Advances in Meteorology

Special Issue on

Atmospheric Transport of Air Pollution from Natural and Anthropogenic Sources

CALL FOR PAPERS

Atmospheric pollutants uplifted into upper atmospheric layers can be carried many kilometers downwind from their source areas by mesoscale circulations and synoptic wind systems. In recent decades it has been demonstrated that the adverse impacts of transported pollution in downwind foreign regions can be larger than the impacts of emissions in the source region itself. The interrelationship between anthropogenic emissions in continental Europe and the acidification of Scandinavian lakes was confirmed in the 1970s. Moreover, the development of multilayer structures of aged air masses over coastal areas in the Mediterranean basin and the convergence of ozone enriched layers towards further inland sites have also been demonstrated in the 1990s.

However, other concerns associated with transboundary air pollution have yet to be addressed. Biomass burning emissions from the African continent and from Canadian and Siberian regions could undergo long-range transport over the remote Atlantic or Indian oceans. Atmospheric mineral dust originating from arid and semiarid soils of Africa and Asia can also be transported over long distances. The very large amounts of mineral dust and carbonaceous aerosols transported may have an outstanding relevance for air quality plans to abate particulate matter ambient levels, as well as for the atmospheric radiative balance. Otherwise, intercontinental transport has increased background O_3 concentrations to the point where they exceed thresholds for protection of vegetation in many locations and also for the protection of human health at rural and even urban areas.

In this special issue we encourage the submission of articles related to mesoscale and synoptic scale processes that give rise to the transport of air pollution and to physicochemical transformations of particle and gases due to aging processes within reservoir layers, including the evaluation of the effects of the transported polluted air masses on health, ecosystems, and climate.

Potential topics include, but are not limited to:

- Recirculatory flows of air pollutants within the mesometeorological scale
- Midtropospheric injection of photooxidants and formation of reservoir layers
- Wet and dry acid deposition and eutrophication
- Characterization of secondary aerosol formation from transported precursors
- Detection, temporal evolution, altitude of transport, and aerosol properties of smoke and dust plumes obtained from satellite imagery and ground-based lidar measurements
- Accuracy and quantitative approach of African dust and smoke modelling
- Predictions of atmospheric transport on different scales and error assessment of models
- Identification of potential sources of pollutants by trajectory statistical methods
- Regional climate variability associated with the transport processes

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