

JAMES RENNIE BEQUEST

REPORT ON CONFERENCE

Expedition/Project/Conference Title: European Geosciences Union, General Assembly 2006

Travel Dates: 02 – 07 April 2006

Location: ACV (Austria Center) Vienna, Vienna, Austria

Group Member(s): Luke Spadavecchia

Aims: To present the current state of my research to the broader community, and improve my understanding of interactions between meteorological phenomena and the carbon cycle. Also to use the conference as a platform to meet peers involved in similar research activities.

OUTCOME (not less than 300 words):-

Using the funds made available by James Rennie Bequest I was able to attend the European Geosciences Union (EGU), General Assembly 2006, in Vienna. The EGU is an international gathering of scientists from a wide variety of backgrounds, working in the field of Earth science. Some 10,000 contributions are submitted in the form of papers, poster presentations and workshops. The multidisciplinary nature of ecological research is reflected in the wide variety of sessions covering diverse topics such as; Hydrological Sciences, Atmospheric Sciences and Biogeosciences. I presented a poster, based on some of my PhD work, as part of the GIS in meteorology session. This was my first visit to an international conference, and I felt that I gained a lot from the experience.

My PhD work involves the quantification of the stocks and fluxes of carbon in semi-natural forests. Our best estimates of forest carbon budgets are based on micrometeorological measurements from eddy flux systems. Whilst these instruments provide detailed data over 0.1-1km scales, they suffer from a number of limitations based on their operational requirements; measurements can only be made on relatively flat homogenous terrain, precluding measurement of many areas of ecological interest. In order to overcome the limitations of such techniques, ecosystem modelling becomes an important tool in up-scaling observations to the regional scale. Whilst we have excellent models to quantify carbon budgets for data rich areas such as flux towers, parameterisation and data sources to drive models at the regional scale remain problematic. My work focuses on the use of remote sensing to upscale ground based data sources to drive models on the regional scale. Critically, my work focuses on the quantification and propagation of errors through models as we move away from data sources.

The work I chose to present involved the estimation of meteorological surfaces to drive carbon flux models via the use of space-time geo-statistics. Such techniques are relatively well known in modelling of atmospheric pollution in the urban setting, but have rarely been applied in the area of flux modelling. Simpler techniques have been favoured traditionally; however, the use of more complex representations allows the quantification of uncertainty in a spatially and temporally explicit manner.

My poster presentation was well received, and I had the opportunity to discuss techniques with scientists from a wide variety of backgrounds. My time in Vienna was very enjoyable and rewarding. I met many young people involved in similar areas of research to myself, and made contacts which will push forward my research and improve the value of products produced. Of particular interest were the results of the Carbo Europe flux network, a pan European project producing coherent data sets suitable for comparative studies and model parameterisation. I also attended a presentation of particular relevance to my own research, on the

use of Gaussian simulation techniques to produce spatio-temporal representations of precipitation events, based on a network of sampling stations. Simulation techniques are of particular importance because they provide a method of quantifying uncertainty through Monte Carlo techniques; i.e. multiple equi-probable realisations of meteorology based on what we know from the station network. In producing a set of realisations to feed to a model, we explicitly acknowledge our uncertainty, and can thus understand the limits to which we can understand the carbon cycle on moderate to large scales.