

工程与应用

## 卫星云图感兴趣区域自动提取方法研究

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**摘要** 卫星云图中人们感兴趣的区域(ROI)往往是各类云团,针对卫星云图内容的复杂性,利用直方图模糊加权C均值聚类方法实现云图的图像分割,对分割结果进行后处理,最终获取云图内的感兴趣区域。常规聚类方法需要人工指定类个数,影响了ROI提取过程的自动化程度。引入修正聚类评价指标,基于该指标实现最佳类别个数的自动确定。云图分割是感兴趣区域提取过程的关键,采用的直方图模糊加权C均值聚类方法在原有算法基础上,引入样本权重概念,使得聚类过程更为合理;同时将聚类对象由原始像素转换为灰度直方图,提高了聚类过程执行效率。实验结果表明设计的感兴趣区域提取方法能较为准确地分辨出陆地、水体、低云、中云、卷云、对流云六类区域,提取结果与客观实际一致。

**关键词** [感兴趣区域\(ROI\)](#) [聚类有效性指标](#) [阈值分割](#) [C均值聚类](#)

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## Automatic ROI extraction from satellite cloud image based on gray level histogram

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### Abstract

All kinds of clouds are the interests for people in the satellite cloud images. Considering the complexity of cloud image, this paper proposes a weighted FCM method based on the gray level histogram for cloud image segmentation. The ROI is finally acquired after finishing post-process. A general clustering method needs the class number specified by people. This paper implements automatically confirming the optimized class number based on the clustering validity index. Cloud image segmentation is the important step during the process of ROI extraction. This paper combines the weighted idea with FCM to make the clustering more scientific. On the other hand, the clustering object is transformed from pixel to gray level histogram. The modified algorithm executes more efficiently. The experiment result demonstrates the ROI extraction method can classify the image content into six regions of interest: Land, water, stratus, middle cloud, cirrus and cumulonimbus. The results are consistent with the objective facts.

**Key words** [Region Of Interest \(ROI\)](#) [clustering validity index](#) [threshold partition](#) [Fuzzy Clustering Method \(FCM\)](#)

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