Geophysical Research Abstracts
Vol. 19, EGU2017-10219-1, 2017
EGU General Assembly 2017

PolEASIA Project: Pollution in Eastern Asia – towards better Air Quality Prevision and Impacts' Evaluation

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The rapid economic development and urbanization of China during the last decades resulted in rising pollutant emissions leading to amongst the largest pollutant concentrations in the world for the major pollutants (ozone, PM2.5, and PM10). Robust monitoring and forecasting systems associated with downstream services providing comprehensive risk indicators are highly needed to establish efficient pollution mitigation strategies. In addition, a precise evaluation of the present and future impacts of Chinese pollutant emissions is of importance to quantify: first, the consequences of pollutants export on atmospheric composition and air quality all over the globe; second, the additional radiative forcing induced by the emitted and produced short-lived climate forcers (ozone and aerosols); third, the long-term health consequences of pollution exposure. To achieve this, a detailed understanding of East Asian pollution is necessary. The French PolEASIA project aims at addressing these different issues by providing a better quantification of major pollutants sources and distributions as well as of their recent and future evolution. The main objectives, methodologies and tools of this starting 4-year project will be presented.
An ambitious synergistic and multi-scale approach coupling innovative satellite observations, in situ measurements and chemical transport model simulations will be developed to characterize the spatial distribution, the interannual to daily variability and the trends of the major pollutants (ozone and aerosols) and their sources over East Asia, and to quantify the role of the different processes (emissions, transport, chemical transformation) driving the observed pollutant distributions. A particular attention will be paid to assess the natural and anthropogenic contributions to East Asian pollution. Progress made with the understanding of pollutant sources, especially in terms of modeling of pollution over East Asia and advanced numerical approaches such as inverse modeling will serve the development of an efficient and marketable forecasting system for regional outdoor air pollution. The performances of this upgraded forecasting system will be evaluated and promoted to ensure a good visibility of the French technology. In addition, the contribution of Chinese pollution to the regional and global atmospheric composition, as well as the resulting radiative forcing of short-lived species will be determined using both satellite observations and model simulations. Health Impact Assessment (HIA) methods coupled with model simulations will be used to estimate the long-term impacts of exposure to pollutants (PM2.5 and ozone) on cardiovascular and respiratory mortality. First results obtained in this framework will be presented.