Geophysical Research Abstracts, Vol. 9, 11220, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-11220

Simulation of global lightning distribution based on thermodynamic and aerosol hypotheses

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We suggest a simple global thermodynamic model of the total flash rate, which is corrected for a potential increase in the lightning frequency induced by ice nucleation in regions with high mineral dust concentration. Simulated total flash rate was compared with the combined satellite data from the Optical Transient Detector and the Lightning Imaging Sensor on a global scale. Ground observations of cloud-to-ground (CG) lightning frequency over mountainous parts of Alberta and British Columbia were compared with simulated values of the CG flash rate at daily and annual time scale. The comparison of the total flash rate simulated with and without mineral dust influence to observations at global and regional scales indicates potential of the suggested lightning model.