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Remote sensing detection of droughts and impact assessment based on temperature vegetation dryness index: A case study in Sichuan province, China

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Drought is one of the most important natural hazards. In-situ observed data is probably not sufficient to monitor drought in a large scale. Satellite-derived data is ideal for detecting area of drought due to their complete, timely, and broad coverage. Utilizing the NOAA/AVHRR data of July and August of 2006, the severe drought occurred in 2006 in Sichuan province, China, had been monitored and estimated based on the temperature vegetation dryness index (TVDI) in this study. We employed a new filtering-cloud composing technology to detect the drought. The property of surface temperature (Ts)-normalized difference vegetation index (NDVI) characteristic space model and the availability of TVDI as a drought indicator were investigated. The TVDI compute model, drought grade levels, and the impact estimation method designed for the Sichuan's drought were shown. The following results were mainly obtained: 1) the decade composed data based on the maximum surface temperature were more suited for the detection of drought than those derived from the maximum NDVI; 2) the dry side and the wet side line were nearly horizontal and the temperature gap was about 45 degrees celsius in the Ts-NDVI characteristic space when the NDVI located on the small level; 3) depending on different TVDI values, TVDI's validity in monitoring drought were unequal: the less TVDI indicated without drought occurrence, the bigger TVDI shown the drought certainly happened, the middle TVDI probably meant the unsure drought; 4) the result of drought monitoring derived from the remote sensing and climate index almost were consistent for Sichuan in 2006.