Asia accommodates over 60% of the world’s population and is the largest emission source of aerosols and their precursors in the world. These emissions could impinge significantly on regional and global climate depending on aerosol distribution, transport and evolution of optical, physical and chemical properties. To unravel the impact and interactions between the Asian monsoon system and aerosol loading, field experiments have been conducted under the Asian Monsoon Year (AMY). Two experiments conducted in China will be reviewed, namely, the East Asian Study of Tropospheric Aerosols and Impact on Regional Climate (EAST-AIRC) and Atmospheric Radiation Measurements (ARM) Mobile Facility mission in China (AMF-China). Thanks to these field experiments, rich information has been gained pertaining to aerosol properties, meteorological regimes, cloud, radiation and precipitation, etc. Climate changes and the roles of aerosols are examined by means of data analysis and climate modeling. Particular attention is given to the weakening of the East Asia Monsoon system and increasing loading of aerosols.