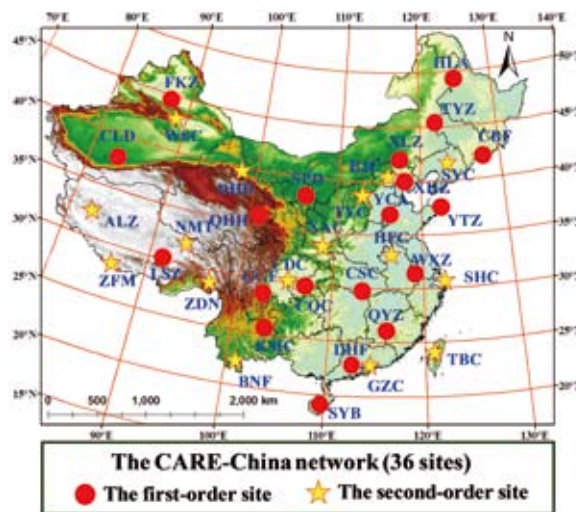


Campaign on Atmospheric Aerosol Research Network of China: CARE-China

Serious air pollution and the involved complex aerosol components in China are aggravating the uncertainties of regional and global climate change, hence it is essential to investigate the distribution of aerosol components over China. Based on a network of field stations supported by the Chinese Academy of Sciences (CAS), “Campaign on Atmospheric Aerosol Research” network of China (CARE-China) was recently established as the country’s first monitoring network for the study of the spatiotemporal distribution of aerosol physical characteristics, chemical components and optical properties, as well as aerosol gaseous precursors.

The network comprises 36 stations in total and adopts a unified approach in terms of the instrumentation, experimental standards and data specifications. This ongoing project is intended to provide an integrated research platform to monitor online PM_{2.5} concentrations, nine-size aerosol concentrations and chemical component distributions, nine-size secondary organic aerosol (SOA) component distributions, gaseous precursor concentrations (including SO₂, NO_x, CO, O₃ and Volatile Organic Compounds), and aerosol optical properties. The data will be used to identify the sources of regional aerosols, the relative contributions from nature and anthropogenic emissions, the formation of secondary aerosols, and the effects of aerosol component distributions on aerosol optical properties. The results will reduce the levels of uncertainty involved in the quantitative assessment of aerosol effects on regional climate and environmental changes, and ultimately provide insight into how to mitigate anthropogenic aerosol emissions in China. Based on the above research, a paper has been published in *Bull. Amer. Meteor. Soc.*(doi: <http://dx.doi.org/10.1175/BAMS-D-14-00039.1>), to provide a detailed description of the instrumentation, methodologies and experimental procedures used across the network, as well as a case



Geographic distribution of the CARE-China network. (Xin *et al.*, 2015)

study of observations taken from one station, investigating the distribution of main components of aerosol over China during 2012.

Sulfate ion, OC and EC are the main components of aerosol. They differ greatly in the spatial and temporal distribution over China. The concentrations of SO₄²⁻, OC and EC were dramatically higher in North China, the central and eastern region and the cities than in the western, the background sites, especially in the Qinghai-Tibet Plateau. SO₄²⁻, OC and EC of aerosol have two similar peaks in the fine mode and coarse mode almost all of sites. The phenomenon is largely different from the usual cognition that SO₄²⁻, OC and EC are mainly accumulated in fine mode of aerosol. This suggests that many aerosol models and climate models must be calibrated or adjusted by the real aerosol parameters in China, and this might be the only way to reduce the errors and uncertainties in evaluating aerosol effects on the regional and global climate change.