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## 水滴清除气溶胶过程的随机算法和数值模拟

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**摘要:** 气溶胶尺度分布的时间演变可量化气溶胶的湿沉降过程, 它在数学上可由考虑湿沉降的通用动力学方程来描述. 该方程为一典型的部分积分微分方程, 与气溶胶尺度分布和雨滴尺度分布均相关, 且由于需要考虑Brown扩散、拦截和惯性碰撞等湿沉降机制而使得清除系数模型非常复杂, 普通的数值方法难以求解. 为此发展了一种新的多重Monte Carlo算法, 以求解考虑湿沉降的通用动力学方程, 并用于模拟实际环境中气溶胶的湿沉降. 对于对数正态分布的气溶胶尺度分布和雨滴尺度分布, 多重Monte Carlo算法进行的数值模拟表明, 雨滴几何平均尺度越小, 雨滴几何标准偏差越小, 越有利于小尺度和中等尺度气溶胶的湿去除, 而稍微不利于大尺度气溶胶的湿去除.

**关键词:** 湿去除; 气溶胶; 降雨; Monte Carlo算法; 数值模拟

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