Meteorological Observing Systems
Special Interest Group

Newsletter Issue 38

Autumn 2014
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Front Cover Photo - CEH CS Sunshine Recorder

QR – link to our RMetS webpage

You can also now find us on Twitter!

https://twitter.com/RMetS_MetObs
Introduction

Welcome everyone to the 38th edition of the Meteorological Observing Systems Special Interest Group newsletter.

We are pleased to announce a new committee member – Dr Mark Wilkinson from the James Hutton Institute in Aberdeen (you can find out more about your new committee member here - http://www.hutton.ac.uk/staff/mark-wilkinson).

You can also now find us on Twitter! https://twitter.com/RMetS_MetObs

Hope you enjoy this edition!

Mark Dutton, Newsletter Editor

Group Website: Members are encouraged to regularly check the Group's pages on the RMetS website at http://www.rmets.org/activities/groups/SIG/detail.php?ID=10 for details of meetings and booking information, including on-line registration for meetings. Whilst every effort is made to publicise meetings via the inserts in Weather magazine and the Newsletter the website is the quickest medium of communicating with you.

Have Your Say: This is your Group and your Officers are always happy to receive feedback about what is being done on your behalf. If you have any comments or suggestions on matters relating to the Group and our activities please do not hesitate to get in touch with any Officer. Contact details are shown on the last page of the Newsletter. Suggestions for future meetings and speakers are always very welcome.

Material for Publication: Written material must be in electronic format, preferably in MS Word or Excel, although PDF format can be accepted. Digital image format should be JPEG (preferable) TIFF or BITMAP. Short news items as email are acceptable. Material can be sent as email attachments to mark@emltd.net, or on floppy disk, CD or DVD to Environmental Measurements Limited, 7 Jupiter Court, Orion Business Park, North Shields. NE29 7SE. Please say if you would like disks returning. In all cases please include your name, address and email or telephone number with submissions. Publication deadlines are 31st March for Spring Newsletters and 31st October for Autumn Newsletters.

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Chilterns Observatory Trust request

- Do you know of meteorological instruments surplus to requirements and looking for a good home?

One of the principal functions of the Chilterns Observatory Trust is to be able to lend meteorological instruments (at a nominal, one-off rental) to amateur observers, schools, and students. The Trust already has several rain gauges, a Campbell Stokes sunshine recorder and a selection of mercury-in-glass thermometers, but it is important to be able to develop a wide-ranging store of instruments, both traditional and electronic.

We have a limited income, so the Trust also needs the goodwill of private companies and institutions to augment our stock of instruments and to help us to replace parts and carry out repairs, and we will be very happy to accept any meteorological equipment that is, for whatever reason, surplus to requirements. The same is true of books and periodicals which are no longer needed.

Contact details as follows:

Philip Eden  
Chilterns Observatory Trust  
Observatory Lodge  
(next to Dell Farm)  
The Green,  
Whipsnade, DUNSTABLE, LU6 2LG  
Tel: 01582 872 226  
E-mail: philip@weather-uk.com
Forthcoming Meetings

1) Future measurements for climate monitoring, Imperial College London, 18 March 2015
   http://www.rmets.org/events/future-measurements-climate-monitoring

2) Summer visit and 200th anniversary of continuous measurements at the Radcliffe Observatory 15 May 2015
   http://www.rmets.org/events/oxford-weather-observations-1815-2015

3) Site visit to LANFEX experiment (unconfirmed – this would happen in July 2015)

4) Weather on other planets TBC Autumn 2015
Meeting Reports

RMetS Meteorological Observing Systems Special Interest Group

Summer visit and AGM at the Centre for Ecology and Hydrology

25th July 2014

This year’s summer visit, combined with our AGM, was held at the Centre for Ecology and Hydrology (CEH) in Wallingford. This was previously the Institute of Hydrology (IH). The AGM is reported elsewhere as minutes of the meeting. 14 attended the AGM. Here we look at the visit which centred on a tour of the met site and two talks on some of the specialised activities of CEH involving measurements.

The Met Site

After the AGM and lunch in the CEH Canteen the visit started with Katie Muchan giving a talk about the Wallingford Met Site and its history. The site was originally set up in 1962 by John Rodda where it remained until 2007 when it had to be moved a few hundred yards to a neighbouring site to make room for new buildings. However, shortly after the move a second move, again only a very short distance, was necessary to make way for a large solar energy installation by a neighbouring organisation. The present site is well exposed with no obstructions near-by all-round. The SIG had visited the original IH met site in July 2007, just before its first move.

Figure 1. The Met Site at CEH Wallingford during the SIG visit on 25 July 2014

Photo by Ian Strangeways
Figure 1 is a general view of about half of the site showing the good turnout of members for the visit. The day was warm and dry. As it is difficult to photograph a complete met site in one shot, because the instruments are well spaced and many are quite small, figure 2 is a composite picture showing all of the instruments in one picture. There are all the usual traditional manual instruments - A Stevenson Screen (in this case one of the new plastic type with a black interior) containing the traditional four liquid-in-glass thermometers, a Campbell-Stokes sunshine recorder, soil thermometers at 10, 30 and 100 cm, surface minimum thermometer over grass and concrete. The wind speed and direction sensors look to me like the originals from the 1960s still in good working order - the anemometer being a ‘cup-counter’ ‘wind run’ sensor measuring in miles. There are several raingauges including two five inch gauges exposed at the standard height of 12 inches with a third exposed with its orifice at ground level in a pit surrounded by a grid. This technique was developed by John Rodda at IH in the 1960s to combat the losses raingauges suffer through wind effects; it is crucial for obtaining accurate catchment water balance measurements. Despite this error being known about for well over a century, most gauges around the world are still unprotected.
There is also a tipping bucket gauge in a pit and another (Rimco gauge) exposed traditionally, both connected to the automatic Weather Station (AWS). This is a Didcot Instruments AWS and is one of many made back in the 1970s, and still in use, based on my earlier prototypes developed when I first joined IH in the mid-1960s. They measure air temperature and humidity, wind speed and direction, solar and net radiation (continuing to measure humidity using the wet and dry bulb method, which is considered more stable in the long term than the capacitive type of humidity sensor). New to the AWS (since my time at IH) is an electronic sunshine sensor. The logger too has been changed to a Campbell Scientific (what else?) from the original Microdata Logger that recorded on Compact Cassettes; these operated from around 1970 for two decades. It is good to see the same AWS still in use. In fact the met site looks very like it did way back. Good to see it being continued and renewed and very professional looking.

![Figure 3. Left: UK evaporation pan at the original IH Met Site. Right: Class A evaporation pan at a met site in Rajasthan, India. Photos by Ian Strangeways](image)

The only ‘instrument’ missing on the new site which was in operation on the original site is an evaporation pan (Fig. 3). Even in the 1970s pans were viewed with uncertainty as to what they actually measured although it is probably similar to evaporation from open water such as lakes. No one took much notice of pan readings until the 1990s when it was noticed that their readings were slowly falling around the globe and it was argued that this was due to ‘global dimming’ caused by a reduction of solar irradiation. The dimming appears to have reversed somewhat recently. The number of pans in operation worldwide, however, has, apparently, fallen greatly and perhaps it would be worth continuing this long-standing traditional measurement on the new site.

In her opening talk, Katie illustrated many interesting features revealed by the 52 years of data from the IH and CEH met sites, including extremes and temperature trends. Significantly, the loss in raingauge catch due to wind errors was 5.6% even at this relatively sheltered site, with 16% quoted as a typical loss at exposed sites (It is probably higher still for drizzle on mountains). Snow is even more difficult to measure due to increased wind effects.
The site’s data can be seen on line updated daily at:
http://www.ceh.ac.uk/data/metsite/wallingfordmetsite.html

And the talk itself can be found at:
http://cehsciencenews.blogspot.co.uk/.

Flux measurements and soil moisture instruments

*Methane flux*

A short distance from the met site some specialised instruments were in operation (Fig. 4). Dr Jonathan Evans described an array of sensors measuring the vertical fluxes of water vapour, carbon dioxide and methane from the ground. It does this by measuring the turbulent wind, sensing the vertical motions of the eddies, using three-dimensional ultrasonic anemometers at the same time as measuring the rapid variations of the three atmospheric constituents. Measured at around 20 times per second this allows the transport of the gasses away from the surface upwards to be quantified. While water vapour fluxes will be quite large since these are a measure of evaporation from the ground and vegetation beneath, the methane is as yet an unknown factor over the type of land beneath the sensors. It is interesting to compare this array with the ‘Hydra’ instrument developed by Jim Shuttleworth and team in the mid-1980s at IH for the direct measurement of evaporation using the same eddy-correlation principles as described above, measuring the variations of water vapour with an infrared sensing system (right Fig 4). IH pioneered many new instrument developments during the 1960, 70s and 80s much to the credit and initiative of its then Director Dr Jim McCulloch. At that time there were few suitable instruments available commercially. Development of the instruments and of the science went hand-in-hand.

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Figure 4. Instrumentation for measuring the flux of methane at CEH. 
Right: the ‘Hydra’. 
Photos by Ian Strangeways
Soil moisture

At the same site Dr Jonathan Evans also described an instrument for measuring soil moisture. It is useful to recall how soil moisture has been measured in the past, the most direct technique being the ‘gravimetric method’ involving the auguring of actual physical samples of soil from different depths (some augers of different sizes were on display). The samples are weighed, dried in a ventilated oven at 105 Deg C and re-weighed giving the ‘moisture volume fraction’ of the sample. But this is laborious, not very accurate and cannot measure at exactly the same point again. In the 1970s development of the neutron probe was pioneered at IH by John Bell and his soil physics section. The principle of this is that a small radioactive source (amerarium-beryllium) in the probe emits fast neutrons that radiate out into the soil. These are slowed, primarily when they meet hydrogen atoms (mostly occurring in water). Some of the slowed neutrons find their way back to the probe were a detector counts them, the number being directly related to the water content of the soil. This is the best method available for measuring soil moisture but the radioactive source, even though small (20 to 100 millicuries), is now considered too much of a hazard and this limits the use of the probe. Alternative methods measuring the dielectric constant of the soil were developed (for example the ‘Capacitance Probe’ at IH by Tom Dean and John Bell) but they have limitations although being safe the technique is now commonly used. Time Domain Reflectometry is a similar system also based on the measurement of the soils dielectric constant which is mostly made up by the water it contains with a dielectric constant of around 80.

The instrument described by Dr Evans is intriguing in that it uses the neutrons arriving from space as cosmic rays as the source (even the EU could not ban these on health and safety grounds, although it might try like King Canute). Fast neutrons, generated as cosmic-rays hit the atmosphere and cascade downwards to the surface, are captured by the hydrogen atoms in the water in the soil. The sensor, which is above the surface (not in the ground), measures the density of fast neutrons just above the surface, this being inversely proportional to the amount of hydrogen bound in water within the soil. The higher the number of neutrons detected by the sensor, the drier the soil is (fewer of them being captured (slowed) by the water molecules). This technology measures soil moisture over a large area, up to 700 m in diameter. For the system to operate, it is also necessary to know the incoming level of cosmic rays, which varies over time, and barometric pressure. This instrument was discussed further in the first talk of the afternoon.

COSMOS-UK

Talk given by Dr Jonathan Evans

This algorithm stands for Cosmic-ray Soil Moisture Observing System.

CEH is installing the first nationwide network of instruments to measure soil moisture and related variables, including wind speed and direction, barometric pressure, air temperature and humidity, a profile of soil temperatures, two near-surface Time Domain Reflectometry (or Time Domain Transmissometry) soil moisture sensors, two soil heat flux plates, and a four-component radiometer to give a breakdown of the incoming and outgoing solar and terrestrial long wave radiation independently and precipitation using a weighing gauge (Fig. 5). The heart of this system is the cosmic-ray soil moisture probe, described above and seen earlier during the field visit. This is a plain tube about a metre long and 12 cm in diameter; a photograph of it would convey nothing
Monitoring chalk river systems
The second talk of the afternoon was given by Dr Gareth Old.

Lowland permeable catchments are important sources of water supply and often host protected habitats and fisheries. But they are also subject to intense population pressures. Understanding how these catchments function is important in order to manage their resources and protect their ecological systems. CEH is currently assessing the impacts of macrophytes (water plants - emergent, submerged and floating) and how they are managed, on river water quality, hydraulics, and nutrient transport, as well as investigating groundwater-surfacewater interactions, nutrient limitations on algal growth and the impacts of climate change on fish. The River Lambourn, near Boxford in Berkshire, designated as a site of Special Scientific Interest, is being used as a ‘laboratory’ (Fig. 6, left). It is very productive of brown trout and grayling.

The long-term monitoring programme includes measurement of the following water quality variables: Turbidity, water temperature, pH, electrical conductance, dissolved oxygen and water level (Fig. 6, right). Suspended sediment concentration is measured by
event-triggered samples. In addition water chemistry is sampled weekly, river flow is gauged monthly (by a current meter suspended from a cableway across the river), water plants are surveyed monthly and three times a year invertebrates are sampled. This represents a very big programme of data collection across a wide spectrum of variables, encompassing several disciplines, something CEH is well equipped and organised to carry out, with its mix of hydrology, meteorology and ecology.

This talk can be seen in full at: (http://cehsciencenews.blogspot.co.uk/)

Figure 6. Photos taken from the talk by Dr Gareth Old on Chalk Streams Left, the River Lambourn. Right, Water quality instrumentation.

Acknowledgements
The visit was organised by Harry Dixon and the group thanked him for a most interesting and full programme. It was certainly very enjoyable for me personally to be there and so able to keep up to date with progress at CEH, having worked there when it was IH for many years. It is good to see instrumentation, measurements and data collection maintaining their importance at CEH.

Ian Strangeways
Obituary - James Samuel Gordon McCulloch
11\textsuperscript{th} September 1928 – 15 September 2014

Born on 11 September 1928 in Auldearn near Nairn in Northern Scotland, Dr J S G McCulloch (Jim) died on 15\textsuperscript{th} September 2014 after a long illness. When, in 1964, I joined what was then the Hydrological Research Unit (HRU) of the Hydraulics Research Station in Howbery Park in Wallingford, there were eight of us working in an attic in the Manor House. Jim joined a year later, coming from the East African Agricultural and Forestry Organisation in Kenya, to become head of the HRU. It was Jim’s insistence on the importance of measurements in advancing the science of hydrology, and the need for better instruments to enable this to happen, that stands out as one of his major innovations and achievements. At that time hydrology was relying entirely on the old mechanical devices of traditional design. Jim's other major contribution was to build-up the fledgling HRU into what became the Institute of Hydrology (IH), a sophisticated and creative organisation with a staff of 150. Jim gave us all great freedom to explore our ideas; it was a remarkably free time – a once-and-only period. IH later became the Centre for Ecology and Hydrology (CEH).

Jim was my boss for many years and I have many memories of him. He was very interested in cars and had driven in rallies in Kenya while working there. I remember one occasion when we were going to Heathrow to take a flight somewhere. For some reason we had to go in my car (a Mini) and as was usual with Jim, it was a last minute rush to the airport. I overtook something near Henley and he admired my cutting it very fine. As we sped down the M4 with only minutes to spare he told me that the reason he always left things to the very last minute was that as a boy his mother and he always arrived so early at the station that they just missed the previous train. I last met Jim a couple of years ago – appropriately at Julian’s garage in Didcot; cars to the end.

He could be a formidable man with great drive and it was this and his worldly realism and pragmatism that drove and promoted IH to great things both in size and science. I was fortunate to have Jim as a boss; it led to a wonderfully full career. So thank you, Jim, personally, and the science community should acknowledge his great contribution to hydrology. End of an era.

Ian Strangeways
Real-time analysis of UK rainfall for dissolved CO₂ content: atmospheric homeostasis?

SIG members will be familiar with Brian Durham’s retirement project to analyse rainwater for its CO₂ content, seeking any built-in feedback mechanism. He has communicated progress through posters at successive RMetSoc conferences showing that CO₂ levels were consistently high, and this trend is repeated in a prototype real-time analyser as described here.

In moving forward from a 2009 MSc project at Reading University (which used pH as a proxy for CO₂), academic staff recommended extracting CO₂ into the gas phase where its distinctive IR spectrum could be reliably measured by spectrometry.¹ A poster at the RMetS Exeter conference in 2011 duly reported results from 18mL samples that had been extracted into a closed headspace.² The big challenge was then to build an instrument that would extract the CO₂ continuously from rainwater as it arrives, to authenticate the 2009 results. Interestingly that step has taken longer. This was partly because of concern that, in conventional science, the existing results were chemically impossible! The Exeter poster had reported that UK rainwater events were supersaturated with CO₂ by an average ten times, and the basic ‘saturated’ level (i.e. de-ionised water in equilibrium with modern atmospheric levels of CO₂) was itself four times richer than predicted by Henry’s Law. How could this happen? Two years were spent investigating possible explanations, culminating in an oral question posed at RSC’s Faraday Discussions 167 conference in September 2013. The solvent properties of water were shown to improve as it approaches freezing, and the published communication argued that this would become significant as cloud water moves into the super-cooled range.³

Speculation on enhanced solvent properties in cool water reinvigorated the development of a real-time CO₂ extractor. The new ‘stripper’ is a glass column with glass packing, through which newly arrived rainwater flows by gravity against a flow of air from which all CO₂ has been removed by a proprietary reagent (Sodalime). The efflux is analysed by two NDIR spectrometers in series, a LI-COR 820 instrument followed by a SenseAir CO₂ Engine K30 FR. Their output is calibrated by three de-ionised water standards: zero CO₂; ‘ambient solution’ made by bubbling with fresh air drawn from outside the lab; and a solution of 14 μmols CO₂ per mol H₂O.
Figure 1: Campbell LoggerNet screen showing rainfall rate against CO₂ effluxed during two Oxford events - Blue: rainfall; Orange: LI-COR 820 CO₂ analysis; Green: SenseAir K30 CO₂ analysis (20ppm offset); Grey: rain temperature (deg C).

Figure 1 (above) illustrates two recent Oxford rain events over 12 hours, with a characteristic spikiness in the CO₂ signature. The LI-COR CO₂ output (Orange) is tracked closely by the more muted SenseAir output (Green, offset 20ppm for clarity). Logically this pattern should be recognisable in the 2009 real-time monitoring from Reading, but this was not immediately apparent, and required a review. The property pH is the negative log 10 of the hydrogen (i.e. hydronium) ion concentration $[\text{H}_3\text{O}^+]$, meaning that acidity in the 2009 rainfall showed itself as downward spikes, understated by the log scale. It was a simple matter therefore to convert pH values to $[\text{H}_3\text{O}^+]$ ion, rendering a positive value for acidity along with the more intuitive linear scale (see Fig. 2 below for 2009 Rain Events 18 and 19 as converted). The resultant similarity with the 2014 record becomes apparent. Incidentally the 2009 data includes much finer resolution of rainfall rate, delivered by a 1m² rain collector that exaggerated the flow to the ARG100 rain gauge.
These two snapshots, separated in time, place and instrument type, illustrate a general outcome - there is no direct relationship between rainfall rate and CO$_2$ delivered. Logically therefore we must anticipate an independent factor causing some rain to carry more CO$_2$ than other rain. It is here that the Faraday Discussions temperature effect can be invoked. If adiabatic cooling of some parts of an air mass (perhaps a leading edge conveyor belt) has the effect of super-cooling cloud drops and thereby making them a `super-solvent' for CO$_2$, this could explain both the high average analyses in the Exeter poster and the spikiness of both real-time traces.

Ongoing work is addressing the dynamics of the real-time stripping process, including: diameter and height of column; type of column packing; air flow rate; and sample flow rate. A wider range of standard solutions will also be applied to optimise the range and resolution of the instrument. Otherwise the next stage will be to investigate any link between delivered CO$_2$ and the temperature of cloud-drops as indicated by the oxygen isotope ratio ($d^{18}$O), seeking a more general statement on atmospheric homeostasis.

Brian Durham

Campbell Scientific has released the CR6 Measurement and Control Datalogger. The CR6 uniquely features new Universal Terminals (UTs) making the CR6 highly versatile, suiting many different applications, as well as applications with changing requirements. These UTs are not fixed in their use but software configurable to be analogue or digital inputs or outputs etc.

The CR6 also provides new functionality including an integrated webserver, Ethernet 10/100, RS-232 and RS-485 support, built-in micro SD memory card storage and USB connectivity.

The CR6 provides high analogue input accuracy and resolution (24 bit effective). Using internal power management, the CR6 varies its power consumption to match the demand of the application or program making it extremely power efficient. The CR6 can be powered directly by solar panel, dc power supply, ac power adapter, 12 V battery, or USB connection.

The CR6 is fully compatible with current Campbell Scientific dataloggers sharing the same CRBasic programming language and operating system. There are no plans to discontinue any other logger.
Committee Meeting Minutes

Annual General Meeting
Held from 1105 to 1200 hrs on Friday 25th July 2014
at CEH Wallingford
The Minutes of the meeting

1. Attendance and apologies
14 Attended – Steve Colwell, Mike Brettle, Stephen Burt, Alan Hewitt, Michael Pollock,
Richard McKay, John Crilly, Simon Bell, Steve Severn, Richard Griffith, Mike Molyneux,
Suzy Bingham, Ian Strangeways, Daniel Rylett

Apologies were received from Mark Dutton, Keri Nicoll, Dave Bullock & Neil Mander.

2. Minutes of last AGM
The minutes of the last AGM (12th September 2013) were tabled and accepted by the
meeting.

3. Chairman’s report
The chairman, Steve Colwell, provided a report, as follows.

A main society meeting on Space Weather: the importance of observations, organised
by Suzy Bingham, was held on Wednesday 13th November 2013. This was
acknowledged as a success.

The weather on other planets meeting due on 6th November 2013 has been
rescheduled for Autumn 2015.

One SIG committee meeting (20th March) has been held since the last AGM. The
chairman has represented the SIG at two of the previous three RMetS Meetings
Committee (Steve was unable to attend on 10th February as he was in the Antarctic).

4. Treasurers report
The treasurer, Mike Brettle, provided a report, as follows.

Overall our financial position is healthy and there have been no major developments
since the last AGM.

Membership of the SIG has been boosted by the raffle at the European Met Society
meeting. We hope many of those who joined will continue to subscribe next year.

Our capital reserves are healthy, I would like to remind you that we can pay reasonable
expenses if required for speakers who might otherwise not be able to attend.
5. Newsletter editors report
Michael Pollock presented the newsletter report on behalf of Mark Dutton.

During this year (2013/14) I have produced two newsletters in line with group policy. I have been supported by contributions and articles from committee members and others for which I am most grateful.

The Autumn 2013 newsletter covered:
- 13th EMS Annual meeting and 11th European conference of applications of meteorology (ECAM).
- RMetS 2nd annual amateur meteorologists conference.
- Measuring energetic particles from meteorological weather balloons (University of Reading).
- Electrostatic eavesdropping on thunderstorms (Biral).

The Spring 2014 newsletter covered:
- Space Weather meeting report (ICL).
- Precipitation measurements at Rothera research station in Antarctica (BAS).
- Quantifying uncertainty in citizen weather data (Aston).
- A new operating system for the Campbell scientific CS135 LIDAR Ceilometers (CS).
- A research project aiming to solve the problem of wind affecting rainfall measurement (EML/Newcastle).

Possible future articles:
- SPICE (WMO) intercomparison.
- Progress on rainfall/wind experiment (Newcastle)
- Article on WMO/TECO conference (St Petersburg).
- Space weather article
- ISO Meteorology – Paul Fransioli
- MM action – NPL temperature scales.
- AH action – NPL IR humidity.
- IS Action – CEH meeting.

6a. Future Meetings – plans
MB - Weather measurements for renewable energy sources
- There might be lift arrangements to reach venue – MB action
- SB is it possible to film meeting?
  - Some RMetS meetings do this – MB to take action.

IS – Future measurements for climate monitoring.
- Speakers arranged and meeting is on website.
- SBurt - ICL booking system allows room to be booked only 6 months in advance, so some doubt on venue.
  - Need to check details of videoconference
As an aside to the program, IS brought up a paper he submitted to weather on temperature reference stations. This discusses the value that could be obtained by extending the US climate reference network (a topic in the March 2015 meeting), globally.

- MM suggested sending a copy of accepted paper to CIMO.
- MM suggested it would be useful for this to be published in March issue to accompany SIG meeting at ICL.
- MM/IS discussed difficulties that WMO would face in trying to enforce standards such as those used in US reference network.
- IS suggested it would be useful to include aspirated thermometry in UK climate network.

**IS – Weather on other planets - joint with RAS**

- IS – speakers in place, need to boost attendance.
- IS – will find out in March from RAS if meeting will go ahead.
- Provisional date of Friday 9th October 2015
- Need to work out attendance fees – IS action
- IS - British interplanetary Society will be kept involved.

Advances in precipitation
Steve Colwell will take lead in arranging this.

Lightning detection
Dave Bullock will take lead in arranging this.

S.Burt Oxford AGM 15/16 May 2015
“A meeting in Oxford is planned to examine the history of recording meteorological instruments, and to commemorate the 200th anniversary of continuous weather records at the Radcliffe Observatory. This is a joint meeting between the South-east local centre, the Observing Systems Special Interest Group and the History of Meteorology and Oceanography Special Interest Group. The meeting is open to all Society members (venue capacity limits apply) and is free to attend, although there is a charge for the optional elements of the programme. The programme will include a display of significant historical meteorological manuscripts from the collection of the Bodleian Library in Oxford (optional tour of the Bodleian Library), a visit to the Radcliffe Observatory weather station site (meteorological observations began here in 1767) and presentations on various aspects of meteorology in Oxford from the 14th to the 21st Century. More details of the event and booking details will follow on [www.rmets.org](http://www.rmets.org) in due course.”

NPL-UKAS are hosting a measurement day event. On Tuesday 9th December 2014 there is a meeting on metrology for air temperature. Meeting is free but registration is required, follow link from [http://www.npl.co.uk/events/](http://www.npl.co.uk/events/)
6b. Suggestions for future meetings.
S. Bing suggested a meeting on soil moisture
- MM – there are some measurements included in WoW.

7. Election of committee and officers
Attempts are being made to find one or two more committee members.
Suzy Bingham stepped down as SIG secretary and was thanked for her work.
Alan Hewitt was elected secretary.
MP/MD to investigate whether Mark Watkinson will join.

The meeting approved the following members to serve as the committee and officers of the group for 2014/2015:

Steve Colwell – Chairman - BAS
Mike Brettle - Treasurer & Membership secretary - Campbell Scientific
Alan Hewitt – Secretary – Met Office
Mark Dutton – Newsletter editor – Environmental Measurements Ltd
David Bullock – Committee member – Vaisala
Stephen Burt – Committee member – Fellow RMetS
Keri Nicoll – Committee member – Reading University
Ian Strangeways – Committee member – Terradata Ltd

8. Any other business
No action taken on ISO Meteorology subcommittee

9. Date and venue of next AGM
This is likely to be in Oxford on Friday 15th May 2015.
Action - AH and SBurt to check room availability
Committee Meeting
Held from 1230 to 1600 hrs on Thursday 16th October 2014
at 104 Oxford Road, Reading
The Minutes of the meeting

Those present:
Steve Colwell, Chairman
Mark Dutton, Newsletter Editor
Mike Brettle, Treasurer
Alan Hewitt, Secretary
Ian Strangeways
Keri Nicoll
Steven Burt
Mark Wilkinson (via teleconference)

Item 1. Apologies
Apologies were accepted from Dave Bullock

Item 2. Agreement of Agenda
The agenda was agreed.

Item 3. Minutes of last meeting
The minutes of the last committee meeting were agreed as being correct.

Item 4. Items arising
Actions from the previous committee meeting were considered and the following matters discussed:

IS – “Weather on other planets” is pencilled in for Friday 9th October as a specialist discussion meeting. Royal Astronomical Society will inform IS in March if meeting will go ahead.
Action: IS to continue to liaise with RAS.

IS – Interested in writing an article on Venusian weather measurement station for AWE magazine. IS presented some sketches of how a station could function.

SB – renewable energy meeting was cancelled because of lack of interest.
MW – Renewable energy is a big interest topic in Scotland.
It appears that we have publicised the event mainly to RMetS and SIG members, but have not reached enough people from the renewable energy industries.
MW – Hydrology group have evening meetings in Scotland. MW sent email about forthcoming mountain hydrology meeting http://www.rmets.org/events/mountain-hydrometeorology
KN - Perhaps we could host a joint meeting with Mountain Hydrology to get interested parties to attend.
Action: MW/KN to get in touch with hydrology group to discuss a possible joint meeting.
Action: AH to set up SIG twitter account.

SB – “Future weather measurements for climate monitoring” has full list of speakers. Disappointing that Met office not able to provide a relevant talk.
Action: SB to test videoconference ahead of meeting.

**Item 5. Treasurers report**
MB - Two new members have joined.
MB – Almost no change in balance. SIG is £4651 in credit.

**Item 6. Newsletter Editors report**
Spring 2014 covered:
- Space weather meeting report
- Precipitation measurements at Rothera in Antarctica (BAS).
- Quantifying uncertainty in citizen weather data (Aston University).
- Research project into wind biases in rainfall measurements (EML/Newcastle).

Articles for Autumn 2014:
- CEH summer visit – received.
- Real-time analysis of UK rainfall for dissolved CO2 – received.
- Humidity sensor development at NPL – not received.
- Change in SI unit scales – not sure who will take action on this. SB - note that SI system is being revised, Newell article in Physics Today.
- WMO/TECO conference in St. Petersburg. Michael Pollock has written for BHS (could modify).
- Manufacturers news at Brussels EXPO.

Action: AH to chase up NPL for humidity sensor article.
Action: MW to send photo for newsletter
Action: SC, MD, MB, AH, IS, KN, MW, DB ensure that we send emails to SB on the Reading account.
Action: ?? change in SI system.
Action: ?? WMO/TECO.

Possible future articles:
- SPICE (WMO) intercomparison
- Progress on rainfall/wind effect (Newcastle)
- Space Weather article

Action: AH to write up “Future weather measurements for climate monitoring” meeting.
Action: SB to write about NPL meeting on temperature measurements (December 2014).
Action: KN to write about radiosonde meeting report.

**Item 7. Past meetings**
AGM at CEH well organised. Thanks to local organisers for helping to arrange.
Item 8. Future Meetings
SC - “Future weather measurements for climate monitoring” is to be held on Wednesday 18th March at Imperial College London.

SB - “Oxford summer visit” has been trimmed back to a single day event on Friday 15th May. There will be a tour of the Bodleian library and the Radcliffe observatory to commemorate 200 years of continuous measurements.
Action: KN/SB will enquire about a room for the AGM.

MD – “Advances in precipitation detection and measurement”. Newcastle could host summer visit in 2016. Can link this to WMO SPICE (Solid Precipitation Inter-Comparison Experiment).

KN – “Lightning detection meeting” could be held at Reading in Spring 2016. This meeting could be held jointly with the new Atmospheric Electricity SIG. We should leave to AE SIG to decide upon speaker list, etc.
Action: KN to liaise with AE SIG.

AH – “LANFEX field site”. A decision on whether to hold meeting will be made in Spring committee meeting. Meeting must be held in early July 2015, as there is unlikely to be another place in the calendar for it. This would include an hour for AGM (otherwise this could be done at Oxford meeting).
Action: AH to contact Jeremy Price to come up with ideas for visit. A plan will be drawn up and a decision made in Spring meeting.

IS – “Weather on other planets” will be £10 per person to book.
Action: AH to set up SIG twitter account with Cat Muller (RMetS).
Action: AH to set up SIG linkedin account with Cat Muller (RMetS).
SC – Rothamstead withdrawn from agenda.

Item 9. Any Other Business
AH to step down from committee at next AGM. AH will continue working with IS on weather on other planets.
Action: AH to recruit Met Office committee member and SIG secretary.

Item 10. Date of next meeting
AH – We have agreed to hold the Spring committee meeting on the morning of Wednesday 18th March 11:30-13:00, before the national meeting.
Action: SC to book a room for 11:00 to 13:15.
Action: AH to cancel booking for Thursday 26th March.

Meeting closed at 15:00
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