

5.137 Twelve years of aerosol composition measurements at Whistler Peak: Comparisons with a global chemical transport model.

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Abstract:

Particle and trace gas concentrations throughout the northern hemisphere are influenced by intercontinental and hemispheric transport of air pollutants. Understanding these influences is important within the context of local and regional air quality and climate, both to develop policies for local pollution controls and to evaluate their effectiveness. The dominant sources of particles to Canada's west coast include dust and anthropogenic aerosols transported across the Pacific, anthropogenic aerosols from the west coast of the US and Canada, biomass burning and biogenic aerosols generated both locally and regionally.

Twelve years (2002-2014) of aerosol chemical composition measurements from the Peak of Whistler Mountain are presented. Since 2002, the aerosol inorganic chemical composition is available year-round from filter packs (PM 2.5); OC/EC measurements from weekly filters are available beginning in 2008; and on-line aerosol chemistry from aerosol mass spectrometers is also available from three springtime periods (2005, 2006, 2008) and semi-continuously since 2009. Aerosol microphysical measurements are also used to estimate total particle volume.

Comparisons are made with 8 years of simulations from the GEOS-Chem-TOMAS chemical transport model. The GEOS-Chem base case simulations agree well with observations. The influence of biomass burning and Asian anthropogenic emissions on aerosol composition at Whistler is then investigated through model simulations with or without these sources.