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メタデータ	言語: eng 出版者: 公開日: 2017-10-05 キーワード (Ja): キーワード (En): 作成者: メールアドレス: 所属:
URL	http://hdl.handle.net/2297/2432

Important atmospheric environmental issues of East Asia

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Abstract

The importance of global atmospheric environmental issues such as global warming acid rain and ozone depletion as well as the local air pollution problems has been recognized worldwide. Especially in the 21st century, East Asia certainly becomes one of the most crucial region in the world to those issues, because of the rapid increase of population and remarkable growth of industries in this area.

East Asia includes generally People's of Republic of China, Republic of China (Taiwan), North Korea, South Korea, Mongolia and Japan in geographical term and covers about 6,640,000 km², and 15% of the Asian continent. More than 1.5 billion people, about a quarter of all the people in the world, live in East Asia now. Furthermore, the population in the region still increases sharply. East Asia, especially mainland China, is also expanding industrialization and motorization a breakneck speed. Such a rapid growth in population and economical/social activities is conducive to the rapid increase of primary energy consumption and leads to environmental damage.

In fact, the atmospheric concentrations of sulfur dioxide, nitrogen oxides (NO_x), suspended particulate matter/PM₁₀ (smaller particles than 10μm) and ozone increases in the most countries in East Asia, causing serious air pollution.

Air pollutants released into the atmosphere are transported by wind and transformed during transportation to produce more harmful air pollutants. For example, sulfur dioxide changes to sulfuric acid and further sulfate, and nitrogen oxide and organic compounds react to produce photochemical oxidants. Primary pollutants and their secondary produced pollutants are transported across the borders and give the serious damages on other countries, as experienced as the transborder acid rain problems within European countries in 1960s and between USA and Canada in 1970s.

Global warming is also very important atmospheric environmental issues in the 21st century. Greenhouse gases, emitted mostly by energy use, are expected to increase dramatically in near future in East Asia. Global warming is also one of the transborder environmental issues.

In near future, the scientist should be elucidate and make solution for the various phenomena on the atmospheric environmental issues. The promotion of joint research of East Asian countries located in the most environmentally crucial region in the world is indispensable.

In the presentation, the important environmental issues in East Asia are discussed with focus on aerosol characteristics and their effects on atmospheric environment such as acid deposition and global warming/cooling.