Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **2035** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

Insight into Global Trends in Aerosol Composition over 2005–2015 Inferred from the OMI Ultraviolet Aerosol Index (G)*

Monday 11 June 2018 16:45 (15 minutes)

Observations of aerosol scattering and absorption offer valuable information about aerosol composition. We apply a simulation of the Ultraviolet Aerosol Index (UVAI), a method of detecting aerosol absorption from satellite observations, to interpret UVAI values observed by the Ozone Monitoring Instrument (OMI) over 2005–2015 to understand global trends in aerosol composition. We conduct our simulation using the vector radiative transfer model VLIDORT with aerosol fields from the global chemical transport model GEOS-Chem. We examine the 2005–2015 trends in individual aerosol species from GEOS-Chem, and apply these trends to the UVAI simulation to calculate the change in simulated UVAI due to the trends in individual aerosol species. We find that global trends in the UVAI are largely explained by trends in absorption by mineral dust, absorption by brown carbon, and scattering by secondary inorganic aerosol. Trends in absorption by mineral dust dominate the simulated UVAI trends over North Africa, the Middle-East, East Asia, and Australia. The UVAI simulation well resolves observed negative UVAI trends over Australia, but underestimates positive UVAI trends over North Africa and Central Asia near the Aral Sea, and underestimates negative UVAI trends over East Asia. We find evidence of an increasing dust source from the desiccating Aral Sea, that may not be well represented by the current generation of models. Trends in absorption by brown carbon dominate the simulated UVAI trends over biomass burning regions. The UVAI simulation reproduces observed negative trends over central South America and West Africa, but underestimates observed UVAI trends over boreal forests. Trends in scattering by secondary inorganic aerosol dominate the simulated UVAI trends over the eastern United States and eastern India. The UVAI simulation slightly overestimates the observed positive UVAI trends over the eastern United States, and underestimates the observed negative UVAI trends over India. Quantitative simulation of the OMI UVAI offers new insight into global trends in aerosol composition.

Author: HAMMER, Melanie (Dalhousie University)

Co-authors: MARTIN, Randall (Dalhousie University); LI, Chi (Dalhousie University); TORRES, Omar (NASA Goddard Space Flight Center); MANNING, Max (Dalhousie University); BOYS, Brian (Dalhousie University)

Presenter: HAMMER, Melanie (Dalhousie University)

Session Classification: M3-2 General Contributions I (DASP) l Contributions générales 1 (DPAE)

Track Classification: Atmospheric and Space Physics / Physique atmosphérique et de l'espace (DASP-DPAE)