Megacities and the coastal zone – air-sea interactions

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Megacities are defined as having populations of over 10 million. There were 20 such cities in 2005, and with the world population and urbanisation growing, this number can be expected to grow in the future. While this definition of a megacity is useful, it is simplistic and underestimates the significance of megacities. For instance, the political boundaries of a city may be uncertain (Greater London has a population of 7.5 million while the London metropolitan area has a population in excess of 12 million) and in some areas several large cities are sufficiently close together that for some purposes that they become a single entity – Washington, New York and Boston may be an example. Regardless of the precise definition, megacities are now an important part of the contemporary Earth System.

Almost all current megacities are located close to the coast and so the environmental interactions between the megacities and the coastal zone are substantial. Many of these involve air-sea interactions and all have profound implications for the local populations. For instance, the halogens emitted from the oceans can affect the cycling of atmospheric pollutants such as ozone, and the discharge of nutrients to coastal waters (via the atmosphere or fluvial system) can alter marine productivity and perturb the coastal ecosystem. There are also feedbacks to consider such as the effects of changed marine productivity on marine gas emissions and the occurrence of harmful algal blooms and the effects of changing climate on all of these interactions.

To address the scientific issues of megacity/coastal zone air-sea interactions, a group of fifteen scientists from 9 countries gathered at the University of East Anglia between 13 and 15 April 2010 for a meeting sponsored by IGBP as a "fast-track initiative" with support from IGAC, LOICZ, SCOR and SOLAS.

The meeting was structured around addressing 4 questions:

- How do marine emissions affect megacity air pollution?
- How do megacities affect coastal ecosystems?
- How do megacity/coastal interactions affect climate?
- How does atmospheric deposition impact marine emissions and other potential feedbacks?

These are challenging cross disciplinary scientific questions and the participants included experts in atmospheric chemistry, climate, marine biogeochemistry and social sciences. The discussion ranged far and wide and it became clear that the scale of the impacts of the megacity/coastal zone interactions are larger and more wide-ranging (geographically and scientifically) than any of the participants initially thought from their own disciplinary perspective. The results of our discussions are now being written up for peer-reviewed paper publications.

This was an exciting meeting demonstrating the value of interdisciplinary science, which all the participants will remember for a long time – if for no other reason than the difficulty they had getting home afterwards as the Icelandic volcano dust cloud closed European air space!

Collaboration established between SOLAS and IOC/WESTPAC through ADOES

At the Eighth Intergovernmental Session of the IOC Sub-Commission for the Western Pacific (IOC/WESTPAC) held in Bali, Indonesia, from 10 to 13 May 2010 a new Working Group on Asian Dust and its Impact on Ocean Ecosystems in the Western Pacific (WESTPAC-ADOES) was established. This represents a new collaboration between SOLAS and IOC/WESTPAC through the SOLAS Task team ADOES. The Working Group will be co-chaired by Prof. Huiwang Gao from Ocean University of China and Prof. Mitsuo Uematsu from University of Tokyo with initial members from China, Japan, Korea and Malaysia. This Working Group will work closely with the task team of ADOES under the frame of international SOLAS.

As a Sub-Commission of IOC, IOC/WESTPAC is mandated not only to carry out IOC global programmes in the Western Pacific regional, but also to develop, coordinate and implement regionally-specific marine scientific research programmes, ocean observations and services, as well as capacity building based on the common interests of the member states in the region.

WESTPAC-ADOES was approved in accordance with the Guidelines for the Establishment of WESTPAC working groups (Rec.SC-WESTPAC-VIII.3) which has been reflected in the Executive Summary of WESTPAC-VIII (http://unesdoc.unesco.org/images/0018/001880/188086E.pdf).

The objective of WESTPAC-ADOES is to bring together scientists in the fields of ocean and atmosphere research, mainly from Member States in the Western Pacific, in order to further promote the study of Asian dust and its impact on ocean ecosystems in the Western Pacific.

Within its 4 year life span (2010-2014) WESTPAC-ADOES will enhance knowledge and data sharing among various research communities through workshops and meetings. WESTPAC will provide USD 8,000 per meeting to support the travel of full members.

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