM) showed a strong linear negative relationship across the biomes and soils, i.e, higher drought intensity tends to have lower LSWI values and lower intensity drought tends to have higher LSWI values. However, the agreement between LSWI-based algorithm and USDM indicators for different drought intensity classes varied substantially from 32% (D2 class, moderate drought) to 77 % (0 and D0 class, no drought). Our results demonstrated that by counting DNLSWI (in days), drought intensity thresholds can be established and used as a simple complementary tool in several drought applications which have currently used a relatively complex, resource intensive USDM drought intensity classification for tall grass prairie.