Meteorological Observing Systems Special Interest Group

Newsletter Issue 51

Spring/Summer 2022

Contents

Front Cover Photo – Tree ring photo

Photo Credit: Ian Strangeways

You can now find us on Twitter!

https://twitter.com/RMetS_MetObs

Introduction

Welcome everyone to the 51st edition of the Meteorological Observing Systems Special Interest Group newsletter.

Hope you find this edition of the Newsletter informative! Thanks!

Mark Dutton, Newsletter Editor

Group Website: Members are encouraged to regularly check the Group's pages on the RMetS website at Meteorological Observing Systems | Royal Meteorological Society (rmets.org) 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 In all cases please include your name, address and email or telephone number with submissions.
Publication deadlines *are 31st March for Spring/Summer Newsletters and 31st October for Autumn/Winter Newsletters.*
Whilst every effort is taken to ensure accuracy, responsibility for the accuracy of material published and opinions expressed lies with individual authors. The Editor is always pleased to receive correspondence on published items which provides correction, clarification, or additional detail. This may be included in future editions of the Newsletter.

Forthcoming Meetings

Making weather and climate measurements in difficult places

Scott Polar Research Institute, Cambridge CB2 1ER - Wednesday 5 October 2022

Weather and climate observations in remote or inaccessible locations are repeatedly fraught with difficulties, whether on our home planet or other planets in our Solar System. Achieving reliable measurements in such difficult locations often stretch existing measurement methods and technologies well beyond normal operating limits. This meeting will examine how such measurements are made, considering five particularly difficult and forbidding environments in turn.

Meeting Chair – Dr Stephen Burt, University of Reading

1300	**Welcome and introduction:** **Making weather and climate measurements in difficult places**
1310	**Atmospheric measurements over Arctic sea ice** *Professor Ian M. Brooks, University of Leeds*
1345	**The UK's changing mountain climate as observed by Met Office high-level weather stations** *Mike Kendon, Met Office National Climate Information Centre, Exeter*
1420	**The challenges of collecting meteorological data in Antarctica** *Steve Colwell, British Antarctic Survey, Cambridge*
1445	Refreshment break
1515	**Instrumentation challenges at high altitudes: observations from the Himalayas** *Richard McKay, Campbell Scientific Ltd*
1550	**Too cold, too hot or just right? Meteorological measurements on Mars and Venus** *Colin F Wilson, European Space Agency / Oxford University*
1630	Closing remarks
1640	Meeting close
	The Scott Polar Research Institute will remain open until 1800 exclusively for attendees to visit the exhibition. *Please note it is not open to the public on Wednesdays.*

This 'face-to-face' meeting will be held at the Scott Polar Research Institute, Cambridge (please note it will *not* be streamed online). The Institute, which was established in 1920 as part of the University of Cambridge, is a centre of excellence in the study of the Arctic and Antarctic. and houses the world's premier Polar Library, extensive archival, photographic and object collections of international importance on the history of polar exploration, and a Polar Museum with displays of both the history and contemporary significance of the Arctic and Antarctic and their surrounding seas.

SESSION ABSTRACTS
Speaker and title

Abstract

Atmospheric measurements over Arctic sea ice
Professor Ian M. Brooks
Institute for Climate & Atmospheric Science, School of Earth & Environment, University of Leeds

The climate of the Arctic is changing rapidly, warming up to four times faster than the rest of the world. While models broadly represent the enhanced warming, they fail to accurately reproduce all the observed features, and show greater variability between models than at lower latitudes. This suggests a failure to properly represent physical processes, and maybe missing processes, within the models. Known problems are the representation of clouds, and turbulent surface fluxes over sea ice. Addressing these model failing requires detailed in situ process measurements in a remote and very harsh environment. This talk will look at some of the measurements made in recent field campaigns - notably the year-long MOSAiC project - and the challenges faced in undertaking them.

The UK's changing mountain climate as observed by Met Office high-level weather stations
Mike Kendon
Met Office NCIC, Exeter

The Met Office National Climate Information Centre (NCIC) are responsible for monitoring the UK's climate, including its mountains. A small network of high-level stations provide observations representative of mountain conditions which could not be provided by nearby low-level stations. These stations use special non-standard equipment, since the instruments normally present at a standard Met Office low-level weather station would quickly fail in the hostile upland environment.
In this talk I will provide a brief overview of the equipment used at these stations, discuss their importance for climate monitoring and show a few example observations from these stations – some of which may be surprising. Finally, I will discuss what these observations tell us about the changing nature of the UK's mountain climate. Some photographs of mountains are guaranteed.

The challenges of collecting meteorological data in Antarctica
Steve Colwell
British Antarctic Survey, Cambridge

Antarctica is the coldest, driest, windiest and highest continent on Earth. It is about fifty times the size of the UK and is almost completely covered in ice. In places the ice sheet is over 4 km thick, and the lowest temperature ever recorded at the surface was -89.2 °C at Vostok station. The highest gust ever recorded in Antarctica was 173 knots (89 m/s) at Dumont d'Urville station. This presentation will look at the technical, logistical and physical challenges faced when installing and maintaining meteorological equipment on this beautiful but hostile continent.

Instrumentation challenges at high altitudes: observations from the Himalayas
Richard McKay
Senior Product Manager, Campbell Scientific Ltd

In 2019, five automatic weather stations were installed on the slopes of the highest Himalayan peaks. This presentation will discuss some of the specific challenges the team faced in choosing suitable equipment along with the unique issues involved in reaching, installing and communicating with automated sensor packages at extreme altitudes.

Too cold, too hot or just right? Meteorological measurements on Mars and Venus

Meteorological measurements have been taken both at Mars and at Venus. Mars meteorological stations face low temperatures (down to -100 °C) and pressures (5-8 mbar) and windblown dust and sand; the longest of these records now approaches 10 Earth years in duration. Venus landers face high

Colin F Wilson
European Space Agency / Oxford University

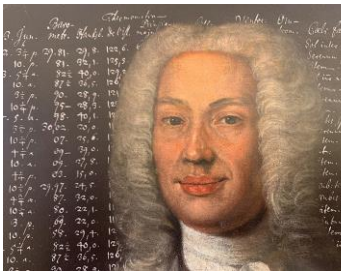
temperatures (475 °C) and pressures (90 atm), and a challenging chemical environment; none have lasted more than two hours. Balloons in the clouds of Venus can enjoy more benign environmental conditions with temperatures and pressures in the 0–60 °C and 0.3 – 0.7 bar ranges respectively – but have to contend with sulphuric acid cloud droplets and limited balloon lifetimes. This presentation will review past and present Mars and Venus meteorological instrumentation and prospects for the future.

A location map and details on how to reach the Institute by public transport or by car can be found at https://www.spri.cam.ac.uk/contacts/directions/. Cambridge is easily accessible by road, and is only 45 minutes by train from London (SPRI is 10 minutes' walk from Cambridge station). There is no car parking at the Museum; visitors are encouraged to make use of the Cambridge Park and Ride facilities as parking within Cambridge is limited and can be expensive.

Registration for this meeting is through the RMetS website: https://www.rmets.org/event/making-weather-and-climate-measurements-difficult-places. There is no charge for attending, or for entrance to the exhibition.

Celsius Symposium – celebrating 300 years of weather statistics

UPPSALA
UNIVERSITET



Date: 5 September, 13:00–16:30
Location: Humanistiska teatern Humanistiska teatern
Organiser: Institutionen för geovetenskaper
Contact person: Malin Eivergård
Phone: +46704250961
Föreläsning

5 September 2022, 13:00–16:30 - The Humanities Theatre, Thunbergsvägen 3C, Uppsala

Why are long series of weather data so important? Well, we can see how weather and temperature vary over time which gives us important pieces of the puzzle in our understanding of the climate. Learn more about Celsius's contribution to climate research, find out how we use the climate data from our weather observations and listen to experts discuss what we can expect from the climate in the future. The symposium is held in English and will be live streamed and recorded. More information about the Celsius celebration: www.uu.se/celsius300

Program
13:10–13:15 Introduction by Anders Hagfeldt, Rector Magnificus of Uppsala University.
13:15–14:00 Phil Jones, Professorial Fellow at the School of Environmental Sciences at the University of East Anglia: "The Celsius Temperature Series in a global context".
14:00–14:30 Martin Ekman, Associate Professor in Geophysics and author of the book "The Man behind 'Degrees Celsius': A Pioneer in Investigating the Earth and its Changes".
14:30–15:00 Break with coffee, tea and the Celsius pastry.
15:00–15:30 Hans Bergström, senior researcher and expert on the Celsius temperature series: "300 years of weather observations in Uppsala".
15:30–16:00 Anna Rutgersson, Professor of Meteorology: "Current technology and observations for future forecasts".
16:00–16:30 What have we learned? What does the future hold? The future of weather and climate data and interpretations. Open discussion between invited researchers and experts. The audience that attend in person have the opportunity to ask questions.

Register here if you want to participate in person. Last day to register is 15 August 2022:
https://doit.medfarm.uu.se/bin/kurt3/kurt/51103
Register to participate online. Last day to register is 2 September 2022.
https://doit.medfarm.uu.se/bin/kurt3/kurt/51095

Meeting Report

Measuring Climate Change

This was a virtual event held on Wednesday 20 October 2021 jointly with the main society.
It was conceived by the Special Interest Group on Observing systems more than three years ago but was postponed twice due to the pandemic. However, that did mean that the timing was appropriate with the COP26 conference being imminent.

The idea of the meeting was to answer the basic question "how exactly do we know climate is changing and by how much?".

Speakers covered important issues such as how effects of changes in station exposure and changes in instrument types are assessed and accounted for and how historical proxy data sets are combined to create long time series. The most interesting things for me were the difficulties involved and the ingenuity being used to overcome them. Several speakers gave interesting descriptions of experiments being made to recreate measurements using obsolete equipment (or replicas) to understand their errors, effectively creating an overlap of measurements between sensors after the event.

The meeting was chaired by Mike Brettle and attracted 80 online visitors.

The meeting is well described on the RMetS website at: -
https://www.rmets.org/event/virtual-measuring-climate-change

A description of key points follows.

The first presentation came from Prof Phil Jones, Research Director of the Climatic Research Unit, University of East Anglia. He covered the major problems in assessing long temperature series. These include site changes, observation time issues, methods of calculating the daily/monthly mean and the true mean and exposure and urbanisation issues. The idea that actual measurements of temperature are not so important as identifying changes ran throughout this presentation. For example, it doesn't matter if a site uses the 'Nordic formula' for true mean (Tx+Tn)/2 as all anomalies from a fixed period are combined into a grid. All that is needed is a consistent method through time. Interestingly there is no recommendation from WMO as to how daily temperature means should be calculated.
He gave an example whereby time series from 70 US stations and a total network of 1228 were compared. The agreement was striking. This showed the algorithms work, and we don't need thousands of stations to calculate the large-area mean. In fact, for a global average only about 100 well-sited stations can give good results.
I was particularly impressed by pictures showing how exposure effects have been studied by rebuilding old screens and taking parallel measurements or using locations where the old methods are still used. Typically, the effect is annually about 0.4°C, but with most series temperatures are too warm by up to 0.7°C in June.

Urbanisation is dealt with by developing a dataset of rural-only stations. These are then gridded and compared with the grid with all the stations.

His last slide, and to me the most impressive, was from work by Guy Callendar in 1938. The temperature series from the 1880s to the 1930s he had produced stood comparison with the latest analysis of global temperatures over that period.

Dr Stephen Burt, Visiting Fellow, Department of Meteorology, University of Reading followed with more detail on instrument changes. He used Oxford's Radcliffe Observatory (an unbroken daily record from November 1813) and Durham Observatory (record commenced July 1843) as useful examples since both have long records. Long series of weather records are most useful when accompanied by detailed descriptions of the site and instruments used. Unfortunately changes in instruments or observing practice may be misinterpreted as genuine climate trends. Fortunately for Oxford and Durham good metadata has been used to enhance the long series of records. The requirement for accurate and detailed metadata remains at least as important in the digital age particularly where existing 'manual' observations are increasingly replaced by automatic weather stations. For example, at Oxford there has been no overlap of modern electronic temperature measurement and mercury thermometers. The mercury maximum thermometer has therefore been re-instated. Differences have been found and some adjustment will be needed. Similarly, an AWS installed at Durham in 1999 coincided with an increase in rain days of about 15% in subsequent years. Other sites nearby show an increase too but only about 5%. Precision can affect extremes. Even units of measurement are sometimes not clear, especially for wind measurements and observing hours can change over time.

Dr Elizabeth Kent, researcher at the National Oceanography Centre moved on to measurements at sea. Before about 1980 a measurement of 'global surface temperature' would probably have been based only on land observations although before 1990 air temperature measurements were made more frequently than sea surface temperatures (SSTs). The first SST temperature measurements go back to 1772 and were made by sailing ships. Now most come from drifting buoys. From the 1990s SSTs were more usually used alongside land measurements.
Both types of temperature measurement need careful treatment before use in climate records. SST measurements need adjustment to reconcile measurements made using different methods and on different types of platform (such as on ships or buoys).
Old style canvas buckets had to be read quickly. Elizabeth showed some impressive infra-red images of canvas buckets containing water as part of a laboratory investigation into this problem.
Air temperature measurement at sea provides particular problems. Air temperature measurements need to be adjusted to a common reference height and to account for biases due to daytime heating of the superstructure near the sensor. Night Marine Air Temperature (NMAT) is used to avoid the effects of daytime heating. Overall SSTs are generally warmer than air temperatures, an effect mainly due to the tropics. Unfortunately, before 1850 most observations were made in daytime. With care it is possible to adjust for daytime heating bias allowing earlier observations to be used reliably.
She gave example of two ships - the Hazard operating in the Pacific and the Belgianland in the Atlantic. They showed 4 and 1 degree Celsius diurnal cycles respectively.

Prof C Merchant, Professor of Ocean and Earth Observation, Department of Meteorology, University of Reading moved from the sea to space with a presentation on satellite-based climate data records
Chris highlighted the key differences between in-situ and satellite measurements. Satellite data does not go back as far but covers larger areas. The number of observations available is immense. There are problems though. They are subject to diurnal variation if there is drift in the local time of overpass of a satellite.

Other problems include the limited number of instruments in use and systematic errors of sensor ageing and changes in the technology in use. Nevertheless, there is good agreement between trends measured by satellite and in situ measurements. Systematic errors are important for satellite measurements. These are often similar to the problems facing in-situ measurements - sensor ageing, new technologies for example.
Satellite data does often still need some sort of interpolation process to create total global cover (not a simple process but uses careful algorithms).
Questions after this presentation raised some further interesting problems. For example areas with high cloud cover being under-represented. Chris explained that microwave observations can 'see' through cloud but only for the last 2 decades. Measurements over sea ice are difficult because it's emissivity varies in a poorly known manner.

Finally, Professor Tim Osborn, Climatic Research Unit, University of East Anglia
This focussed on using instrumental and proxy data combined. A proxy being a quantity that can be measured and itself varies with changes in a climate parameter. Tree rings are a good example. There is a problem in that they are affected by multiple influences. They can be precisely dated though and it's possible to average over many individual trees and environments. Choosing samples at the edge of their range can increase sensitivity of tree ring data to environmental influences. Linking tree ring data to meteorological parameters is essentially an empirical process. When a tree died can be found using overlap of adjacent trees and looking for matching patterns. This is more precise than carbon dating.
He used two examples - moisture limited tree growth on the NE Tibetan Plateway and Yamal Peninsula in Arctic Europe.
Large spatial scale networks of proxies can be combined. Tim gave as an example a composite plot of temperature anomalies around 11 volcanic eruptions.
Showing 2000 years reconstruction. Data came from different sources. Trees dominate in the last millennium, sediment in the first.
Proxy data can also reveal events for example, the North Atlantic oscillation. In this case by looking at two sites in Scotland and Morocco expected to show opposite effects.

All the speakers gave very informative presentations. The meeting will have answered a lot of questions and improved understanding in the audience.

Scientific Article

Proxy climate data

Ian Strangeways

July 2022

At a recent committee meeting of the RMetS *Meteorological Observing Systems, Special Interest Group*, proxy climate measurements were discussed. While these are not produced by instruments, like mercury thermometers for example, they are nevertheless 'Natural Meteorological Observing Systems' - in that they 'record' their response to changes in the environment around them, including the weather and climate. Our discussion encouraged me to do some private research of my own into the current state of the art. What follows are my findings and thoughts on the matter. The opinions expressed here are mine entirely, and do not necessarily represent those of the Special Interest Group or the Royal Meteorological Society. They are, however, relevant to meteorology and, in particular, to climate studies. The references cited are the most up-to-date that I could find. It is a fascinating area of research, somewhat ignored I feel.

Proxy data are the only way we have of sensing what the climate was like before the invention of scientific instruments, the first sealed, liquid-in-glass thermometer being developed in Italy around the mid-1600s. Of particular interest, here, is how the proxy data have responded to the changing climate *since* the use of instruments began, almost 400 years ago, and how their readings compare with those of scientific instruments over that period.

This is important for several reasons. The proxy data complement the instrument measurements as an alternative 'independent' estimate of climate, and they also extend the area of coverage of instruments geographically, which has been, and still is, limited in many parts of the world. Also, by calibrating the proxy measurements against precise instrument measurements, over as long a period as possible, the climate prior to the instrument era will be estimated with increased confidence. The most relevant variable in climate-change is, of course, temperature. Proxy temperature-measurements are, therefore, those of greatest interest.

The value of having proxy climate data coverage over as much of the instrument era as possible was also raised by the IPCC in their fourth Assessment Report, where they expressed the view that: …*this assessment would be improved with extensive networks of proxy data that run right up to the present day. This would help measure how the proxies responded to the rapid global warming observed in the last 20 years*.'

Proxy climate measurement are obtained from many different sources, each having a different time-resolution, for example tree-rings, ice-cores, corals, sponges and glaciers can often discern individual years, whereas lake and marine sediments, borehole temperatures and cave formations (stalactites) are limited to decadal-to-century resolution.

Tree-rings occur as a light band, reflecting growth in the spring and early summer, and a darker band, forming in the late summer and autumn. Growth responds not only to temperature but also to precipitation and other influences, such as the level of solar radiation which might be affected by air-

pollution and volcanic activity; disease can also be a factor. So there is not a simple one-to-one relationship between tree-growth and any one variable; informed inferences have to be made to extract the required temperature information (Briffa and Osborn, 1999. Briffa et al**,** 2004.). Rings are most useful where there are clear seasons, making trees in the midlatitudes more responsive than those in the tropics. They are also limited to areas where suitable trees grow; and they only tell us about conditions in the growing season, not the full year. A problem arose around the 1960s, called the tree-ring divergence problem, when it appeared that the rings had stopped mirroring the thermometer record. But this appears to have been resolved, being limited, it seems, to trees in high arctic latitudes, possibly, it has been suggested, due to 'global dimming'. Nevertheless, tree rings do provide a long-term pointer as to temperature and also give information about individual years.

Ice sheets and glaciers form through the compaction of snowfall over thousands of years. Drilling down through the layers of ice to retrieve a "core", obtains a cross–section of that accumulation. Contained within the cores are dust from volcanic eruptions, air bubbles that provide samples of past atmospheres, notably carbon dioxide, and oxygen isotopes in the water. The latter provide information on temperature at the time the snow was precipitated. The isotope ^{18}O is slightly heavier than ^{16}O and causes the water molecule in which they occur to be heavier, so that more energy is required to vaporise $H_2{}^{18}O$ than $H_2{}^{16}O$. The ratio of the two isotopes in the ice core can be used to estimate the temperature at the time the ice was formed (Buizert *et al*. 2021, Stenni *et al*. 2017). As with tree-rings, individual years can often be resolved in the ice, making tree-rings and ice-cores particularly useful as proxy climate sensors if we are interested in looking in detail at the last few hundred years, year-by-year, and comparing them with the instrument record. Ice cores are especially useful as they also contain information on carbon dioxide levels (from the air bubbles in the ice) and volcanic activity from dust. Unlike tree-rings, which are very local in their record, ice-cores reflect the environment over a much larger surrounding area, from where the snowfall originated.

Whether *phenology* can be considered as a form of proxy climate data is debatable, but it is certainly closely related. More could be made of the observations going back to Gilbert White, William Markwick and Robert Marsham and their successors (Strangeways 2018).

Tree-rings and ice-cores are the principal proxies that can resolve each year. There are others that can distinguish individual years, like corals, sponges and glaciers, but these are more specialised. Others can only resolve decades or centuries, including lake and ocean sediments, borehole temperature profiles and cave formations such as stalactites. These additional proxy techniques will not be described here, as the main concern of this article is with proxies that can be brought right up to the present day, with a yearly resolution. However, an outline-summary of all the different techniques can be found at the following website (last accessed on 7 May 2022):
https://interactive.carbonbrief.org/how-proxy-data-reveals-climate-of-earths-distant-past/

There is very little information available on the topic of proxy climate data for the non-specialist reader, and many questions arise that it would be good to have addressed. There is scope here for a comprehensive review-article written for the popular scientific press, such as the *Weather* magazine, by experts in the field.

References

Briffa KR and Osborn TJ. 1999. Seeing the wood from the trees. *Science* **284**, 926-927.

Briffa KR, Osborn TJ and Schweingruber FH. 2004. Large-scale temperature inferences from tree rings: a review. *Global and planetary change* **40**, 11-26.

Buizert C *et al*. 2021 Antarctic surface temperature and elevation during the Last Glacial Maximum. *Science*. **4;372**(6546):1097-1101.

Stenni B *et al*. 2017. Antarctic climate variability on regional and continental scales over the last 2000 years, Clim. Past, **13**, 1609–1634,

Strangeways IC. 2018. Phenology: plants and animals as meteorological sensors. *Weather*, **73,** 86-89

Committee Meeting Minutes

Monday 28th February 2022 at 13:00 via zoom

https://ukri.zoom.us/j/94546988492

Minutes

1. Apologies
    - Stuart, Keri, Katie

2. Minutes of last meeting
    - Agreed

3. Chairman's Report
    - There was a meeting of the meetings committee last week but I could not attend as this was during half term. As I am there as a polar expert and not representing the SIG then I could not ask for an alternate.

4. Treasurer's Report

    - Finances still good, membership fees coming in.

5. Newsletter Editor's Report

    - In 2021 we produced two newsletters (Spring/Summer and Autumn/Winter editions). I would like to thank the committee and members for their support in the production of these.
    - The last edition, Autumn/Winter 2021 contained the following:
    - Forthcoming Meetings - Celsius Symposium – celebrating 300 years of weather statistics
    - Biral Article - Monitoring volcanic activity using an electrostatic lightning detector
    - Summer Committee Meeting minutes
    - Autumn Committee Meeting minutes
    - Annual General Meeting minutes
    - I welcome ideas for the Spring/Summer 2022 newsletter at the meeting
        - There was some discussion about possible articles from the committee including possible a report from EGU and possible an article from RPR limited.

6. Committee membership/recruitment
    - Still trying to find an additional Met Office representative.

7. The UK Climate Extremes Review Committee: Membership and topics
    - Possibly look at the precipitation event in Norfolk in August 2020 also the gale on the 18th February 2022. Stephen Burt to follow this up when his book signing is over. There needs to be good representation across the board on the review committee including the Met Office and Torro.

8. Proxy measurements.
    - The idea of a meeting on proxy measurements has been suggested as a meeting but after discussion round the group it was decided that it would be better to put it in as a question to be published in weather on asking where there have been no recent proxy data.

9. Future Meetings

(a) Climate measurements in difficult places.
    - A full list of speakers has been organized and the meeting will be held in Cambridge at the Scott Polar Research Institute on the 5th October see https://www.rmets.org/event/making-weather-and-climate-measurements-difficult-places

(b) Visit to Eskdalemuir.
    - It is not clear yet if the Met Office Lerwick anniversary will be a public event.

10. Any other Business
    - Stephen Turner noted that it is the 60-year anniversary of the climate station at Wallingford. Possibly an article about it for the newsletter. Possibly an option for a summer visit.

11. Date and venue of the next committee meeting

    - Doodle poll to be setup to find peoples availability.

Wednesday 29th June 2022 at 13:00 at the society headquarters and online

Minutes

1. Apologies
    i. Stuart, Keri, Katie

2. Minutes of last meeting
    i. Agreed with one correction.

3. Chair's Report
    i. There has been one meeting of the meetings committee where the upcoming "Climate measurements in difficult places" meeting was discussed.

4. Treasurer's Report
    i. Finances still good, membership fees coming in.

5. Newsletter Editor's Report
    i. Still looking for more articles for the next newsletter.
    ii. Mark said that he would like to step down as newsletter editor and Stephen Turner agreed to take over from him in a phased transfer.
    iii. The committee thanks Mark for his efforts during the past 12 years as newsletter editor.

6. Committee membership/recruitment
    i. Still looking for an extra person from the Met Office to sit on the committee.

7. The UK Climate Extremes Review Committee: Membership and topics
    i. Nothing has been done on this, but Stephen Burt said that he would look into it in the autumn when he should have more time available.

8. Proxy measurements
    i. The article that Ian wrote will not be appearing in Weather, he said that he would send it round the committee to consider if it could go in the SIG newsletter.

9. Future Meetings

    a. Climate measurements in difficult places.
        i. SPRI has been booked for this meeting on the 5th October, it will be an in person

meeting only and can be booked via this link https://www.rmets.org/event/making-weather-and-climate-measurements-difficult-places

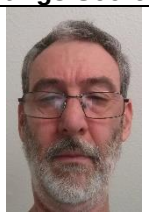
ii. There are question marks over two of the speakers and it is hoped that those can be resolved.

(b) There was a discussion round the committee about possible meeting for 2023/24 with urban meteorology or urban flooding being suggested for 2024. Steve Colwell to look back at other previous meeting suggestion and then discuss these options via email for a meeting in 2023.

10. Any other Business
    i. None

11. Date and venue of the next committee meeting
    i. Looking at the 4th October as an option for a face to face committee meeting with a virtual AGM before this, location to be confirmed.

Group Officers

Chairman and Acting Meetings Secretary	Treasurer & Membership Secretary	Newsletter Editor
 **Steve Colwell** British Antarctic Survey Madingley Road Cambridge. CB3 0ET Tel: 01223 221483 src@bas.ac.uk	 **Mike Brettle** 94 Countrymans Way Shepshed Loughborough Leics. LE12 9RB mike.brettle@hotmail.com	 **Mark Dutton** EML 7 Jupiter Court Orion Business Park North Shields. NE29 7SE Tel: 07810448726 mark@emltd.net
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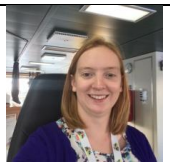
 **Stuart Goldstraw** Met Office (Details coming soon)	 **Katie Muchan** Environment Agency (EA) katie.muchan@environment-agency.gov.uk	