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经度、纬度及时差设置对AERMOD预测结果的影响

Impact of longitude, latitude and time difference on AERMOD predictions

关键词: [环境影响评价](#) [大气预测模型](#) [AERMOD](#) [经度](#) [纬度](#) [时差](#)

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作者 单位

张有贤 兰州大学西部环境与气候变化研究院,兰州 730000

符辛竹 兰州大学资源环境学院,兰州 730000

王小燕 兰州大学资源环境学院,兰州 730000

摘要: 为了验证经度、纬度和时差参数对AERMOD模式预测结果是否有影响,假设在某气象条件下存在一个点源,利用AERMOD模式计算该点源排放的污染物的浓度分布.保持气象条件和污染源参数不变,仅改变点源所在地的经度、纬度或时差,重新利用AERMOD模式进行了预测,比较预测结果的差异.结果表明,经度、纬度和时差参数对白天时段行星边界层参数的计算值有影响,受影响的参数包括地表热通量、摩擦速度、Monin-Obukhov长度、对流速度尺度、温度尺度和混合高度.经度、纬度和时差的不同取值对AERMOD计算出的污染物小时平均浓度最大值和浓度分布影响明显.根据AERMOD公式的描述和能量变化得出,经度、纬度和时差的改变引起了项目所在地白天太阳高度角的变化,进而改变了地表热通量.地表热通量的改变,造成了行星边界层参数的变化,最终影响了浓度分布的计算值.

Abstract: To examine the impacts of three parameters including longitude, latitude, and time difference, on the output of AERMOD, the concentration-distribution of discharged pollutants were calculated by the AERMOD model assuming a point source under certain meteorological conditions. Subsequently, one of the three parameters was changed at a time for model recalculation. We found that the model gave an array of dissimilar results. Analysis of these results showed that the three parameters, i.e. longitude, latitude and time difference, individually can affect surface heat flux, friction velocity, Monin-Obukhov length, convective velocity scale, temperature scale and mixing height necessary in the calculation of planetary boundary layer during daytime. Besides, the concentration-distribution and average maximum hourly concentration were most sensitive to the variation of these three parameters. According to the description of the formulas of the AERMOD model and the energy balance, we can infer that changing any of the 3 parameters may vary the solar elevation angle on the pollution site during the daytime, which could result in the change in the surface heat flux. The surface heat flux change can cause the variation of the parameters for computing the planetary boundary layer, which ultimately influences the values of concentration-distribution.

Key words: [environmental impact assessment](#) [air forecasting model](#) [AERMOD](#) [longitude](#) [latitude](#) [time difference](#)

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主办单位: 中国科学院生态环境研究中心

单位地址: 北京市海淀区双清路18号 邮编: 100085

服务热线: 010-62941073 传真: 010-62941073 Email: hjxxb@rcees.ac.cn

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