

ENVISAT卫星先进合成孔径雷达数据水体提取研究——改进的最大类

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Title: Research on extraction of water body from ENVISAT ASAR images:a modified Otsu threshold method

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摘要: 星载雷达遥感是目前洪涝灾害水情监测的重要技术手段之一,而欧空局ENVISAT卫星上搭载的先进合成孔径雷达ASAR是目前功能最为强大的星载雷达系统。依据微波遥感影像中水体后向散射系数相对较低的特征,将图像分割中的常用算法——阈值法应用到ENVISAT ASAR数据水体提取中。进行了洞庭湖地区2007年枯水期和洪水期两景ENVISAT/ASAR APP-1P影像的实例研究,结果表明,综合考虑类间和类内方差两个因素的改进的最大类间方差法较之双峰法和最大类间方差法,其确定的最优阈值水体提取精度最高。另外,该方法相对简单、容易实现,可极大地提高当前ASAR数据计算机水体识别的自动化水平,进而推动ASAR数据于阴雨或多云天气条件下在洪涝灾害水情监测中的应用。

Abstract: Satellite-borne microwave remote sensing is one of the important technology tools for flood disaster monitoring.Up to now,the advanced synthetic aperture radar,ASAR instrument on board the ENVISAT satellite is one of the most powerful radar systems.So in this paper,in accordance with the characteristic that the water body has relatively low backscattering coefficient on ASAR images,two scenes ENVISAT/ASAR APP-1P imageries during the low water season and high water season in 2007 were taken as the test examples in Dongting Lake region,and the common algorithm in image segmentation-threshold methods were applied to the water body extraction from the above ENVISAT/ASAR imageries.The experiment results show that comparing with the double-peak threshold method and traditional Otsu threshold method,the precision of water body extraction based on a modified Otsu threshold method is the highest,which comprehensively considers both variances of inter/inner classes.In addition,through the experiment results it also shows that after solving the issue of threshold by the modified Otsu method,the automatic level of water body extraction from ASAR data and the application of ASAR data to flood disaster monitoring under the wet or cloudy weather conditions are greatly promoted.

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