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地面观测资料分析

大尺度辐射度模型敏感性分析及在祁连山林区的应用

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摘要：

辐射度模型（RGM）用于计算植被二向性反射(BRDF)。但是目前基于辐射度方法的计算机模拟模型的应用被局限在较小的、比较单一的场景范围之内。把RGM模型扩展为大场景辐射度模型(LRGM)，关键在于如何把大场景分为子场景，既保证模拟精度，又可以显著缩短计算时间。通过不同地形条件下模拟结果的对比，分析讨论了子场景划分方法的敏感性，分析表明：①地形对BRDF是有影响的，主要表现在后向观测方向的增强作用和前向观测方向的减弱作用;②子场景个数对模拟结果影响不大，最大偏差不超过0.007。然后，选取黑河流域大野口山区水源涵养林带为观测试验区，利用大场景辐射度模型进行真实结构模拟，将模拟结果与ASTER数据进行对比，结果表明，二者最大绝对误差不超过0.0382，证明LRGM模型模拟遥感像元尺度的BRDF是可行的。

关键词： 大尺度辐射度模型;BRDF;森林场景;敏感性分析

Sensitivity Analysis of Large Scale Radiosity Graphics Model and the Application on the Forest of Qilian Mountain

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Abstract:

Radiosity Graphics Model（RGM）is mainly used to compute the Bi directional reflectance distribution function (BRDF),which is suitable for small scale scenes such as farmland, lawn or homogeneous forest. Large Scale RGM (LRGM) can be applied to simulate large scale forest scene over complex topographic surfaces based on scene dividing method. It can also save computing time. In this paper, sensitivity analysis of LRGM was carried out firstly, concerning different terrain conditions and different sub scene numbers. The results illustrate: ①BRDF is influenced by terrain, in back observation direction the terrain can strengthen the BRDF. In forward observation direction the terrain can weaken the BRDF; ②The sub scene number is not so sensitive to the BRDF. For example, the deviation is no more than 0.007; Secondly, Dayekou forest region in the Heihe River Basin was chosen as our study area, and the data including DEM, tree structure parameters and component spectral were used to simulate the BRDF of the scene by LRGM model. Then, the LRGM simulation result was validated with the ASTER data. The mean absolute error is no more than 0.0382. The result indicates that the LRGM can simulate the BRDF on a large scale well.

Keywords: Large scale Radiosity Graphics Model BRDF Forest scene Sensitivity analysis

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