

地球物理学报 » 2012, Vol. » Issue (6) : 1867-1875 doi: 10.6038/j.issn.0001-5733.2012.06.007

空间物理学 · 大气物理学

最新目录 | 下期目录 | 过刊浏览 | 高级检索

<< << 前一篇 | 后一篇 >> >>

引用本文(Citation):

刘红年, 张力. 中国不同排放情景下人为气溶胶的气候效应. 地球物理学报, 2012, (6): 1867-1875, doi: 10.6038/j.issn.0001-5733.2012.06.007

LIU Hong-Nian, ZHANG Li. The climate effects of anthropogenic aerosols of different emission scenarios in China. Chinese J. Geophys. (in Chinese), 2012, (6): 1867-1875, doi: 10.6038/j.issn.0001-5733.2012.06.007

中国不同排放情景下人为气溶胶的气候效应

刘红年, 张力*

南京大学大气科学学院, 南京 210093

The climate effects of anthropogenic aerosols of different emission scenarios in China

LIU Hong-Nian, ZHANG Li*

School of Atmospheric Sciences, Nanjing University, Nanjing 210093, China

摘要

参考文献

相关文章

Download: PDF (2842KB) HTML 1KB Export: BibTeX or EndNote (RIS) Supporting Info

摘要 本文利用区域气候模式RIEMS2.0(Regional Integrated Environmental Model System)和2006年以及2020年三种排放情景下的排放资料,研究了2006年气候背景下的人为气溶胶的浓度分布特征及辐射效应,估算了未来不同排放情景下人为气溶胶的主要成分硫酸盐、硝酸盐、黑碳、有机碳(含二次有机碳)的综合气候效应.结果表明:(1)2006年中国地区人为气溶胶浓度硫酸盐>有机碳>硝酸盐>黑碳,其区域柱浓度平均值分别为6.0、4.0、1.3和0.3 mg/m².(2)2006年硫酸盐、硝酸盐、有机碳和黑碳的平均辐射强迫分别为-1.32、-0.60、-0.40和0.28 W/m².硫酸盐、硝酸盐和有机碳的负辐射强迫超过黑碳的正辐射强迫,人为气溶胶总辐射强迫为-1.96 W/m².(3)人为气溶胶的辐射效应及引起的地面气温变化对排放源非常敏感,未来采取不同排放政策导致的人为气溶胶的含量及辐射效应有较大差异.在未来排放增加的情景下,各区域的气溶胶浓度、辐射强迫、气温下降幅度和降水减少幅度也相应加大.

关键词 排放情景, 人为气溶胶, 气溶胶气候效应, RIEMS2.0

Abstract: The Regional Integrated Environmental Model System (RIEMS2.0) and the emission data of 2006 and 2020 were used to simulate the distributions and climate effects of anthropogenic aerosols sulfate, nitrate, black carbon and organic carbon for the entire year of 2006. The results show that: (1)The regional average column burdens of sulfate in 2006 are the largest among the anthropogenic aerosols, followed by organic carbon, nitrate, and black carbon, with the regional average value of 6.0, 4.0, 1.3 and 0.3 mg/m², respectively. (2)The regional average radiative forcing (RF) of sulfate, nitrate, organic, and black carbon are -1.32, -0.60, -0.40, and 0.28 W/m², respectively. The negative RF of sulfate, nitrate, and organic carbon are larger than the positive RF of black carbon. The net RF of anthropogenic aerosol is -1.96 W/m². (3)The radiative effects and temperature change caused by anthropogenic aerosols are sensitive to emission inventory. The column burdens and climate effects of anthropogenic aerosols are strongly influenced by the emission scenarios. In future, the larger emission intensity may cause more considerable negative RF, temperature drop and precipitation reduction.

Keywords Emission scenario, Anthropogenic aerosol, Aerosol climate effect, RIEMS2.0

Received 2011-01-11;

Fund:

国家重点基础研究发展规划(973)项目(2010CB428501)、公益性行业科研专项(GYHY201206011)和江苏高校优势学科建设工程项

Service

把本文推荐给朋友

加入我的书架

加入引用管理器

Email Alert

RSS

作者相关文章

刘红年

张力