Met EXCHANGES

University of Reading

NERC funded science relevant to the Financial Services
Autumn 2010

NATURAL ENVIRONMENT RESEARCH COUNCIL

Welcome

Welcome to the first edition of our newsletter – focussed on the latest research going on in the School of Mathematical and Physical Sciences at the University of Reading relevant to the financial services sector.

The school is home to the internationally renowned departments of Meteorology, Mathematics and Statistics, and hosts major parts of two NERC collaborative centres: the National Centre for Earth Observation and National Centre for Atmospheric Science.

In my role as a Natural Environment Research Council (NERC) Knowledge Exchange Fellow my focus is to link the financial services sector to the cutting edge research that is being carried out within the University of Reading.

My hope is that this quarterly newsletter will help to keep you up-to-date on our latest research that may be beneficial to your business.

Sarah

IN THIS ISSUE

The impact of snow on the monsoon

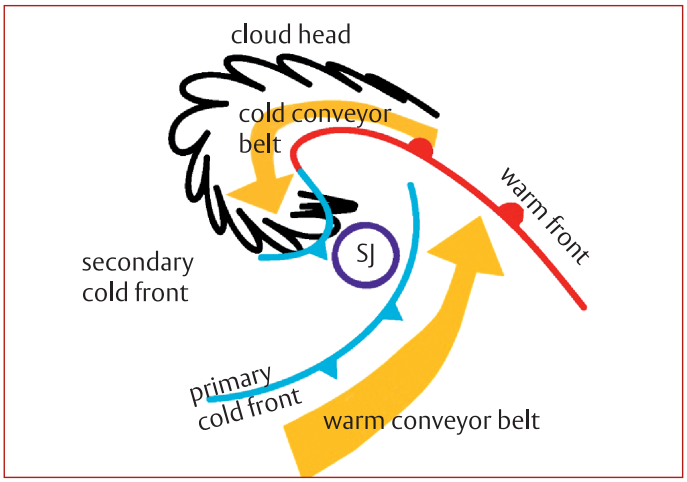
Although the dominant forcing mechanism of the Indian monsoon is sea surface temperatures in the Pacific and Indian Oceans, snow anomalies may also provide a useful indicator of the onset of the monsoon. Anomalous heavy snow during winter or spring has long been regarded as a possible precursor of deficient Indian monsoon rainfall during the subsequent summer.

However previous work in this field is inconclusive, in terms of the mechanism that causes snow anomalies to impact the summer monsoon and the region from which snow has the most impact.

Andy Turner's research using idealised experiments with a climate model has found that snow cover in the Himalaya region has a key role in weakening the monsoon in early summer. The monsoon onset was shown to be delayed by a couple of weeks, which could have significant impacts for agriculture. This work also highlights the need for reliable and widespread observations of Himalayan snow cover/depth for use by forecasters.

Sting jets

Sting jets are highly localised low-level jets that can become a source of damaging surface winds during the passage of certain extratropical cyclones.



Despite the growing interest in the subject within the meteorological community in recent years, there are still very few published studies on the subject. Recent work by Sue Gray and her group in Reading has been improving our understanding of the processes that contribute to the development of sting jets.

In a recent study Oscar Martinez-Alvarado and Sue Gray showed that cyclone Anna, which passed over the United Kingdom during the early hours of 26 February 2002, featured at least one sting jet. The simulations, performed with two forecast models with high vertical resolution (in comparison with operational versions), showed that the models were capable of reproducing sting jets with similar, though not identical, characteristics. The differences between the forecast models were shown to affect the evolution of modelled sting jets.

FIND OUT MORE

To learn more about the latest news stories in more detail and to download the papers visit:

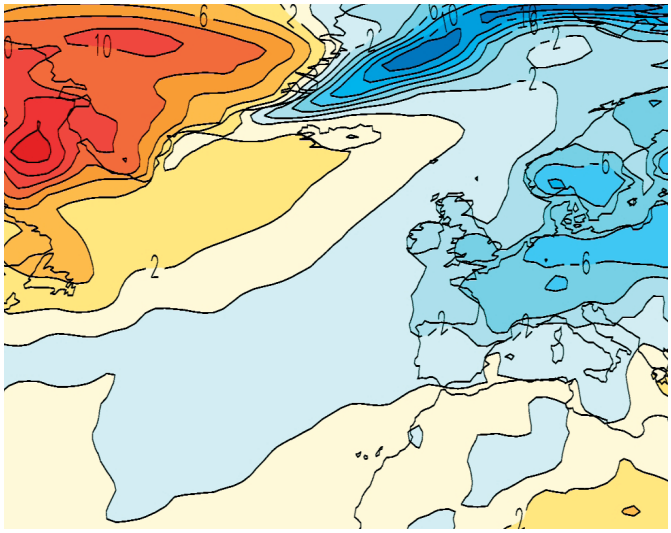
www.met.reading.ac.uk/ke

If you have any more questions or would like to discuss any of the articles in this edition please contact:

s.p.e.keeley@reading.ac.uk

Can we predict European climate change on local scales?

Understanding future changes in climate at spatial scales as small as a few kilometres would be ideal for understanding future risk in a particular area. But is our understanding and modelling of the climate system advanced enough to offer such predictions?



By understanding the dynamical processes that control European climate Tim Woollings has been considering how each process leads to uncertainty in the future climate. Tim's work shows that European climate poses a unique challenge for climate prediction. On relatively small scales there is still a large spread in climate model predictions of future European climate, which is strongly affected by several processes which are known to be not well represented in the current models.

Cold winters and solar activity

Motivated by recent relatively cold winters in the UK, Mike Lockwood and others have investigated the possible connection with solar activity. Their research shows that cold winter excursions from the hemispheric trend occur more commonly in the UK during low solar activity.

The Maunder minimum (c. 1650-1700) was a prolonged episode of low solar activity which coincided with more severe winters in the United Kingdom and continental Europe. Solar activity during the current sunspot minimum has fallen to levels unknown since the start of the 20th century.

Cold UK winters are often linked to persistent winds from the north and east. Analysis of satellite data has shown that the solar effect is consistent with solar UV variations modulating the occurrence of atmospheric blocking events in the eastern Atlantic via their effects on the stratosphere. This is a regional and seasonal effect relating to European winters and not a global effect. Average solar activity has declined since 1985 and cosmogenic isotopes suggest an 8% chance of a return to Maunder minimum conditions within the next 50 years: this suggests that, despite hemispheric warming, the UK and Europe could experience more cold winters than during recent decades.

Rainfall data – filling in the gaps

We often need data where there is none available and there are various methods to fill in the gaps. For rain gauge data it has been shown that geostatistical analysis performs better than other available interpolation techniques.

Geostatistical analysis also has the important property that it can be used to quantify the likelihood of the interpolated values. The TAMSAT research group in Reading has been using geostatistical techniques to generate ensembles of daily rainfall fields consistent with a given seasonal forecast or a given set of satellite observations within sub-Saharan Africa. These ensembles can then be used as input to downstream models to give a probabilistic forecast of agricultural crop yield or hydrological parameters such as riverflow.

Met Exchanges

The newsletter linking Reading science and the financial services

For more information, please contact:

Dr Sarah Keeley
School of Mathematical and Physical Sciences
University of Reading
Earley Gate
Reading
RG6 6BB

Tel 0118 378 6013

s.p.e.keeley@reading.ac.uk

www.met.reading.ac.uk/ke