Proposed Studentship

Does black carbon and humic materials in snow and ice decay?

Supervisors: Martin D. King (RHUL)

Project Description

Applications are invited for a proposed research studentship to investigate whether natural oxidation of black carbon and humic materials in snow and sea-ice can lessen the climatic forcing of aerosol on the cryopshere albedo.

It has been recently shown that nanogram quantities of black carbon in snowpacks can significantly reduce the albedo of snowpacks. The black carbon is from anthropogenic burning and transported to the Polar regions as aerosol. Increasing concentrations of black carbon in snow may be causing the earlier springs and loss of sea-ice in the Arctic. The Intergovernmental Panel on Climate Change listed this radiative forcing for the first time in its last report and the uncertainty was large. To reduce the uncertainty of this radiative forcing causing climate change in Polar regions requires parameterization of the effect of Black carbon on snow so that it can be included in global climate models and its true effect assessed as a function of latitude and season and scenarios where (a) black carbon is increasing or (b) burner technology changes the and optics properties of black carbon change. As little as 10 ng of Black carbon in 1 g of snow can cause 1% change in albedo.1 It has also been suggested that the effect of black carbon in snowpack is a factor of two more effective than carbon dioxide in changing global air temperatures.2

The successful candidate will set-up and conduct experiments in a new sea-ice simulator at Royal Holloway: conducting experiments on the reflectivity and light penetration depth of sea-ice and snow with different black carbon and humic loadings, modeling the optical properties of the snow/ice and measuring the decay in optical properties with natural oxidation owing to hydroxyl radical and ozone.

The successful candidate should possess a good honours degree in Chemistry, Physics, Earth Science or related discipline and be prepared to undertake some work in cold (~ -20°C) temperatures. In the 2008 Research Assessment Exercise we were ranked equal 6th in the UK with 70% of our research rated as world-leading or internationally excellent in terms of originality, significance and rigour.

Eligibility for this studentship is restricted to UK citizens and applicants who have been ordinarily resident in the UK throughout the 3-year period preceding the date of application for an award, and has settled status in the UK within the meaning of the Immigration Act 1971 (ie is not subject to any restriction on the period for which he/she may stay). Further information can be found from the National Environmental Research council website http://www.nerc.ac.uk.

*Please contact the Postgraduate Programmes Co-ordinator, if you have additional questions about the department or application procedures (email: **pgadmin@es.rhul.ac.uk** ; fax: 01784-471780; tel: 01784-443581).*
*An application form can be found here **www.rhul.ac.uk/studyhere/postgraduate/applying***
Applicants are requested to send an additional copy of their CV directly to the lead supervisor of the project in which they are interested. Please also contact the supervisor if you have any questions about the project itself.