

SOIL WETNESS VARIATIONS MONITORING BY MULTI-TEMPORAL PASSIVE MICROWAVE SATELLITE DATA ANALYSIS

Wei Zheng¹, Haixia Feng², Xin Wang¹

1National Satellite Meteorological Center of China Meteorological Administration,
Beijing, China, 100081

2 School of Earth and Space Sciences, Peking University,
Beijing, China, 100871

ABSTRACT

Precipitation-runoff processes are correlated with catchment's hydrological conditions. The estimation of soil wetness variations is of considerable importance to improve the reliability of flood warning(Lacava et al.,2006). Huaihe River Basin in China is an area where flood disaster happened very frequently. The disaster has had adverse impacts on the region's economic development(Zheng et al.,2008).

In this paper, Polarization Ratio Variation Index (PRVI) is presented which, on the basis of long-term multi-temporal Special Sensor Microwave/Image (SSM/I) data, can monitor soil wetness variations at a large scale. PRVI derives from polarization ratio index (PRI) which is computed by SSM/I data at 19GHz, vertically and horizontally polarized brightness temperature values and Robust AVHRR Techniques (RAT)(Tramutoli,1998; Lacava et al.,2005). Nearly 18-years (1988-2005) PRVI are calculated from SSM/I data. Preliminary results achieved for the several important flooding events in Huaihe River Basin from 1988 to 2005 years are described, which confirms the reliability of proposed method.

We can find obvious PRVI peak values in 1991, 1996 and 2003 years in Mengwa flood detention area map of Huaihe River Basin, which means that serious flood occurred in the three years respectively, consistent with the historical flooding records. We find that serious flood may approach in the area when PRVI exceeds its "normal" value (PRVI=2) by analyzing the PRVI spatial distribution characteristic. The forming of a higher PRVI (>2) zone along the Huaihe River indicated a higher risk of flood.

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