Remote sensing detection of droughts based on TVDI: A case study in Sichuan Province, China

Introduction

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.

In the summer of 2006, Sichuan Province China experienced its worst drought in modern times. It is necessary to detect the spatial patterns of drought in the whole Sichuan.

Data

Decadal AVHRR NDVI **New cloud filtering method for composing the NDVI for** drought monitor:

Using the maximum land surface temperature (Ts) composites (MTsC) rather than maximum NDVI value composites (MVC), the NDVI data based on daily images of AVHRR were produced for a decade of each month.

The split-window Ts algorithm (Becker and Li, 1990; Yang and Yang, 2006):

$$T_s = A_0 + P\left(\frac{T_4 + T_5}{2}\right) + M\left(\frac{T_4 - T_5}{2}\right)$$

Table 1. Comparison of MITSC and MIVC							
station	20-07-2006(d1)			30-07-2006(d2)			Suit
	Ts(K)	NDVI	S10(%)	Ts(K)	NDVI	S10(%)	time
Pingwu	304.2	0.22	69	303.2	0.27	71	d1
Mingshan	303.3	0.28	83	306.0	0.24	69	d 2
Rongxian	307.8	0.34	89	309.2	0.21	63	d2
Guang'an	310.4	0.35	72	311.3	0.31	60	d 2
Jianyang	302.5	0.18	66	307.1	0.29	57	d2
Cangxi	305.7	0.15	37	309.5	0.27	32	d2
Yuezhi	304.3	0.15	42	312.0	0.24	35	d2
Anyue	308.8	0.23	59	310.3	0.33	47	d2
Longchang	307.2	0.28	76	311.1	0.31	64	d2

• Observed soil moisture at 0-10cm (S10)

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Key findings

The decade composed data based on the maximum land surface temperature were more suited for the detection of drought than those derived from the maximum NDVI value.

> 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.

References

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