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论文

基于SSM/I数据的淮河流域洪涝监测分析

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摘要：

以淮河流域为研究区域,基于被动微波遥感SSM/I数据计算的极化比值指数PRI和RAT技术,提出极化比值变化指数$PRVI$。利用淮河流域1988～2005年6月下旬到7月期间的$PRVI$数据研究了淮河流域的洪涝时空特征,重点分析了发生流域性大洪水的1991年和2003年的洪涝特征,研究发现:淮河流域发生严重洪涝灾害的主要表现特征之一是淮河干流中游及其向北岸、上游和下游方向延伸约100km,向南岸延伸到流域南界的区域出现$PRVI$高值带,并结合淮河流域的自然环境分析了$PRVI$高值带出现的原因,指出$PRVI$高值带包括了大部分沿淮河干流的湖泊、洼地、行蓄洪区,支流河口、下游洼地等。进一步认为高值带内的$PRVI$值越大,高值带的面积越大,洪涝灾害越严重,防汛形势越严峻。这一结论对淮河流域洪涝灾害的监测和预警具有重要的应用价值。

关键词： SSM/I　PRVI　淮河流域　洪涝

Flood and waterlogging monitoring and analyses based on SSM/I data in Huaihe River Basin

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Abstract:

The estimation of soil wetness variations is of importance to improve the reliability of flood warning.In this paper,the coarse spatial passive microwave data was used to monitor large area flooding and soil moisture because of the ability of the microwave signal to penetrate through cloud and provide all-day data and because of its sensitivity to surface moisture and wate.It can effetively reveal large-scale soil wetness and flood patterns under cloudy and rainy conditions.Polarization Ratio Variation Index($PRVI$) was presented on the basis of polarization ratio index(PRI) calculated by the horizontal and vertical polarization brightness temperature data and Robust AVHRR Techniques(RAT).Nearly 18-year(1988-2005) $PRVI$ serials were calculated from Special Sensor Microwave/Image(SSM / I) data in the Huaihe River Basin.$PRVI$ datasets were obtained in the ten-day periods from June 21 to July 31 in the flood season.Several important flooding events in the Huaihe River Basin from 1988 to 2005 were described,and the flooding events of 1991 and 2003 were especially analyzed.We found that the serious flood and waterlogging disasters could be reflected by the formation of a higher $PRVI$ value zone in the buffer along the Huaihe River mainstream extending 100 km north and basin boundary south.The higher $PRVI$ value zone was consistent with the historical records.Furthermore,the reason for the formation of higher $PRVI$ value zones was analyzed.The zone included many flood detention areas,lakes and bayous and low-lying lands.The higher $PRVI$ value zone may be used as an indicator for flood forecast.Preliminary results confirmed the reliability of the proposed method.It is of great significance to the prevention and mitigation of flood and waterlogging disasters.

Keywords: SSM/I　PRVI　Huaihe River Basin　flood and waterlogging

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