Institute *of* **Physics**

LONDON AND SOUTH EASTERN BRANCH REMS SECTION

The Environmental Systems Science Centre Reading University Thursday 23 September 2004

This visit has been organised by David Pick

The Environmental Systems Science Centre (ESSC), at the University of Reading, is the NERC group responsible for research into new ways of handling spatial data, particularly remotely sensed data within computer models, in the environmental sciences. Originally established at Reading in 1985 as the NERC Unit for Thematic Information Systems (NUTIS), the research was divided initially into the use of remotely sensed data, the development of geographical information systems, and digital cartography. The need to use numerical models for complex problems such as in climate or hazard modelling broke down the traditional division by calling on skills from all these areas.

The Director is Professor Robert Gurney, OBE, who is an hydrologist. He was appointed in 1990 by the University as Professor of Physical Geography and Director of NUTIS.

ESSC is currently made up of four research groups:

Atmospheric Science: Many of the physical processes that are believed to force climate change, or to provide feedbacks in response to the forcing, involve the atmosphere. Of particular importance is the hydrological cycle, which includes the evaporation of water from the surface, its transport as vapour, its condensation to form clouds and the ultimate return of the water to the surface through precipitation. Aerosols provide both a direct radiative forcing in clear-skies and an indirect forcing by influencing cloud properties. These and other processes must be included in climate prediction models. The aim of our work is to find new ways of testing the representation of these processes in the models, using new analysis techniques and remote sensing data.

Terrestrial Science: Many land processes are poorly understood at large scales, yet better understanding is required for climate prediction and land use management. Remote sensing is potentially very useful to aid in understanding scaling-up from local areas, where much work is already carried out, but much of the work has not been carried out at the scale of the processes being modelled, and so limited use has been made of techniques such as assimilation.

Marine Science: The Marine Informatics group is lead by BMT Prof. Keith Haines and is primarily involved in ocean modelling and data assimilation systems development. Assimilation of data from ships and moored buoys such as the TAO array, as well as from satellites, into the best ocean models, is the key to ocean forecasting systems, as well as for seasonal forecasting using coupled ocean-atmosphere models. New algorithms for the use of satellite altimeter data and temperature profile data have been developed, always aiming at combining data streams in a physically sensible way.

Solid Earth Science: The surface of the solid Earth is far from static. In the case of phenomena such as volcanoes and earthquakes the dynamism is of large magnitude and complex behaviour and can have significant hazardous impact locally, regionally and globally. Our work in this area is directed to developing new methods of measuring this dynamism and incorporating these measurements into models that can be used to mitigate the resultant hazards. *Volcanoes and the risks they pose are the focus for our work*. But the techniques used have wider applicability: to earthquakes, landslides and subsidence.

EESC is located at White Knight's Park Reading. Maps and Travel directions will be provided. Numbers are limited to 20.

The programme for the visit is:

10.40 – 11.00	Arrive at ESSC
11.00 – 16.00	Presentations and interactive demonstrations on the work at ESSC. A buffet Lunch is included.