

WEDNESDAY 20 OCTOBER 2004: NEW DEVELOPMENTS IN OBSERVING SYSTEMS

Mike Molyneux Met Office **Recent developments in synoptic measurements**

Automatic weather stations (AWS) are run operationally around the country. This imposes constraints that come from the practicalities of standardisation and the cost of sending staff to remote sites to fix failures. However, in the last few years major effort has been made to automate the "subjective elements" - present weather, visibility and cloud cover. I will present discussions on these topics since it is unlikely that many people will be aware of exactly how all these measurements are made. At the moment a project is running that considers the need for a "next generation" system which is likely to alter the concept of a self contained AWS

[Tim Hewison](#), The Met Office **Temperature and humidity profiling from ground-based microwave radiometers**

Ground-based microwave radiometers are capable of retrieving profiles of temperature and humidity in the lower troposphere at a high temporal resolution. These can be used to supplement less frequent operational radiosonde profiles. This presentation will explain the principles of operation and the ill-posed nature of the retrieval problem. This requires additional background information, which can be provided from a statistical climatology or Numerical Weather Prediction model field. Possible methods of enhancing the retrievals' poor vertical resolution by integrating observations from active instruments will also be discussed.

[Prof Anthony Illingworth](#), University of Reading, **New radar techniques for observing clouds and precipitation at the Chilbolton Observatory**

Over the past decade new radars for clouds, precipitation and clear air winds have been developed at Chilbolton. Cloud radars at mm wavelengths (96 and/or 35Ghz) have been operated at vertical incidence virtually continuously for several years providing a unique data set of the vertical profiles of cloud characteristics with 30 second and 60m resolution. A 10cm (3GHz) precipitation radar with polarisation and Doppler capability is mounted on the large 25m dish with its unrivalled spatial resolution and provides a test bed to develop algorithms for the new radars for the national radar rainfall network. First results from convection observed in the July 2004 CSIP campaign with the new 23cm (1275MHz) radar which detects winds in the clear air will also be presented. [Website](#)

[Dr Alan Blyth](#) University of Leeds **The UK's Universities' facility for atmospheric measurement – a world class observing facility**

The NCAS Universities' Facility for Atmospheric Measurement (UFAM) provides ground-based and airborne instruments, and expertise for their development and utilisation, allowing the UK academic research community to make innovative measurements of physical and chemical properties of the atmosphere. The instruments

within UFAM include, for example: an ozone and aerosol lidar; both ground-based and airborne Aerosol Mass Spectrometers and Fluorescence Assay by Gas Expansion (FAGE) instruments which respectively measure the composition and size of aerosols and OH by laser-induced fluorescence; and a Cloud Particle Imager that produce images of small 10 um-sized particles while penetrating clouds at 100 m/s. Some of the UFAM instruments will be described in this talk. <http://ufam.nerc.ac.uk>

[Dr John Foot](#) Met Office (Acting Head FAAM) **The facility for airborne atmospheric measurements BAe146-301**

The Facility for Airborne Atmospheric Measurements (FAAM) BAe146-301 is jointly run by the Met Office and the NERC Centres for Atmospheric Science. The BAe146-301 aircraft was extensively modified for atmospheric research by BAe Systems and is operated by Directflight. FAAM is based a Cranfield in Bedfordshire. The range of measurements that can be made will be presented along with details of the first scientific campaigns achieved in 2004.

<http://www.faam.ac.uk>

[Prof Alan Thorpe](#) NERC Centres for Atmospheric Science **Observation targeting to improve weather forecast skill**

It was first suggested in 1994 that information from the forecast model itself could be used to predict in real time the location of sensitive regions from which analysis errors might grow rapidly leading to a forecast error. This led to the idea of using such sensitivity information to determine where, when and how best to observe the atmosphere to produce the most skillful forecast. Such "targeting" of observations has now been attempted in research campaigns on several occasions and in this talk we will review both the targeting methodologies but also the results from these campaigns. Targeting can be devised to maximize the benefit of observations for different attributes of the forecast - reducing forecast error of a "deterministic" forecast or reducing the spread of an ensemble forecast. These methods can lead to different sensitive region locations. Such research is now incorporated within a WMO programme "THORPEX: a Global Atmospheric Research Programme". In October to December 2003 a campaign took place in the north Atlantic sector and the ongoing research connected to this campaign will be described. More generally, targeting leads us to the concept of a fully interactive forecast system which is responsive to the needs of the user and thereby specific to that user. This in turn leads us to the idea of a global grand ensemble of the world's forecast systems focused on and specially designed to predict the most severe weather hazard of the day wherever it may occur.