2013 PhD studentships
Department of Environment, Earth and Ecosystems

Science Faculty, The Open University, Walton Hall, Milton Keynes, MK7 6AA

Greenhouse gas evasion from channels draining intact and deforested tropical peatlands

Guaranteed Funding

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- **Work on a climate relevant area of ecosystem science.**
- **Field work in Borneo.**
- **Study at first hand the unique peat swamp forest environment and contribute to an understanding of the human-induced changes that threaten its long-term sustainability.**
- **Training in the latest biogeochemistry analytical techniques and in ecosystem science.**

Peatlands store a large fraction of the world's soil carbon and are vital components of global carbon soil-atmosphere exchange processes which includes the emission of the second most important greenhouse gas, methane (CH_4). Tropical peatlands are high carbon density ecosystems that are currently extremely vulnerable to destabilisation through human and climate induced changes. They contain 50-70 Gt carbon (3% global soil C) but rapid land use changes (deforestation, drainage) and fire are releasing this C (Page *et al.,* 2003). Damage to the regional environment and biodiversity is similar to the impact of deforestation and fire in non-peatland areas.

Figure 1: Boat access to a Sebangau Forest stream © S. Moore

On-going research by this group on forests in Central Kalimantan, Borneo, shows that current estimates of carbon loss from drained and deforested peatlands neglect fluvial carbon fluxes as a major loss pathway for carbon (Moore *et al.,* 2011). This additional carbon loss from the peat store is exacerbated following fire. In this project we aim to identify the ultimate fate of this fluvial carbon and quantify gaseous losses of the greenhouse gases carbon dioxide and methane.

This will be achieved through:

1. **Measurement of carbon dioxide and methane evasion** and exports in streams/canals in the intact Sebangau forest and in degraded sites in Borneo (Fig. 1).
2. **Trace gas exchange measurements** using chamber methods.
3. **Detailed measurements of stream hydrology** to help quantify CO_2 and CH_4 loss rates from defined catchments.
4. **Analysis of fluvial carbon** quality to include radiocarbon ages of dissolved CO_2.

The project will provide the student with a wide range of biogeochemical, hydrological and GIS skills in a tropical ecosystem setting. The student will be based, for up-to 3 months on each visit, with partners at the University of Palangka Raya, Indonesia where they will have access to field labs, technical and field support as well as vehicles for site access (boats, speed-boats, cars and motorbikes). Due to the challenges of working in Kalimantan peat-swamp forests, a good level of fitness and self-motivation is required.

The Department has a thriving postgraduate community and the postgraduate training programme provides a full range of courses covering: research techniques, scientific methods, information technology, communication and interpersonal skills, which are tailored to the needs of each student.

If you would like to apply or have any queries about this project please contact the first named supervisor either by email v.gauci@open.ac.uk or by writing to the address above enclosing a brief letter of motivation, a full academic CV and the names and addresses of three academic referees.

References: Moore, S., *et al.*.(2011), *Biogeosciences*, 8, 901-909, doi:10.5194/bg-8-901-2011
Page, S. E., *et al.,* (2002) *Nature*, 420, 61–65

All information at:
http://www8.open.ac.uk/science/environment-earth-ecosystems/studentships-vacancies/studentships