Abstract Submitted
for the FWS14 Meeting of
The American Physical Society

Thermal Infrared Radiative Forcing by Atmospheric Aerosol NARAYAN ADHIKARI, WILLIAM P. ARNOTT, University of Nevada Reno — The radiative effect of aerosol in the longwave (LW) spectral domain is usually considered negligible and is often not included in climate models. We have demonstrated that both the bottom of the atmosphere (BOA) and top of the atmosphere (TOA) LW radiative forcing (RF) due to coarse mode aerosol, associated with large airborne mineral dust particles, and that due to fine mode aerosols, mainly associated with small biomass-burning smoke particles, are significant and positive. The LW RF produces heating at the Earth's surface, counterbalancing the well-known cooling effect associated with aerosol RF in the shortwave (SW) spectral region. Also, the aerosol LW forcings on typical conditions in Reno, NV, are comparable in magnitude to the enhancement due to increase in CO_2 concentration in the Earth's atmosphere since the preindustrial era of 1750. These results underscore that the importance for inclusion of accurate aerosol LW RF in atmospheric radiative transfer in general and climate models in particular.

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Date submitted: 10 Oct 2014 Electronic form version 1.4