

## Drought monitoring and evaluation performance of temperature vegetation drought index (TVDI) over Eurasia

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Drought has been a common concern recent years as it is one of the high frequent nature disasters in Eurasia that is included in the Belt and Road Initiative under the background of global warming. Thus, it is of great significance to study the drought monitoring and assessment in the region to develop effective plans to mitigate the effects of disasters. This study explored applicability of Temperature Vegetation Drought Index (TVDI) derived from MODIS normalized difference vegetation index (NDVI) and land surface temperature (LST) data as an index for drought monitoring in Eurasia in growing season (April - September) from 2005 to 2014. Three methods were used to compare TVDI against Standardized Precipitation Evapotranspiration Index in three time scales (SPEI-01, SPEI-03, SPEI-06) and the Essential Climate Variable surface soil moisture product (ECV-SM) at continental scales and Land Cover scales, as well as records of drought events from Emergency Events Database (EM-DAT) and relative literatures. The results indicated acceptable correlations between TVDI and SPEIs, ECV-SM in most areas, and TVDI had higher coefficients of correlation with ECV-SM than SPEIs at continental scale. Then we found that the correlation coefficient maps at continental scales were visually consistent with the land cover types, thus correlations between TVDI and SPEIs, ECV-SM were analyzed at Land Cover scales. TVDI showed strong correlation with SPEIs and ECV-SM in evergreen Needle leaf forest, deciduous broad leaf forest and grasslands. However, the accuracy of TVDI in open shrub lands that mainly distributed at high-latitudes remains to be further validated in the future. Finally, a comparison with typical drought-year and typical drought events also demonstrated TVDI could be used as a drought index to monitor drought events in study area over study time.

Keywords: drought monitoring, Temperature Vegetation Drought Index, growing season, continental scale, land cover, drought records