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技术方法

基于TM的辐射传输模型反演叶面积指数可行性研究

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摘要：

基于PROSAIL辐射传输模型，引入土壤反射指数SRI来简化模型，提出直接从反射率计算SRI的方法； 同时，针对不同的植被状况，采取不同波段组合对模型的参数进行敏感性分析，确定自由参数与反演波段组合，提出一种基于不同植被状况的叶面积指数反演策略； 最后，应用遗传算法对模拟的TM光谱反射数据进行实验。结果表明，对于LAI＜3的植被，反演精度较高； 但是对于LAI＞3的植被，反演精度较低，其原因主要是冠层反射对LAI不再敏感。因此，辐射传输模型反演LAI有一定适用范围，只有在此范围内LAI的反演精度才可靠。

关键词： 辐射传输模型 PROSAIL 叶面积指数 模型反演

A FEASIBILITY STUDY OF LEAF AREA INDEX INVERSION USING RADIATIVE TRANSFER MODEL BASED ON TM DATA

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Abstract:

Using a canopy radiative transfer model, PROSAIL, the authors introduced soil reflection index（SRI） to simplify model, and proposed a method for computing SRI directly from reflection. Besides, sensitivity analyses of various vegetation parameters on modeling performance under different band integration approaches were conducted. On the basis of sensitivity analyses of the model, a set of new band integration approaches with genetic algorithm was induced to calculate the estimating values of LAI for Landsat TM data . Experiments with Landsat TM data indicate that the retrieval accuracy is relatively high for vegetation with LAI less than 3, and that, with LAI more than 3, the retrieval accuracy is low. These phenomena are attributed to the fact that the canopy reflection is no longer sensitive to LAI when the vegetation is too densely developed. From this study, it is concluded that LAI retrieval with the PROSAIL model is only credible in a certain range.

Keywords: Radiative transfer model PROSAIL Leaf area index Model reversion

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