



NURTURING NATURE
Increasing biodiversity

ECOLOGICAL DUTY
Reducing our impact

SOUND SOURCING
A sustainable supply

Barometer

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At the Met Office, we recognise the value of Corporate Responsibility. **Rob Varley**, Met Office Operations and Services Director describes how we're doing the right thing.

It's a mindset

In the past, Corporate Responsibility has often been seen as an afterthought — a peripheral interest aside from the main focus of organisational strategy and delivery. Now, however, people are increasingly taking it seriously as businesses discover the value of making Corporate Responsibility a priority. As the lead Met Office Director for Corporate Responsibility, it's my role to ensure that this thinking is embedded in everything we do.

When organisations act responsibly it's good for business. It's good for our brand and reputation, it's good for staff recruitment and retention, and often it's a plus point when working in collaboration or bidding for business. To maintain our sustainable procurement policy we look to our suppliers to have a good record, while from a health and safety perspective our dedication to corporate responsibility helps to make sure people are safe and looked after in the office and out in the field.

There are four main strands of our Corporate Responsibility strategy and this issue of *Barometer* touches on all of them. Firstly, we aim to reduce our environmental impact by acting responsibly and ensuring impacts are identified and managed effectively. Take a look at the lifecycle of *Barometer* — from growing the tree, through to printing on, and recycling, its paper (pages 9 & 10).

Next, we strive to have a positive impact on society and on the communities in which we work: whether locally, nationally or internationally we aim to help improve people's lives and livelihoods. An example of this is our work as part of the World Meteorological Organization's Voluntary Cooperation Programme (page 4). Our new corporate charity is ShelterBox which — as an international disaster relief charity that delivers emergency shelter, warmth and dignity to people affected by disasters worldwide — has a good fit with our brand values and ethos (pages 13 & 14).

The third strand of our corporate responsibility strategy is to provide a positive workplace, therefore we invest in staff and support them in realising their full potential (page 6). The final strand is building positive business relationships — operating ethically and with integrity in business and everything we do. This includes our sustainable procurement policy and recycling activities (pages 9 & 10).

One of our key responsibilities as the Government's climate science agency is to raise awareness of the impacts of climate change. A recent Ipsos MORI survey, commissioned by the Met Office and Environment Agency, revealed key trends in the British public's attitude to climate change. According to the results, people want to know more about climate change and want to see more done about it by Government and business. Overall, the survey shows most people appreciate that climate change is already being seen in many parts of the world, but we have more to do to raise awareness of its likely impacts

here in the UK so that the country can prepare for the changes expected in the coming decades.

All over the world, people are beginning to realise the benefits of socially responsible behaviour and the relationships between business, society and the environment. One success story is the enhanced biodiversity of the Met Office headquarters in Exeter (page 15). The rewards of Corporate Responsibility do not have to come at a huge extra cost — it's a mindset. In fact, responsible behaviour can help to save money; saving energy reduces overheads, recycling reduces waste disposal costs. And improving staff retention helps us keep the expert staff we need to remain world-class. As this issue of *Barometer* reveals, working to have a positive impact is good for everyone, and at the Met Office we treat our responsibility very seriously.

➤ For more information on our values and principles see www.metoffice.gov.uk/corporate/csr.html

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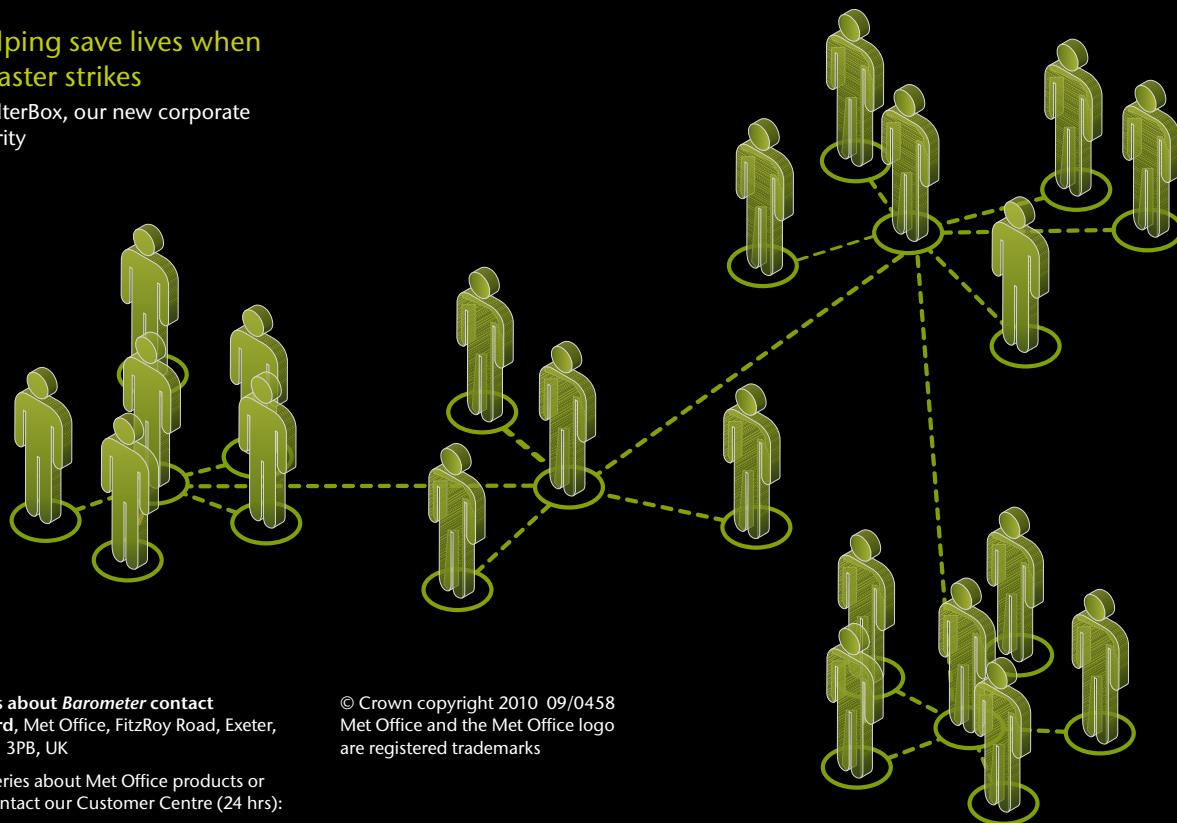
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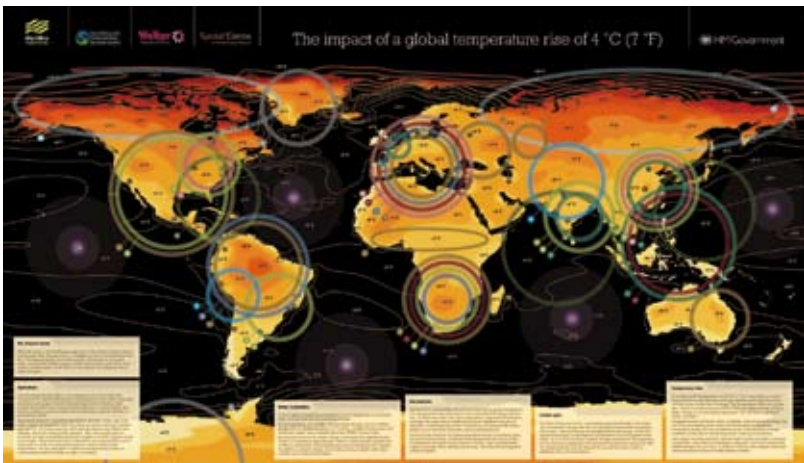
The winter blues

Winter is a difficult time for people with Seasonal Affective Disorder (SAD) but help is at hand from the Met Office.

SAD is a type of depression, caused by low levels of natural light. Research has shown that Light Therapy and Cognitive Behavioural Therapy can help people suffering with SAD.

This winter, people in Cornwall and East Berkshire were invited to sign-up for a pilot scheme, called Brighter Outlook™. During winter when there is a lack of sunlight, an automated weather alert will remind people with SAD to use a light box and practise some self-help strategies to manage their symptoms of winter depression.

Dr Tish Laing-Morton, Met Office Clinical Director, said: “Our knowledge of the link between the weather and our health is becoming deeper and this initiative is one more example of how we can help people to manage their condition and remain well. We hope this pilot brings real benefits and provides the platform to extend schemes to even more people.”



Last December, the world looked on as the climate debate heated up when world leaders met in Copenhagen for the United Nation’s 15th annual Conference of the Parties (COP15).

The conference was attended by Met Office experts who provided the scientific facts of a warmer world and the challenges it presents to humankind. Our science was well represented across the event in a series of information sheets and side events, as well as in the media.

In particular, new figures released by the Met Office and the World Meteorological Organization highlighted the continued global warming due to increasing emissions of greenhouse gases into the atmosphere. On behalf of Government, we created maps and animations (see above) showing the contrast between the impacts of 2 °C and 4 °C of warming caused by emissions and the importance of limiting global average-temperature rises to no more than 2 °C above the pre-industrial climate average.

There was significant interest in our regional climate modelling tool, PRECIS (Providing Regional Climates

for Impacts Studies) which helps people understand how the climate may change in their country or region. We also took the opportunity to launch our new programme on avoiding dangerous climate change (AVOID) that we lead on for the Department of Energy and Climate Change (DECC) and the Department for Environment, Food and Rural Affairs (Defra). AVOID puts the latest scientific knowledge about dangerous climate change into the hands of policymakers and was used by DECC to inform its negotiating position at the conference.

The Met Office will continue to provide the best science to inform national and international decisions on reducing emissions. Clearly, there is also more work to be done in helping the public understand and adapt to the inevitable changes in climate, while taking action to avoid even worse effects.

For online versions of our climate change information sheets see www.metoffice.gov.uk/climatechange/policymakers/policy/copenhagen.html or if you prefer a hard copy email enquiries@metoffice.gov.uk

Europe’s changing climate

New research and climate projections for Europe were revealed in November at the ‘ENSEMBLES – A changing climate in Europe’ symposium at the Met Office, Exeter.

The ENSEMBLES project is a five-year research programme involving 66 institutes across Europe and the rest of the world, led by the Met Office Hadley Centre and funded by the European Commission. The project has just released its final results about climate change and its impacts.

This cutting edge research shows that CO₂ emissions must be reduced to almost zero by the end of this century if a rise in the mean global temperature beyond 2 °C is to be avoided. A temperature rise of no more than 2 °C is widely acknowledged as the ‘safe’ level to avoid dangerous climate change.

The research programme developed the first probabilistic climate projections of temperature and rainfall changes for Europe over this century. Part of the work includes an assessment of the impact of climate change on a range of sectors including agriculture, health, energy, water resources and insurance.

ENSEMBLES research also provides a clearer picture of the physical, chemical, biological and human-related feedbacks in the climate system and how to represent them in models, which has increased certainty in climate predictions.



All around the world



In our efforts to make a positive impact on society and in the communities in which we work, we're active both at home and abroad.

Global community

As part of a global community, our involvement in the Voluntary Cooperation Programme (VCP) — managed by the World Meteorological Organization (WMO) — helps to promote sustainable development and protect lives across the world. Providing services and equipment, we work with national meteorological services in developing countries to expand their skills in providing weather and climate information and, in worst-case scenarios, prepare for and respond to natural disasters. We also support training in different areas including forecasting, applying statistics and managing people.

Together with the WMO and partners across the world, we work through the VCP to improve communication, particularly when severe weather is on its way. As part of this, we have provided more than 40 developing countries with media systems

that help national weather services to prepare their own television broadcasts and forecasts for newspapers and websites.

Climate observations are key to helping people everywhere understand the effects of global climate change and, in turn, address issues such as food security and sustainability. Through the VCP, we work alongside observation stations in places such as the Seychelles and the South Pacific to monitor the day-to-day weather, while helping them to develop databases to store their climate observations. We assist in emergencies whenever we're needed, helping to rapidly restore the critical services of national weather services whose countries have been afflicted by natural disasters or conflict.

Changing risks

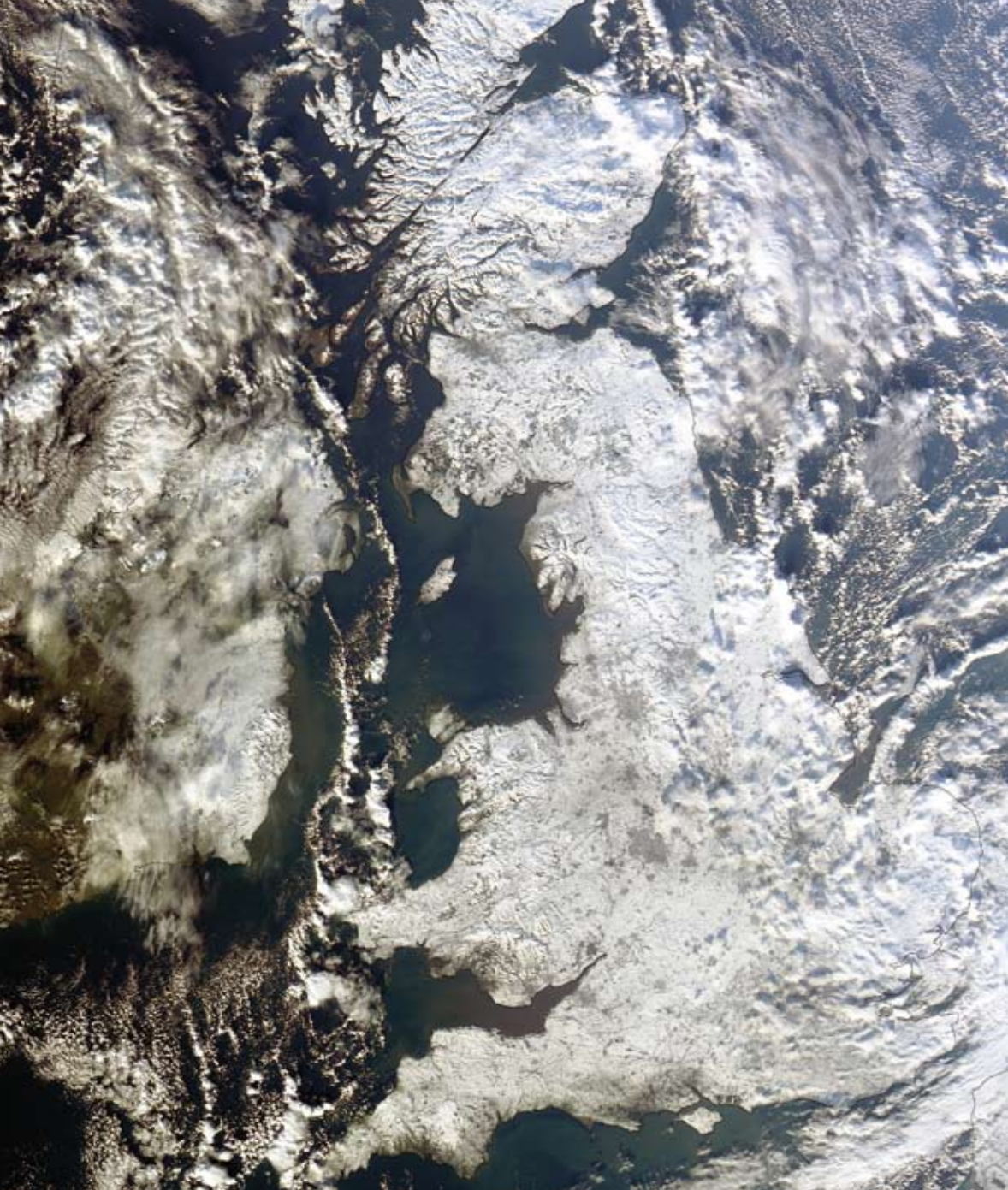
We help people recognise that the frequency and risks of severe weather are on the rise as our climate changes. Our long-range seasonal to decadal forecasts can be useful, for example, to developing nations where food security may be an issue due to changes in rainfall patterns. Turning our climate projections into risk analyses is relevant because traditional weather patterns are no longer a reliable guide.

The Met Office Hadley Centre makes its PRECIS (Providing Regional Climates for Impacts Studies)

model available to national weather services and related research institutions to build climate change scenarios, drawing in local expertise. It is provided free for research after relevant training and is being used in projects across the world, including Africa, Asia and South America.

Working together

We also share our knowledge in numerical weather prediction and climate modelling, based on the technology of our world-renowned Unified Model™. For example, high-resolution Limited Area Models (LAMs), such as the Africa LAM, have been built and introduced through the VCP and, combined with training, make it possible to give much earlier essential forecasts and warnings of severe weather. Working with others as part of a global community, in partnership and collaboration, forms a crucial part of our corporate responsibility. Supporting national weather services in developing countries means that, together, we can enhance the quality of life, promote sustainable development and, ultimately, protect lives. This not only motivates them and benefits their daily lives and livelihoods, but also rewards us with the knowledge that we're passing on essential skills that help people to understand the weather and climate.



Snow blanketed most of the UK when a NASA satellite captured this image on 7 January 2010.

Snowed under

This winter we experienced some of the most severe weather we've had in decades as snow and ice swept across the country. Our forecasts and warnings helped the emergency services, our customers and the public to manage the difficult circumstances.

As we declared a white Christmas in 2009, some of us wondered whether it was all just a dream. But as cold weather, snow and ice continued into the New Year, the reality became all too clear. While some of us like the idea of snow, the reality is often brutal with conditions causing chaos on the roads, forcing flights to be cancelled and many schools to be closed.

From mid-December, cold air from Eastern Europe started a cold spell in the UK with widespread frost, ice and snow affecting many areas with the first significant snowfall on the night of 17 December. Parts of south-east England, Yorkshire and north-east England were badly affected, with deep snow in East Anglia.

By 19 December, cold air had spread across most of the UK with snow and ice causing travel disruption in the run-up to Christmas. Low temperatures continued into the New Year as winds from the north and north east brought freezing temperatures to the UK.

In most winters our winds come from the south-west, with air travelling over the relatively warm Atlantic causing mild conditions in the UK. However, during the cold spell, Atlantic air was 'blocked' and cold air flowed down from the Arctic or the cold winter landmass of Europe. Low temperatures in the UK were accompanied by snow because areas of low pressure were running in from the north-east, tracking across the North Sea picking up moisture, which falls as snow.

However, it was not as cold everywhere. North-east America, Canada, North Africa, the Mediterranean, and south-west Asia all had temperatures above normal — in many places by more than 5 °C, and in parts of northern Canada, by more than 10 °C.

In December, the mean UK temperature was 2.1 °C, the coldest for 14 years and colder than the long-term average of 4.2 °C. However, December was one of only two months in 2009 which had a below-average mean temperature. In the UK, 2009 as a whole was the 14th-warmest on record (since 1914). This above-average temperature trend was reflected globally, with 2009 being the fifth-warmest year on the global record (since 1850).

We had around 100 million hits on our website during the cold spell, with 15 million hits during the snow on 5/6 January. Our forecasters were tested on a daily basis, accurately predicting the wintry weather before it arrived. Most snowfalls were well forecast but there were localised forecasts that proved difficult given the combination of rain, sleet, snow, freezing rain, and extensive icy roads. Despite tough conditions, the accuracy of our forecasts was widely acknowledged by our customers.

Dealing with the deluge

During the UK's wettest November on record, heavy rain and gales battered north-west Britain from 18–20 November 2009. Extensive flooding was made easier to deal with because of Met Office warnings of extreme weather issued well in advance of the event, together with the united approach of all the different government agencies involved.



Aerial photo of flooding in Cockermouth.

The extreme weather was caused by an Atlantic weather front becoming almost stationary across Northern Ireland, Cumbria and south-west Scotland. South-westerly winds associated with the front drew warm, moist air northwards from the Azores region. The mountainous terrain of Cumbria and southwest Scotland intensified the rain.

The most widespread impacts of the serious flooding were in Cumbria with over 1,300 homes affected, and many more left without power and water. Several bridges collapsed and others were closed. There was severe travel disruption on both roads and railways. The worst affected town was Cockermouth where water levels reached 2.5 m. Tragically, a police officer died after a bridge collapsed in Workington.

Seathwaite in Cumbria endured 314.4 mm of rain in 24-hours — a new UK record for the wettest November day in a single location

Parts of Scotland were badly hit with some property flooding and travel disruption in Dumfries and Galloway and the Borders. There was also some flooding in parts of north Wales, causing travel disruption.

People from across the Met Office were closely involved with different agencies throughout the period of severe weather. The way that different agencies worked together received widespread praise, particularly the work on the ground from the emergency services. The unified approach of our Operations Centre forecasters, Public Weather Service Advisors, the Environment Agency and the Flood Forecasting Centre (FFC) also received accolades.

The Pitt Review, which followed the devastating floods of summer 2007, identified a need for Met Office meteorologists to work side by side with hydrologists from the Environment Agency. The FFC brings the two organisations together into one integrated team and was extremely successful in forecasting the rain and flooding in 2009.

Rainfall estimates provided by Met Office Chief Forecasters and interpretations of impact provided by the FFC — when, where, and to what extent flooding would occur — were of the highest standard. Moreover, the FFC's joined-up approach was a

particular achievement. Similarly, our offices in Scotland were kept busy, working closely with the Scottish Environment Protection Agency.

Our Public Weather Service Advisors were in close contact with emergency responders during and after the heavy rain, helping them to put procedures into place to prepare for and respond to the floods. We also kept the Cabinet Office and senior government officials briefed. The Cabinet Office specifically praised and thanked our Operations Centre forecasters, Public Weather Service Advisors, as well as Met Office and Environment Agency staff at the FFC.

Almost everywhere had well above average rainfall, with many places having over twice the normal amount. The wettest areas were Cumbria, Northumberland, the Scottish Borders and parts of Northern Ireland, mid-Wales and southern England. The exception was the far north of Scotland, where rainfall was slightly below normal. November mean temperatures were well above the 1971–2000 norm,



Aerial photo taken near Keswick.

typically by between 1.5 and 2.5 °C over England and Wales and between 0.5 and 1.5 °C over Scotland and Northern Ireland. It was the warmest November in the UK since 2003, ranking seventh in a series starting in 1914.

Looking back on what was the wettest November in the UK in a series from 1914 there are bound to be lessons to be learned, but individual endeavour, strong teamwork and FFC procedures worked well. There are positive signs for the future, with potential for further integrating the science, technology, people and the resulting services of the FFC. Although the floods have now passed, the recovery will take a long time, and our thoughts and sympathy are with all those that have been affected.



Investing in people, inspiring careers



As anyone who loves their job will tell you — it's the company you keep that's important. For **Kay Eldergill**, psychology graduate and former HM Customs and Excise employee, joining the Met Office as a Human Resources Advisor in 2001 suited her down to the ground.



Kay is head of HR and, therefore, oversees all HR operations. This could involve allocating resources, career development, providing frontline advice and recruitment. As Kay says: “In terms of what’s done here, weather forecasting is just the tip of the iceberg.”

Promoting science

While the prospect of being surrounded by a mix of bright, committed scientists attracts many applicants to the Met Office, public sector constraints and budgetary pressures from the Government put the squeeze on vacancies in 2009.

However, there’s a growing need to promote Met Office careers at university events — and really put science back on the career map. As Kay says: “Organising presentations given by our scientists is key to encouraging the right students to come and work for us.”

Learning and development

For graduates to move into forecasting or science roles, first degrees need to be based in maths, physics or physical science subjects.

Careers are structured into a number of professions including science, meteorology, technology, and sales and marketing. Training and support are provided, along with mentoring and relevant courses. Weather forecasting, for instance, involves nine months classroom and on the job training. Employees need to pass exams to demonstrate their capabilities at entry level, after which further development support is provided.

Investors in people

The Met Office has also just been re-accredited as Investors in People. This external acknowledgement recognises the value placed on learning, development and work/life balance — whether as a 21 year old starting a career or someone over 60 working part time.

Changing the Rewards structure is another major HR development. Previously, there were five broad job bands with set salary levels. By moving away from a traditional hierarchy over to role-based pay, salaries are now based on an employee’s contribution to the organisation as a whole.

Mapping out careers

With improving performance as an overall aim, the Met Office has undertaken a programme using psychometric tools for recruitment and personal development. A ‘Skills Framework’ has also been put in place to help define career options.

Kay explains: “If someone wanted to progress from Scientist to Senior Scientist, the different capabilities

required are clearly mapped out. This may involve taking extra professional qualifications. I am, for instance, being supported by the Met Office as I finish my Masters degree.”

So for the Met Office to continue being one of the best weather and climate services in the world, it’s clear that two things take precedence: the quality of our science and our people. And for these it’s essential to have the right infrastructure, attractive career packages and a competitive spirit. Only then can we be sure of attracting and keeping the very best talent on board.

Encouraging local talent

Developing sixth form pupils’ potential in the local community is something the Met Office’s Kay Eldergill and Diana Chaloner, Director of Human Resources, wholeheartedly support. It has led to the creation of a new initiative called the Reach Programme, which began in 2009. ‘Reach’ stands for: Raising excellence and achievement for academically gifted students at Exeter College. As the main sponsor, the Met Office is giving some of the academy’s most ambitious science students the chance to work on a real-life scientific project.

As Kay explains: “Our wide range of professions is represented within the Reach Programme’s extra-curricular activities — from Library and Archive, to HR and Law. Participants can also enjoy a lecture and seminar programme with inspirational speakers, e-mentoring, conferences, master classes, residential summer schools and events.”

Employment and skills

The Met Office is involved in setting up a local Employment and Skills Board within the Exeter and North Devon area — the purpose being to understand the needs of local businesses and investors.

The current focus is on supporting the legal profession, with the long-term view of gaining government funding for firms to set up apprenticeships in the region. High profile organisations, such as the Met Office, are often of a size and reputation that attracts jobs and talent to the area. The hope is that educational and employment programmes supported by the Met Office and the council will help stem the ‘brain drain’ from Devon.

The cycle of life

From first draft to final print, your quarterly *Barometer* goes through many processes before it lands in your lap. But by using paper from sustainable sources to produce the magazine, the Met Office is both reducing its environmental impact and setting a precedent for its suppliers.

Across the globe, an area half the size of the UK is deforested every year to produce things like wood flooring, furniture — and paper. The products of this illegal trade can be found worldwide, from building sites in Australia, to private homes in New York and offices in the UK. Yet, these same forests sustain the lives of sixty million indigenous people and countless plant and animal species as a source of shelter and sustenance. So uncontrolled depletion is simply a disaster waiting to happen.

In 1993, the Forest Stewardship Council (FSC) was born, as a direct response to the public's concern about deforestation. As an international, non-government organisation, the FSC not only promotes responsible forest management — but also provides a reliable and trusted wood labelling scheme the world over. By switching to FSC paper for everything from stationery to the *Barometer* magazine, the Met Office is helping to support the organisation's work — while also meeting its own environmental targets.





Making changes

The benefits of using paper certified by the FSC are clear. For a start, their crops are well-managed, which means they don't deplete rainforests. They also comply with strict environmental, social and economic standards. But for the Met Office, the decision to use FSC paper for *Barometer* magazine had added factors — not least corporate responsibility. As Paul Fitcher, Design Studio Production Manager explains: "It's something our clients expect us to take a lead on. After all, the Met Office has a responsibility to use environmentally friendly papers and use printers that have a similar ethos."

Barometer had previously been printed on a FSC coated paper. The changeover came both from Paul's own input, and as part of the Met Office's 'brand refresh' a few years ago. "We felt *Barometer* should be in-line with the other design for print material we use," says Paul. "It was partly my decision to change to uncoated paper from a managed source. But it had a lot to do with the refreshed brand — and the push to become more environmentally friendly across all our processes. It's something everyone should aspire to."

Reduce, reuse, recycle

However, the changeover has also had a major impact on the design and print processes.

Originally, *Barometer* was printed on coated paper. Now it uses 50% recycled material, diverting waste from landfill and manufactured to the ISO 14001 international standard. All of which makes a big difference. As Paul puts it: "Our designs and colour palette have been developed specifically for uncoated material."

Another unexpected issue has been drying time. Because of the different texture and finish of the paper, together with the vegetable inks used by the printer, the ink takes longer to dry — which means that printing takes an extra few days. Understandably, Paul was concerned the quality of *Barometer* might suffer. But those fears were soon laid to rest. "It's a constant juggling act between production timescales and maintaining quality," he explains. "Because *Barometer* is a customer-facing magazine, it was a big step for us to take — but I think it works well. And it also shows our clients we take the environment seriously."

A new horizon

It's important for the Met Office to keep up-to-date with the government's environmental standards and targets for their customers. But the decision to use FSC for *Barometer* magazine, as well as their other printed collateral, has a wider influence on the supply chain. Paul says: "Because of demand, a lot of suppliers only provide FSC paper now. Which, in turn, means it's also in the paper makers' interests to make sure their sources are reliable, well-managed — and FSC accredited."

It doesn't end there. The Met Office is constantly looking for ways to lessen its environmental impact. "It's not just FSC," Paul explains. "It's using environmentally friendly paper in

general and seeking out printers with environmental accreditations such as ISO 14001." The list goes on — and there are yet more changes ahead for *Barometer*. And of course, what happens to *Barometer* after it leaves the mailing house is, quite literally, in your hands.

"...the Met Office has a responsibility to use environmentally friendly papers and use printers that have a similar ethos."



Shooting down recycling targets

Reducing waste generation from all our activities was the main objective of the Corporate Responsibility Committee, when putting their waste targets in place.

There are demanding targets for Government Departments — with the desired result to be recycling 75% of their waste by 2020. We adopted the target, but we have already surpassed this with a total of 75.52 % of our waste being recycled this year alone.

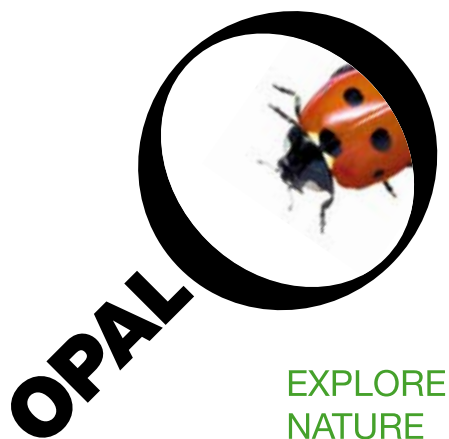
With separately identified waste 'streams' for processing our recycled waste — culminating in collection bins for most items — whether it's batteries, plastic cups or food waste — the Met Office has made it exceptionally easy for its employees to recycle. With a total of 23 waste streams we are constantly striving for new methods, encouraging staff to put forward their own ideas and suggestions. As Health, Safety and Environmental Advisor, Neal Pearce puts it: "I'm not interested in meeting standards and requirements — I think we should exceed them. We're not content to rest on our laurels."

A sustainable supply

Meeting the government's new sustainability requirements when it comes to buying products, equipment and services is a big priority for the Met Office.

- Every year, the Met Office procures thousands of pounds' worth of items — from observation through to technical office equipment — that meet the Sustainable Task Force targets and Government standards.
- Sustainability must always be weighed against other practicalities. When the Met Office went out to procure a replacement car fleet they chose diesel models to reduce CO₂ — rather than electric vehicles, which had disadvantages due to the need to recharge.
- Having adopted the Green Accord established by Exeter City Council and Global Action Plan, the Met Office will be working with local suppliers — especially in the construction industry — to lessen our environmental impact and improve our sustainability.

Expanding horizons



With so much of the population living in towns and cities these days, it is increasingly easy for people to lose their connection with nature. But an exciting new initiative called Open Air Laboratories (OPAL) aims to redress the balance by encouraging people back into nature and raising awareness of climate change.

Led by Imperial College London, OPAL is made up of 15 partner organisations, including the Natural History Museum, the Met Office and several universities. Working together under the OPAL banner, they aim to deliver different projects across England that bring together scientists, amateurs, local interest groups and the general public.

In its own words, OPAL aims to ‘create and inspire a new generation of nature-lovers by getting people to explore, study, enjoy and protect their local environment.’

The project consists of both national and regional activities, with local projects initiated by ‘community scientists’ who are employed directly by OPAL at locations across the UK. Their job is to take projects into the local community – working with councils, Primary Care Trusts and even organisations like the Brownies and Scouts. So one day they might be working directly with toddlers, and the next in an old people’s home.

The projects are as diverse as the different interest groups involved. A northeast project, for example,

aimed to help school children learn about ‘5 a day’ and the importance of a balanced diet. Taking a hands-on philosophy to education, OPAL gave the children a plant pot each with some peat and seeds. The challenge of ‘growing their own’ helped the children see vegetables in a new light and learn about their nutritious properties.

“Each community scientist has a slightly different scientific discipline, so they have different ideas about how to take that information to their community groups,” says Helen Bye, Business Manager at the Met Office.

At a national level, OPAL is also running a series of nature and environment surveys that anyone can take part in. Community scientists help to introduce these regionally but anybody can log on to the OPAL website and download survey field guides and workbooks for free. By taking part, participants will help to unveil new nature insights around the country while contributing to real scientific research.

Many of the OPAL initiatives now in place have been made possible because of a £11.75 million grant

“We hope OPAL will encourage much greater understanding of the state of the natural environment and its biodiversity, particularly among the most disadvantaged communities in England and among all ages and abilities.”

Professor Sir Clive Booth, Chair of the Big Lottery Fund



Photos: OPAL (Open Air Laboratories)

from the Big Lottery Fund (BIG). The funding came through BIG's Changing Spaces programme that has awarded around £200 million to help communities in England enjoy and improve their local environments.

As Professor Sir Clive Booth, Chair of the Big Lottery Fund explains: “We hope OPAL will encourage much greater understanding of the state of the natural environment and its biodiversity, particularly among the most disadvantaged communities in England and among all ages and abilities.”

Working together

Part of the Met Office's involvement with OPAL is to run the Climate Change Education Centre, which, in time, will take the form of four physical weather centres in the UK.

“The idea is that the public will be able to see what weather stations look like and how they operate. It will act as an education piece, but the information it collates will also feed into the OPAL website,” Helen Bye says.

While the weather centres are being established, the Climate Change Education Centre is currently running a series of initiatives. One of these aims to raise awareness of the urban heat island effect — something the weather centres will also focus on.

The urban heat island effect occurs when cities retain more of the sun's heat than surrounding rural areas, leading to significant temperature differences. It will

potentially become more of a problem as global warming pushes up average temperatures. So to help gain a better understanding of how air moves in urban areas, the Climate Change Education Centre set up a ‘bubble test’.

Using bubbles formed from washing up liquid and then observing the direction in which they float in a city street, participants in the experiment helped capture vital information about how air flows through a city. It was a simple, yet effective, approach to a complicated issue.

“These tests strike a chord with the general public, in a way that allows them to see how their results translate into meaningful science,” Helen says. “People think of climate change as a global problem. This is a way of giving people fun tools to understand more about what's going on in their own community.”

A Climate Change Education Centre website that will help raise awareness of global warming, is due to go live soon. OPAL, in general, is constantly gathering pace. So if one the biggest hurdles to protecting our environment is public interest — the work of OPAL could turn out to be one of the best tools we have.

iSpot
Your place to share nature

OPAL projects

OPAL aims to raise awareness of the environment among the public but also wants to learn from their findings. A project called iSpot, for example, encourages people to submit photos of plants and animals that they would like OPAL experts to identify. This scheme has already identified a species of moth not previously thought to inhabit the UK from a photo sent in by a six year old. The first two national surveys are also well under way, with people from all over England identifying earthworms and looking at lichens as indicators of air quality. 2010 will see the launch of national surveys on the topics of water and biodiversity.

Information about all of OPAL's events and activities can be found at www.OPALexploreNature.org

Helping to save lives when disaster strikes



Our new corporate charity is ShelterBox, an international disaster relief charity that delivers emergency shelter, warmth and dignity to people affected by disasters worldwide.



After watching TV news footage of aid agencies throwing food out into a desperate crowd, Tom Henderson went into his garage and filled a large green box with items he deemed essential to survive after a natural or manmade disaster. His idea for ShelterBox was born, and with the help of his Rotary Club, it got off the ground in 2000.

Based in Cornwall, with another eight international affiliates, ShelterBox has grown rapidly. It's now a major player in the field of disaster relief — and is the organisation chosen to be the Met Office's Charity Partner for the next three years.

Practical help

Since the first consignment of 143 boxes were sent to earthquake victims in the Indian state of Gujarat in January 2001, ShelterBox has responded to more than 80 disasters in over 50 countries. Boxes of emergency aid containing a tent and vital equipment are delivered immediately to displaced or homeless families, helping them survive and rebuild their lives. Within days of the devastating earthquake in Haiti on 12 January, thousands of ShelterBoxes were sent to help the estimated one million people left homeless. Some of the boxes were used by the ShelterBox Response Team to build an emergency field hospital. The Met Office provided daily weather forecasts for Haiti to ShelterBox.

As Andy Yeatman, who leads community relations on the Met Office Corporate Responsibility Committee said: "ShelterBox fits perfectly with the ethos and brand values of the Met Office. They had the vision and drive to spot a fantastic idea and then see it through. They've helped thousands of people through incredibly difficult times and are certainly an organisation with exceptional integrity."

Weather event warnings

With the exception of events such as earthquakes, volcanoes and conflicts — many disasters are weather related.

And — due to climate change — cyclones, hurricanes and flooding are predicted to increase in their frequency and scale. The relationship with the Met Office has proved invaluable in the forewarning and tracking of weather systems, such as where a typhoon is going to hit next.

As Becky Maynard, response team member and ShelterBox's fundraising head, points out: "When disaster strikes, the need for shelter is critical and immediate, forewarning of the severity and likely location of weather related disasters allows us to mobilise teams and equipment. The support of the Met Office is crucial in helping us to anticipate need and deliver appropriate aid within 48 to 72 hours of disaster striking."

For an 'all-in' price of just £490, each box contains a large family tent, groundsheet, blankets, water carriers plus purification, mosquito nets for malarial areas, a stove, basic cooking utensils, children's school packs and simple tools to help repair homes and camp infrastructures — everything to help a family survive.

Disasters can affect any part of the world, from the freezing mountains of Afghanistan to the blistering hot deserts of Swaziland. So the ShelterBox tents are designed to work in all temperatures ranging from +60 °C to -20 °C and winds up to 70 mph. Strong poles and UV protective fabric means the tents should last for up to six months even in the least hospitable environments.

By camels, canoes and 4WD

ShelterBox's highly trained teams distribute boxes on the ground, working closely with local organisations and international aid agencies. Reaching the affected regions — often remote and inaccessible — is one of the first challenges they face. At times like these, they rely greatly on the goodwill of local people for all kinds of free transport and also the help of



ShelterBoxes arrive at the airport in Port-au-Prince, Haiti.

"For our ten year anniversary, ShelterBox's goal is to keep on going that extra mile. Delivering shelter, warmth and dignity to even more people who have lost everything, through no fault of their own."

Tom Henderson, Founder & CEO of ShelterBox

organisations such as the US Navy, which can offer helicopters for aerial reconnaissance and rescue.

The Met Office has been supporting ShelterBox to establish an innovative new capacity building project — The International Academy of Disaster Relief — a major step forward in the training and continuing development of ShelterBox response team volunteers and the wider humanitarian community. Ben Spurway, ShelterBox Response team member and International Academy Manager explains: "Met Office Training and Development staff have provided some great advice, gained from training their operational staff and meteorologists from other countries. In return we are working together to develop programmes that enable Met Office staff to learn and apply to their roles, experience we've gained deploying

humanitarian aid." To find out how you can get involved with The International Academy of Disaster Relief, see www.shelterboxacademy.org

To date, a total of 50,000 boxes have helped 500,000 people. Becky Maynard adds: "Even when our partnership with the Met Office ends, we're sure we can count on their continued support, and make use of their weather tracking systems."

➔ If you'd like to know more about ShelterBox or to donate, visit www.shelterbox.org

Diverse interests

Since summer 2008, Adrian Jupp, Senior Scientist in the Satellite Radiance Assimilation team, has worked tirelessly to promote environmental awareness and improve the biodiversity of the Met Office headquarters site in Exeter. Organising a group of volunteers, Adrian has developed a wildflower meadow for the benefit of local flora and fauna, and for the enjoyment of staff.



Since the Met Office moved to its new HQ site in Exeter in 2003, the organisation has made considerable strides in improving its day-to-day environmental performance within the building, with policies in place on issues such as recycling and water and energy consumption. The impact that we have on the immediate environment through management of our grounds is now also achieving prominence.

Strong interest

This is a result of members of staff like Adrian taking a strong interest in biodiversity. It's also thanks to statutory requirements such as those imposed by the Natural Environment and Rural Communities Act 2006, which places a duty on all public bodies to have regard to biodiversity in the exercise of their functions. In addition, a new audit which helps building managers to improve the environmental performance of buildings called BREEAM in Use, also considers biodiversity aspects, providing further motivation for action.

The Met Office headquarters site stretches to several acres, and had previously been managed much like any other business park location, with regular mowing of the grassed areas and spraying of herbicide under areas planted with trees and shrubs. A group of staff with an interest in biodiversity approached Property Management to suggest that there might be a better way forward.

Initially, a large grassed area infested with thistles was identified as a pilot area, and work commenced on controlling the thistles and adjusting the management to just two cuts per year to create an area similar to a traditional hay meadow, comprising a wide range of native wildflowers and grasses. Worryingly, 97% of such meadows have been lost in the UK since 1945, and there is almost none of this habitat type left in the countryside around the site.

Voluntary action

Volunteer staff have been growing native wildflower plants from seed at home for planting out in

the meadow. As the seasons progress the area is becoming much more colourful and attractive to wildlife, as well as to staff taking their lunch breaks. Further areas have since been identified, and the process of adjusting management and wildflower planting has been extended to these, with woodland flowers being sown on areas of previously bare soil around trees and shrubs.

In 2008, two species of orchid were found to have colonised, with numbers of both increasing substantially in 2009 when two more species were also discovered. Gardening contractors have been made aware of these, with locations marked to ensure that the plants are protected from accidental damage. Many species of butterflies, moths and other insects are now arriving, and the rare and spectacular wasp spider was found in 2009.

Enlightened approach

At the Met Office Awards for Excellence 2009, Adrian received the Corporate Responsibility award for his work on improving the biodiversity of the Met Office HQ site. The award recognises staff that have helped the Met Office meet its objectives in a sustainable way and acting in a positive manner in its dealings with staff, customers, suppliers and the wider community.

It is a common misconception that areas set aside for biodiversity will appear untidy and unattractive, but the areas which have been set aside so far prove that modern buildings can sit comfortably within the framework of a more informal, modern and enlightened approach to grounds management and biodiversity. Adrian is now helping to prepare a formal biodiversity policy at the Met Office, and biodiversity matters will be integrated within the organisation's Environmental Management System. In the future, visitors to the Met Office should find an increasingly green and pleasant land.

➔ See the opposite page for a profile on Adrian Jupp, Senior Scientist in the Satellite Radiance Assimilation team.

Science profile



Adrian Jupp
Senior Scientist – Satellite
Radiance Assimilation Group

The Met Office employs professionals and experts who are constantly expanding the boundaries of weather and climate prediction. Here we meet one of them...

From enhancing the biodiversity of the Met Office to helping improve the accuracy of weather forecasts – it's all in a (very varied) day's work for Adrian Jupp.

Adrian Jupp is a man who seems to succeed in whatever he does. Last year, for example, he won a Corporate Responsibility prize at the Met Office Awards for Excellence 2009 for his work on improving the biodiversity of the Met Office HQ site. This is something he does purely as a spare-time hobby and is completely unrelated to his day job. As a Senior Scientist in the Satellite Radiance Assimilation Group his role has less to do with nature conservation and more to do with improving weather forecasting for the Met Office.

Natural progression

Having joined the Met Office in August 2000 to work on the use of GPS data to improve weather forecasts, Adrian moved to his current post in the Satellite Radiance Assimilation Group in 2008. The team's role is central to forecasting at the Met Office as satellite data underpins the successful Numerical Weather Prediction (NWP) system.

Of course, the Met Office's NWP is only as good as the information that is fed into it, as Adrian explains: "To produce a good weather forecast, we first need to estimate the state of the atmosphere at the present time in a complex process called data assimilation. This means combining a wide range of observations, coming from everything from traditional instruments which measure temperature on the ground, for example, to more sophisticated ones, such as satellites."

Adrian and his team are specifically concerned with radiances – the upwelling radiation from the Earth and its atmosphere. These are measured by satellites and can tell us a lot about atmospheric composition, temperature and humidity. All of this can be used in the data assimilation process, which feeds directly into forecasts.

"When people think of satellites in meteorology they will most likely think of the satellite pictures they see in the media, but the assimilation of satellite radiances is more important in helping us to forecast the weather," Adrian says.

Clouding the issue

Like most things in forecasting, using radiances is not without its difficulties. As Adrian explains, "One of the main challenges is the use of data in cloudy areas, due to the very complex and sometimes poorly understood physical processes inside clouds."

That aside, as rich new data sources have become available, the group has enhanced forecasting accuracy by using a wider range of satellite data in more scientifically advanced ways. But Adrian's team is far from complacent, as he explains, "Over the next few years, we will continue to improve the use of the data we already have, prepare for the data expected from newly launched instruments, and get involved in helping to design the next generation of weather satellites."

Going back to nature

With such an involved and seemingly complex job, bringing his lifelong interest in wildlife and nature conservation into the workplace has certainly had its benefits for everyone at the Met Office.

"I work as a conservation volunteer in my spare time, so I felt I had something useful to contribute to encouraging wildlife on site and developing a biodiversity policy," Adrian says.

With a wildflower meadow already blossoming, and attracting a wide variety of species of plants and insects, the Met Office's outdoor space has become the perfect place to take a break and switch off from the hustle and bustle of the office.



Adrian organised a group of volunteers to improve biodiversity on the Met Office Exeter site by creating a wildflower meadow. Red clover is now increasing across the meadow.

In a new book, *Extraordinary Clouds*, acclaimed author Richard Hamblyn has worked with the Met Office to provide an assortment of some of the most unusual clouds in the world.



Quite extraordinary!

At some point in our lives, most of us have looked up to the sky and gazed at the clouds. Produced in association with the Met Office, *Extraordinary Clouds* is full of striking photographs of clouds, celebrating the weirdest formations suspended in the atmosphere, and explaining how they are created.

Many of the eye-catching and bizarre images were taken in remote locations or by satellites. Accompanying each picture is an explanation of where, and how each picture was taken as well as the way that each cloud was formed.

Working in association with experts from the Met Office, Richard Hamblyn continues the theme of his earlier books, *The Invention of Clouds* and *The Cloud Book*, to share some of the most dramatic pictures of skies. A foreword by Keith Groves, the Met Office Operations Director, sets the scene for this stunning collection.

The pictures show the often unexpected patterns that are created by the natural cycles of the weather. As the book is full of nature's art, you don't need a detailed knowledge of meteorology to enjoy it. *Extraordinary Clouds* has something for everyone — whether you just have a general interest and enjoy the spectacle, if you're an amateur meteorologist or even a member of the cloud appreciation society. The amazing photographs and the informative captions are bound to inspire anyone who picks up this book.

Noctilucent clouds (above)

Also known as polar mesospheric clouds, noctilucent clouds are the highest clouds in our atmosphere, forming on the fringes of space some 80 km (50 miles) or more above the surface of the Earth. They consist of ice particles seeded on microscopic nuclei, although the precise mechanism of their formation in the cold, dry conditions of the mesosphere is still a matter of debate. Noctilucent

clouds (from the Latin for 'night-shining') are usually seen around midnight during the summer months in high latitudes (above 50° north or south), as in this unusual 'herring-pattern' example, photographed above a lake in Finland. Though rare, these clouds are beginning to be sighted more frequently and at lower latitudes for reasons that are not yet known, but which may turn out to be connected to the warming of the Earth's lower atmosphere.

→ For your chance to win a copy of *Extraordinary Clouds* simply complete the pre-paid card opposite.

→ *Extraordinary Clouds* by Richard Hamblyn is published in paperback by David and Charles. Readers can order a copy for the special price of £5.50 (rrp £9.99) with free p&p (UK only). To order please call 0844 880 5851 or visit www.rubooks.co.uk and quote code RS2133.

Where the wind takes you

Actor; travel presenter; writer and motorcycle enthusiast: you'd be forgiven for considering Charley Boorman a 'jack of all trades'. But by his own admission, braving the elements on the back of his motorbike is where he feels most at home.



Charley's obsession with motorbikes began at the age of seven. Ever since, he's found ways to include this mode of transport in his daily life, whether on his latest trip, 'By Any Means 2', or simply getting from A to B at home. As Charley says: "I should have been a racer! I ride my bike everyday — it's really the only way to get around London."

Travel is also a passion that runs deep, stemming from early memories of roaming the globe with his father John Boorman. As a renowned film

director, John's career often meant that time on the road played a central part of family life. "My father took us round the world with him the whole time — which is where I got my zest for adventure," Charley explains.

Whirlwind adventure

Going from country to country, as Charley has in his recent run of travel series, takes careful planning — including staying constantly up-to-date with the weather. It's something that greatly affects his decisions and can mean the difference between a

smooth ride and running into real trouble. As he explains: "Not only does rain make riding a bike a very depressing experience — it makes filming very difficult. What's more, bikes and mud can be a really treacherous combination."

Throughout his travels, Charley has faced much extreme weather. From experiencing typhoons in the Philippines during 'By Any Means 2', to crossing swollen rivers in his first travel series the 'Long Way Round' with close friend Ewan McGregor.

While inconvenient, Charley thinks it's these moments that make for a truly memorable journey. "Chaos is always a possibility no matter how much research you do beforehand. But it's all those 'dodgy' bits you look back on fondly."

But with the help of the Met Office, Charley and the crew make every effort to stay one step ahead of the weather. "We used the Met Office website and satellite photos throughout our trips — and I personally use them whenever I fly too. The information on there tends to hit the nail on the head every time, which is pretty impressive!"

Changing climate

For Charley, travel isn't just about transport. It's about exciting new experiences and understanding different cultures. Wherever he goes, there are plenty of fresh encounters waiting. But most of all, it's the people he meets that make his journeys worthwhile. "I think the more you travel the more you realise that people are just people. Despite what you hear in the media, the majority are law abiding and just want to get along with their lives."

A strong concern for human rights and the effects of climate change on global communities is something Charley expresses through his involvement in children's charity, Unicef. In particular, climate change is an issue he feels the whole world needs to address. "It's the children who will get it in the neck first," he says. "Especially since water shortage is already a huge problem — and one that'll only get worse. It's something we should all take issue with."

Following a successful acting career, several travel series and a recent book, it seems there's a world of possibility ahead for Charley Boorman. "There's a number of different projects on the way," he confirms. "It would be great to journey across the whole of South America or even India. There's simply loads on the horizon."

Optical effect

These excerpts from *Extraordinary Clouds*, written by Richard Hamblyn in association with the Met Office, describe mammatus clouds at the base of a storm cloud and a stack of altocumulus lenticularis clouds.

Mammatus clouds (above) Usually appearing on the underside of an extended cumulonimbus anvil, mammatus clouds (from the Latin for ‘udders’) are associated with unstable, often stormy weather, though they can also be seen in relatively calm conditions, long after bad weather has passed. Their appearance is the result of pockets of cold, saturated air sinking rapidly from the top of a storm cloud, forming downward bulges or ripples at the base — an unusual example of clouds forming from convection in reverse (most cumuliform clouds being the result of pockets of warm air rising). Their shape can vary considerably from long, undulating ripples covering many square kilometres, to smaller patches of near-spherical pouches, as in this somewhat menacing display of globular mammatus contorting itself over a college sports stadium in Hastings, Nebraska in June 2004.

Pink UFOs (below) A stack of altocumulus lenticularis clouds hovers over the Alpujarra Mountains in southern Spain, stained by the rays of the setting sun. Lenticular clouds (Latin for ‘lens-shaped’) are a common sight in mountainous regions and are created when a stable layer of humid air is forced to rise over high ground, condensing its moisture into cloud. If alternate layers of moist and dry air are present the clouds will form in a vertical stack. As the airstream returns to its original level once it has passed over the obstacles, it sets up a standing wave effect on the lee side of the mountain. They have often been mistaken for UFOs.

