WEDNESDAY 20 NOVEMBER 2002: AFRICAN METEOROLOGY

Dr R Washington richard.washington@geography.oxford.ac.uk: Predictability of southern African rainfall: modelling and observations

Southern Africa experiences rainfall variability on a rich mix of time scales. This reflects the competing influences of sea surface temperature variability in a variety of ocean basins. In this paper both observational and modelling work aimed at clarifying the competing roles of Indian and Pacific Ocean SSTs is discussed. The strongest non - ENSO teleconnections are in the Indian Ocean and take the form of SST warm and cold pools and associated pressure systems in the central and southern regions of the basin. The second stage of research has centred on running a series of idealised experiments using the atmosphere-only (HadAM3) component of the UKMO Unified Model. These experiments have included Indian Ocean only, Pacific Ocean only and combined forcings. Results reinforce the importance of the Indian Ocean SST patterns in affecting southern African rainfall variability and indicate that the atmosphere dynamics are sensitive to the location of the SST warm and cold pools. All of this work helps to quantify the predictability of southern African rainfall.

Dr A Diongue aida@env.leeds.ac.uk: The impact of satellite and ground based observations on numerical weather prediction for Africa

The JET2000 experiment took place in West Africa during the last week of August 2000. It provided unprecedented high-resolution observations of the African easterly jet (AEJ) and the boundary layer across the West African monsoon region. The ability of NWP models to analyse and forecast the features of this region is investigated using the ECMWF and Met Office models. The model analyses appear to represent the AEJ well but the 5-day forecast exhibits structures significantly different to the observations and climatology, due to a cold and moist bias in the boundary layer. The misrepresentation of the AEJ and the boundary layer temperature and humidity bias in the 5-day forecasts appear systematic. The significance of different data sources in generating a good analysis from a poor forecast is also explored by denying in turn during five days the satellite data, the upper-air and Synop network observations from the ECMWF assimilation system.

Dr D I F Grimes d.i.f.grimes@reading.ac.uk: Satellite-based rainfall monitoring for disaster management in Africa

Operational monitoring of rainfall is of enormous potential benefit for many countries in Africa, both for early warning of crop failure and famine at one extreme and timely forecasting of floods at the other. Yet throughout Africa, raingauge networks are becoming less viable and are usually not able to give useful information at an appropriate time scale. Neither is radar a feasible proposition for most countries. In principal, monitoring of rainfall by satellite is a very attractive alternative. Satellite methodologies giving cheap and reasonably reliable rainfall information have been available for more

than 10 years but the take up by governments and NGO's has been disappointing. The main reasons seem to be poor technical support and training and poor communication with end users. This talk addresses these issues in the context of a World Food Programme funded project for Famine Vulnerability Assessment in the Sudan.

Dr M Diop mariane@env.leeds.ac.uk: Forecasting convective systems in west Africa: the experience of JET2000

Forecasting of cumulonimbus convection is a difficult exercise in most parts of the world, but it is in the tropics, where convection dominates the rainfall and can be particularly intense, that convective forecasting is of primary importance. Despite this, the process of convective forecasting remains tricky, with forecasters being required to manipulate a range of model, theoretical and empirical products to make decisions concerning particular convective systems. An overview of the west African meteorology is presented, focussing on the key features such as the ITD, AEWs, the monsoon depth that determine (influence) the forecast. Examples forecast during the JET2000 experiment are given for illustrations.

Dr C M Taylor cmt@ceh.ac.uk: Land surface feedbacks on rainfall in semi-arid Africa

Land surface properties such as soil moisture and vegetation biomass can exert a strong influence on deep convection. The African Sahel provides favourable conditions for such land-atmosphere interactions. Surface fluxes of heat and moisture are very sensitive to antecedent rainfall, whilst storms exhibit a high degree of spatial and temporal variability. As a consequence, the planetary boundary layer retains a "memory" of recent rain events. Observational and modelling evidence is presented to illustrate how this memory influences subsequent convection.

Dr A P Morse A.P.Morse@liverpool.ac.uk: Climate and tropical disease: Working towards forecasting epidemics

Epidemics of infectious diseases are a major burden in the developing world. Malaria and meningitis have a major impact on society and its economic development particularly in sub-Saharan Africa. Malaria kills 2.7 million people a year, mostly children, with over 90% of this total in Africa. Meningitis is associated with the Sahel region of Africa where every 5-10 years they are subject to large epidemics. Both diseases have a strong seasonal cycle and are often associated with climatically anomalous years. The ability to make a skilful seasonal forecast together with timely and disseminated meteorological observations could enable the areas at risk of epidemics to be identified months in advance. This talk looks at work in progress on the use of a statistical model for the prediction of meningitis and a dynamic biological model for malaria both of which can ultimately use seasonal probabilistic meteorological forecasts.