Summer School Keynote - Communicating hydrological data-20250716_090228-Meeting Recording

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Samantha Rees started transcription

Samantha Rees 0:03

If Steve's going first, I'll hand over to Steve. And if you and if we could take questions at the end of each of their talks, if you have a question for Steve, please write in the chat and we'll come to it at the end. Thank you.

Steven Cole 0:16

Awesome, right? OK, just checking. You can see my slides and they're on the full screen. Yeah. Great. OK. All right, but welcome, everybody. So my name's Stephen Cole and I head up one of the.

Samantha Rees 0:24

Yeah, we can.

Steven Cole 0:33

Science groups at Ukch, so it's on hydrological forecasting and digital systems, and I'm going to present some work not just from our group but from across, across ukch. So it's not, it's not all my work. There's lots of lots of people that contribute to this and.

Yeah, it's the way we work in ukch. Lots of lots of multidisciplinary teams to make these types of things happen. OK, so we wanted to talk a bit about communicating hydrological data, so.

As you probably become aware over this weekend you you're probably aware anyway. There's a whole range of hydrological data that's available for people to to use in different ways, whether that's for research or for operational.

Decisions. So these could be point observations, things like rain gauges and river river level on play, it could be gridded data sets. They're things like radar rainfall that you might see on the weather forecasts or satellite data.

And it could also include model output, so and these could be deterministic where

you just have one model output or they could be ensembles, so they could be. If you've got a future projection, you might have multiple realisations of the future situation.
So what that means is that there's a there can be an awful lot of the the a lot of information for users or stakeholders or researchers to to analyse, and we can probably all sympathise with that. That chap in the corner where you've got a wealth of data and you're still trying to come up with this.
Insight or decision that you need to make so.
One area that I work a lot in is in sort of flood forecasting, so it could be somebody is trying to decide whether or not to issue a flood warning for a certain area and it's a yes or no decision really. Whether you make that that cool. And so it can be quite tricky when you've got lots and lots of different data sources to look at. So how do you make?
Do we make that data more actionable to support to support the decision makers?
So some of the drivers for the for some of the things that we do in ukch is around things like the Sendai framework. So this is.
The United Nations and it's a international framework around Disaster Risk Reduction, but the aim is that want to reduce, reduce disaster risk and the losses associated with it. So that could be.
Lives. Or it could be livelihoods, physical damage to things, cultural damage. So all these different types of impacts that the the natural natural world can have on us. So that could be from floods and droughts in in this case. But it can be other things. Earthquakes, tsunamis, all these sorts of things as well. But when we think about risk, that can sort of change over over time. So we might have an idea of what our background risk is at the moment. So that could be, you know, some assessment of what we think the average annual flood damage might be. So say for the UK.
But we're also interested in understanding what it might be in the future. So if we're doing planning, we might want to understand what it is in, you know, 50 years or 2050, for example. But we also might want to know.
Well, what is actually happening right now or perhaps over a sort of forecast period and that could be from days through to maybe weeks, months or even even a few years if we're thinking about national risk assessments?
And all of this can be underpinned by understanding more about historical events and impacts as well. So looking backwards can be can be useful to put things into context.

So I wanted to give you some there's AI got a challenge. I've got quite a few potted examples here of how we use data in different ways to try and address some of these problems, and one of the one of the big challenges we have is around flood estimation. So.
At UKCH we did, we developed these industry standards, statistical methods for understanding flood risks. These are based on historical observations of rainfall and river Flay. And it's to help with things like flood risk assessments. Say if you're designing a defence structure or a cold.
And what's the capacity that you need to cope with in terms of rainfall or or or river Flay for example?
And say just to say a little bit about how what we what we do and how we use that data and communicate it. And there are two types of statistical methods we use, one is looked is focused on the.
Rainfall. So we've got a depth duration frequency model, so that uses long records of quality controlled rainfall and so they can be daily daily in our hourly rainfall data and on the right there, we've got the sort of output through through the web.
Web service for consultants and others to use so they're showing you what the 1000 year one hour catchment rainfall is for a particular catchment for example. And there's the sort of growth curves, the rainfall frequency curves.
Below, and we do similar things for flood frequency as well and these will use not only those observations on rainfall and river flow, but it will think about catchment descriptors as well. So you know the area of your catchment, what the standard average annual rainfall is, what the urban.
Coverages and so forth to help you estimate things like the the median annual flood, and then you can estimate the higher return periods as well. But communicating this is important. So there's one way the outputs are available through through web services.
But also it's communicated through reports and webinars to to educate others about the methods and the data that's gone into these things. And right now we've got a big update and the British, British Hydrological Society is.
An important society in the in the UK and we've got webinars where we're disseminating the information to to the rest of the community.
So that's one thing about sort of statistical methods. Now I wanted to say something about sort of modelling chains that we use. So I'm using flood forecasting here, but it could equally be similar approaches to climate change projections. But you you have

inputs. So these could be precipitation, river flows, potential EVAP.
Operation into these types of models and they can come from a range of sources. So there we've got a radar image on the right and on the left, some rain gauge, interpolated rain gauge information and you can see the sort of pros and cons. These different types of sources.
We use those with flood models and then we can produce output such as. In this case the river flow or river level up to time now. So use those observations to get our best estimate of what's happening right now, and then in the future we can use project projections. In this case, it's a forecast from.
America Weather prediction model. So you could just have one forecast and that would just give you one one forecast river flow. But more commonly we're using ensemble information to try and try and understand the uncertainty in these projections. So you can see there.
How the uncertainty might increase as a function of the lead time and how we communicate that and use that for decision making is important.
So within the UK we have national scale models. So we've got something called the grid to grid model which operates across across the UK, one kilometre resolution and a 15 minute time step.
And it produces outputs out to to five days or so for the flood forecasting application, and it's used for flu view. So river and surface water or flu view flood forecasting.
And it uses spatial data sets on terrain, soil, geology and so forth. And then they sort of ensemble forecast that we're talking about are important for feeding into things like hazard impact models and the flood guidance statement. So there's a picture there of the flood guidance statement that is issued by.
The Flood Forecasting Centre and the equivalent is Scotland to emergency responders. So that's one way the data gets Fiat fed through to these types of output products.
So an example of how this has worked say this is something from cper, so they they have the probabilistic outputs here from the grid squid model on the left.
Then they use that to issue their their forecasts to to emergency responders and the public highlighting where the the greatest risk is. And they also used it to trigger emergency satellite information collection because they had confidence.
Since something was happening, they could they could task the satellites to collect additional data that they can then use either during the event or afterwards for paste

event analysis.
And so I said something about impact models say you may, you may be familiar with these types of risk matrices, but the idea is that we're not just talking about the hazard. So how high the river level might be.
We're trying to think about what the potential impacts are of that, but also in these sort of risk matrices you're trying to capture the uncertainty. So you've got, you've got the likelihood here as well on the, on the Y axis. So we've got impacts on the X axis from minimal to severe and then you've got the likelihood from.
Very low to high, and that combines to give you the overall risk. So this is common. This is a sort of common framework that's used in the in the UK for a severe weather warnings, but it's increasingly used internationally as well.
So to make those sort of things more automated, we've been developing hazard impact models that use this sort of risk approach of risk being a combination with hazard exposure and vulnerability.
And and and part of this has been done in under the Natural Hazards Partnership, which is sort of a combination of a range of government organisations and universities and research organisations that come together to try and develop these these new services.
And say just to talk you through one of the the the models that we have running. So this is the England and Wales Super Forecasting Centre. We have various sources of existing information. So we've got ensemble rainfalls we've got.
Ensemble hydrological module outputs, but we've also got some important static information from detailed flood maps to where where things may be impacted and we have information about receptors and population. So we can combine this together so we can get an idea.
With our hazard footprint from these ensembles of where we think flooding might be, we can use this information on flood maps and receptors and population to try and understand what the impact might be, and then we can pull this together into real time systems to.
To deliver real time estimates of flood risk and these are the sort of tools that go into the these flood guidance statement products.
And we have a similar system that we've developed recently for for Scotland say it's got a similar components here. The only difference is that this was just focused on surface water through rainfall. So we didn't we didn't have a runoff component in this. We were just using.

A ring pull input, but it's a very similar system and it's something that we're running at UKCH 24/7. But what how? How it can be used? Here's an example from a storm bibet.
And so that's in two 2023 and some of the benefits of this type of approach, we were looking at impacts on property and on transport they they could prepare earlier.
And so warnings got got out earlier and actually one of the things that was interesting in this event was that Transport Scotland, who are responsible for the rate network, actually proactively closed one of the the A roads for the first first time they've not really done that before. They've waited for things to happen before they. Would react and close the road, but because of the confidence in the forecasts and they took a different approach this time and proactively closed the road in advance and and through, this has been various sort of interactions with different stakeholders in Transport Scotland, Scottish Water, there's been a lot of positive. Feedback about these type new types of products and services.
So now I wanted to change and have a little discussion about climate change. Say we use similar modelling chains to to support looking at what the impact of climate change might be on on UK flooding and that gets.
Communicated through different ways, so the climate change risk assessment process, but some of the graphs and some of the statistics that you can get at. So this is in this is in collaboration with with others other consultants that.
Can help with calculating some of the impacts, but some of the headline type things you can get you can you can see. So this graph on the bottom is showing two different future epochs. So twenty 50s and twenty 80s and what the impacts might be and the different temperature change scenarios whether it's.
2° or 4° and this is really showing the change in expected annual damages and in this case is for non residential property. So commercial properties and it's broken down by the different countries within the UK and the Black one is the overall UK.
Damage. So this is one way that information is communicated to help with those sort of decision decisions and planning and.
There's going to be I'm going to show you quite a few things in the in the remaining slides around climate change impacts. Sorry, about portals and how delivering, delivering information through web portals has been a really step really big step change over the last.
Five, five years or say and one here is around climate change impact. So you can go on any location within the the UK River network and you can see the sort of

information I've shown before. In this case it's looking at the how, how the frequency of.
Floods might change, and the different climate scenarios going forward, and there's a there's a there's a benefit case study from the Environment Agency that can you can look at as well if you want to understand a bit more.
And so now I wanted to that was focused on the flood side. This part is looking at sort of water resources. So thinking more along the low flow or flow volumes. So this is a project, this is called the E flag. It is a project.
It was funded by, funded by government, and it's a complicated diagram here, but it is using from the top. You've got your climate change scenario. So from Ukcp 18 and then it feeds through a whole range of different sort of modelling approaches to.
And get some insights on drag predictions. So it was using the UK climate projections and we're using things like the grid to grid models were an example of the national scale model that we were using. But we're also using other other models as well.
And.
And then we could get information around for for a whole range of catchments across across the UK and there's there's a a data paper and a portal associated with this. But I wanted to go through a few more examples of some of the the headlines coming out of this.
So one of the things that was really interesting was having a look at the load flows, so Q 90. So these flows are exceeded 990% of the time. And what you're seeing here is for a range of catchment. So each plot is for a different catchment.
And you're seeing the the traces from the different models that we used. So it's interesting. So the the X axis is time going from sort of current current date to 2080 and you can see.
Even though there's some disagreement in the models in terms of exact values, the the trend is very consistent across across them. So you're getting this this quite strong signal that the the low flows are going to decrease.
Significantly, in some cases going into the future, so this can have big implications for water supply. So this is an example here of looking at reservoir level. So we're working with the water companies using this sort of information.
And again, it's time along the bottom and the colours as it gets to purple, that's showing a lower level of the the reservoir or minimum minimum level of the reservoir during the year. So you can see how for certain areas.

The the the reservoir stocks are going to be under under stress going forward into the into the future and then finally just want to say something about hydrological status and outlooks. So this is this is a reservoir in Wales and I happened to be on holiday last week and.
On the bottom right is a picture from last Friday and I had to walk around the reservoir and you can sort of see the difference in the reservoir levels from the sort of normal pitch on the left to the one on the right. But to understand the current situation, we've got a whole range of data sets.
We've got the National River Flower Archive, which may have been mentioned earlier in the week, and you'll hear more about it I'm sure today. So that's the UK, we, we, we pull all the information together across the the UK in a consolidated location.
We also have information on soil moisture, so the Cosmos UK network provides information at over 50 sites around soil moisture, so this is auk wide network as well. So this can give us information on the current.
You know, where are we now? And one of the outputs that we produce is the is the hydrological summary. And so that's produced every month. But we can also have a look over the next three months as well. So we we produce these monthly outlooks.
So just to get into a little bit more, this is an example from the 22 dry. So we've got there. On the left there, the the sort of current picture and on the right the the hydrological summary. But we've also started to look at.
Different metrics and how to display these through through various portals and I'll come on to that a bit more on the next next slide. So again a big a big impact, a big improvement here is having interactive.
Live portals with data from a number of providers, so this is looking at we've got daily real time river flows for over 950 sites in England and Scotland. It has the Cosmos UK network in there as well. It's got the grain, water, boreholes.
And it's got rainfall across across the UK and this is just another sort of summary of the different sources of data that's that's on the water resources portal. So there are some links and there's some links on the final slide that I can I can put in the chat afterwards.
And to some of these, some of these websites. But it's amazing just having this ability to pull this information together in one coherent location has been a really big improvement and there's been an awful lot of Co development of this with various stakeholders on what do they want to see.
How we can improve the the the the information that's presented?

And say some of the the feedback is it's here from a range of organisations, so it could be natural resources well so equivalent of the Environment Agency, the canal and Rivers trust water companies for example.
So it's like I said, it's been a really big push in this direction over the last few years and it's really having it is really having impact on how people do their day-to-day activities. So as I said, there's there's the forecasting part as well. So the look forward for the next three months.
And that's a it's a. It's a comprehensive suite of methods, so there's different approaches, there's ensemble stream flow prediction, there's statistical approaches, and there's the dynamical meteorological to hydrological forecasts.
And again, this is this is now not in the past, it was a static PDF and now it's it's supplemented by an interactive portal. So again there's there's links there where you can. So you can you can zoom in more. You can look at your particular area of interest as well as having.
Real summary.
And just to finish, this is the sort of live situation. So these are the sort of the two latest products that have come out of this, you know the the monthly activities that we do. So on the left is the hydrological summary that is issued this week.
So it has. You can go and have a look and it gives you more information, but you can you can have a you can see on the the map the red is showing where there's there's relatively low flows. In the West we've we've got.
Normal to above and then we've got some. There's some headline points there on the right hand side is the outlook. So looking forward over the next three months, say similar to what you can see on the left hand side, there's this WE split.
Say western regions normal to above normal in July and around normal July to September, but elsewhere predicting it's going to be normal to low plays most likely and in terms of communication, I just thought I'd flag there's been a new initiative this month.
We've started, we use social media a lot as well for communicating these things, but we've started to include video descriptions of the summaries as well. So that's I'm not sure if Steve would be pleased that that's that's one of our hydrologists there, but he he.
He had the the luck of being the first first one to to do the the the first video summary, but yeah, so we're constantly evolving how we're doing this communication and that's just one example. So that's.

That that was a whistle stop tour of an awful lot of information and different things that we do. There's a load of links here to some of the the portals if you want to have again have a play and understand a bit more about some of the underlying data sets. Like I said, I'd stick some of that into the chat.
But yeah, hopefully, hopefully that's useful and just about on time. I think Sammy say if there, if there are any quick questions, very happy to take them.

Samantha Rees 25:49
Haven't had any chat yet, but oh, we've got a hand up.

Steven Cole 25:56
Brilliant. Yeah, please.

SG

Subhajit Ghosh 25:56
Yeah, I in one of your slides that shows the SWMHIM system is forecasting system and there you say impact library. So what that impact library means it's.

Samantha Rees 25:57
Hiya.

SG

Subhajit Ghosh 26:12
Kind of our damage curve.

Steven Cole 26:14
Yeah. OK. Really good question. So this slide.
I think, yeah. So the impact library, so yeah, so I went over this very quickly. So basically we have these updated flood map, we have these surface water maps for specific return periods of flood scenario. So say the 100 year 3.

SG

Subhajit Ghosh 26:21
Yes.

Steven Cole 26:39
An hour duration rainfall for example, and what we can do is for each forecast member, each ensemble member you can see which map is the closest to that

forecast.
And say.
For a particular map, you can use this. These these other sources to try and assess what the what the impact might be so you can see there there's a flood extent and you can you can then think about right what types of properties are affected, what type of transport, what.
What? What type of people? And then you can you can use that to assess how severe you think the impact is.
So hopefully that that, that could see so, so these are static, the impact library static, the bit on the left is dynamic and what we're doing is for each ensemble member we're trying to work out which which of these sort of static maps is the most representative for each of those ensemble members.
So then we get that that spread of uncertainty and what we think the impacts are.

Subhajit Ghosh 27:49
But it's this library open source like hazels or something or or it's just proprietary?

Steven Cole 27:56
Say some of this.
The the maps are becoming openly available, so you can you can download these.
Some of the this information is sensitive or not not publicly available. So some some of the calculations have to be done in a in a in a closed way.
But the methods are published and yeah, so you can you you can understand the methods.

Subhajit Ghosh 28:24
Oh.
Thank you.

Steven Cole 28:38
Yeah, if there's any, any.

Samantha Rees 28:39
Any other questions?
Hey, thank you.

Steven Cole 28:46
Well, that's a really good question. Thank you.

Samantha Rees 28:50
Thank you, Steve. We will hand over to Manuela now. I think if you have got any questions, Steve, if you need to shoot off of whatever. Yeah, but I can send questions through to Steve, if there are any that sort of come up for anyone. So feel free to stay. Steve, if you want to. But yeah, I know how.

Steven Cole 29:04
Yeah. Please stay. Please stay.
Yeah. Yeah. Go visit. Yeah, yeah, yeah. There's a long list of things, but there. Thank you. Thank you.

Samantha Rees 29:09
How much everyone has on.
Right.
Thank you. And I will hand over to Manuela now.

Manuela de Mendonça 29:22
Thank you, Sammy, and thank you Steve for that as well. That was really, really interesting. I think what I am going to talk about follows on quite nicely from that and doesn't really overlap too much.
Can you see the slides?
Yeah. And I assume you can all hear me great. So I'm going to talk about communicating hydrological science, not just data and more particularly communication for large research projects.

Samantha Rees 29:41
Yes.

Manuela de Mendonça 29:57
And communication with laypeople as well, and looking at kind of the how and the why we do this. So I'm project manager for Hydra Jewels. One of the projects that

kind of Co sponsors this course and a lot of the scientists who will have been. Running the courses that you've been taking also work on Hydro Jewels as well, and then in the other part of my job I work with non university research organisations across the UK working on their relationship with government and how that works and how it can work better.
So I'm not a scientist, which I think for management and communications around large projects can actually be a really helpful thing sometimes because a lot of my job is around.
Making sure that the science that we promised we're going to deliver is actually delivered and making sure that it ends up in front of the right people as well. This might end up being a big part of your jobs and your careers as well if you stay working in research, it might not be something that you're particularly interested in, which is fine, but it's really important to understand.
Like the context of this and why it's important for kind of big research projects as a whole to have like a good communication strategy and how that feeds into the scientific research itself. So I'll talk to you a bit about communications within Hydra Jules and then also we can talk through writing.
For a kind of non expert audience and some tips that I would give you based on some of the kind of policy briefs that I've had to write before.
So basic question, why is it important to communicate science and research effectively, so there's kind of a whole range of reasons that I think are probably quite obvious to you already. So on one end of the scale, we have big issues like the coronavirus, pandemic and global climate change there are.
Are complicated issues, but they are relevant to everyone and they have to be communicated to everyone in a way that kind of allows different people with different levels of understanding to grasp these concepts, something a bit closer to home is going to be things like communicating with whoever is funding your.
Research and helping them to understand the scope of what you've delivered, how relevant that is to them, and then what further opportunities there are for you to get funding from them or for them to kind of invest in the research that you're doing in future?
You may also at some point end up communicating or writing for non expert kind of layperson groups or kind of educated non expert groups like parliamentary groups on various different environmental issues, different policy briefs or briefs for kind of different.

People working in different industries who have a vested interest in the science that you're doing, but I'm not going to understand it to the technical level that you will as well. So I've just listed a few examples of communication opportunities that present themselves for hydrological researchers. So there's advocating for further.
Funding and so on. A project like hydrogels, we do that as kind of a project as a whole, and demonstrate how that fits into the wider industry. Defending APHD thesis, demonstrating that your funding has been well spent. Again, that's something that we do on large projects, encouraging other practitioners to use new methods that you might have developed.
Educating local or national governments to make informed decisions, which is a lot about what Steve talked about encouraging further or complimentary research in your area, perhaps some other scientists trying to change public opinion or behaviour encouraging other scientists to use your data and your results and also presenting your work.
Work at conferences as well.
So I'll talk to you a bit. First of all around stakeholder relationships and how we manage that on a large project like Hydra, Jules.
So this starts or like the core part of my job with project management is the governance of a big project like this. So monitoring the progress, the different working groups and different scientists are making on their various different work screens.
And looking at how they are delivering against the initial scope that we committed to delivering to NEC, the natural Environment Research Council, who are the main funder for this project? So that includes a lot of internal reporting and discussions amongst the scientists.
That lead various different work streams and then also external reporting. For example, we will have to write a midterm report for NAC at some point in the autumn that provides various different case studies to kind of bring to life some of the work that we've been doing. And then also very clearly going through the original brief that we had and.
Just think if it's changed in any way and if it has changed, why and why we are justifying that and why we think that we're doing the right thing, deviating from the original brief as well.
There's also a lot of external stakeholder communication and engagement as well, so lots of the different work streams, like a lot of the work that Steve was describing,

involves organising meetings with and workshops with other people in the. Hydrological community. So within the UK that can be people like the Met Office like SEPA, like the Environment Agency he I will use the example of Steve again it's helpful for them to understand the research that he's doing so that they can then go on to use it for things like flood forecasting.
And flood warnings as well. We also make sure that we have scientists having a presence at various different international and national conferences as well. And that raises the profile of like the project as a whole, which is really useful as like a vessel for people who are both kind of quite senior in their career and quite junior.
To deliver their research to people, so we try and send people to conferences like EGU and then also have people presenting at, for example, the British Hydrological Society Symposium in the UK as well. A big, big thing that Sammy and I are both organising at the moment is our.
Midpoint showcase meeting that we're hosting in September. So this is something that we've designed very specifically to try and convene other members of the hydrological community, not just scientists who work on HYDRA. Jules.
So we're inviting different practitioners from places like the Met Office and the Environment Agency, who use a lot of our work and then also other scientists from around the world who do complementary research, who would be interested in networking and engaging with our scientists and also having a broader discussion about what.
The feature of hydrological research is going to look like and that can be everything from the final eighteen months of the hydrogels project to you know what research and we should be prioritising for people to use over the next 5 to 10 years.
So this is happening at the Royal Society in London and so we've got people giving talks from all over the UK and some people coming from places like Japan and Canada as well.
Registrations for this are actually open at the moment, so if anyone would like to see an example in real life of what kind of work a large project like this develops, and also what kind of communication and convening events we can put on.
I assume these slides are going to get circulated afterwards and you'd be very welcome to attend if there's any registration doesn't cost a whole lot, but if there is any students who are looking for free registration, then you can e-mail Sammy and I and we'll see if we can do something about that for you.
Hydrogels also does a certain amount of public engagement and outreach as well,

and on large modelling projects large hydrology projects this isn't necessarily a given that things like this will be happening, but it's something that we focus on engaging with people who are perhaps earlier on in their career or.
Or working in a slightly different field to the scientists who work on the project and making sure that they have opportunities to learn from our scientists and broaden the field of expertise within this area. So.
We have things that we offer like this course, data-driven approaches to hydrological science and we also run internships as well. They are actually running at the moment and will be running again next year as well. And they are an opportunity to.
Take some of the things that you might have learnt on this course and actually apply them on a project for six weeks. Working with a group of supervisors and he will kind of give you access to some of the facilities that we can use at UKCEH.
And we've got someone who's working at the British Geological Survey on an internship this year as well. That will then support you to go on and, like, have a bit more context for what you might want to do with your career later down the line. So.
We have that focus on people who are quite early in their career and then also it's important on big projects like this that have a focus on working with other people in the kind of hydrological community to facilitate that as well. So we also provide funding for what we call the researcher exchange programme.
And this lets scientists from other organisations come and spend some time working in person at UKCH or any of the other organisations that also support on hydraules or some of our hydraules scientists to go and work elsewhere as well. So we have someone from the Met Office. He comes and regularly.
Spends a few days per month working in the Wallingford office, which allows for much better kind of collaboration and communication on the science that they're doing together than if they were just having to do the whole thing via teams, calls and emails as well. We also have some people who just come for a week or a two week period.
Or two weeks based out of six months apart and try and do some work and work on a paper together with someone from a different organisation in a way that they maybe wouldn't be able to do if they were trying to do the whole thing remotely as well.
Now a lot of the work that happens on Hydro jewels is at a slightly more technical level than is available to the general public. However, we also try to do engagement with much younger people as well, so we do as well as kind of having.

Your presence on social media and media, we try to go to as many science fairs as we possibly can as well, so it tends to be about kind of one big one per year and we make an effort to go to all of the different 4 devolved countries in the UK and provide.
Opportunities for young people to to think about and discuss how some of the science that we do effects their real lives. So we recently went to The Big Bang Festival in Birmingham which had.
21 thousand teenagers over a period of three days. It wasn't just us, it was other people as well. And they came and we talked to them about things like how flooding and drought might affect their real life, their their worlds.
And we use that interactive sand table for that so they can make little landscapes and then 'cause it to flood cause it to drought. Talk about how they might manage that. We talk about soil moisture and why that might be important. And then also how much water goes into producing their food. And the idea with this as well is that we kind of create a pipeline of.
Teacher scientists. He might not have thought about this type of research before. He then find it much more interesting and then kind of bear it in mind as they grow older and go to university and things like that as well. Again, if this is the type of work that you're interested in and you don't have opportunities through your current study or your current place of work.
And we really like bringing in other people who we don't necessarily know, but enjoy working on this communications bit. So if coming to science festivals and talking about your work and talking about hydrology in general is something that you're interested in, you are very welcome to get in touch with Sammy and I and talk about coming to future science festivals.
As well.
So I'm just going to talk a bit about what good communication looks like if you are writing for a layperson audience, and I think this tacks on quite nicely to what Steve was talking about and very clearly kind of outlined what you can display with the. That he works with and what kind of decision making that's used to inform. So some situations that you might be in working in hydrological research are communicating the value of your research to a programme board or trustees of your organisation. Or people working for a funding organisation who've been supported in your research, who might be experts in their own field in science, but may not understand the nuts and bolts of what it is that you've been doing with hydrological data this

whole time.
And I think sometimes it's very easy to try and condense your research and your work down into something and pack in as much information as possible, which can make it inaccessible to people who are reading it, who maybe don't have the same background as you.
So writing reports for trustees is something that kind of I have to do for hydraules, and it's often helpful for me to do this with someone who's written a paper or with one of the.
More senior scientists on the project. He has kind of got a better understanding of the science and then it's helpful for me, as someone who's not a scientist, to help craft that into something that is easily accessible and digestible for someone. He is kind of educated, but not necessarily a scientist themself.
So if I was in a situation where I was having to write a paper for a trustee, write a short summary for a trustee, or for someone else, perhaps a a politician, or someone working in the civil service and government, I would start out by thinking about what result I'm trying to achieve.
So this can be anything from kind of informing and educating about the work that you've been doing to kind of keep it at the forefront of people's minds. It can be prompting a specific action, like for example, issuing a flood warning, or it might be to kind of support a bid to get more funding in the future.
It's then important to think about who your key stakeholders actually are with this communications place. So are you speaking to other scientists? Do those scientists necessarily have an understanding of your work specifically, and if so, at what level? Is it members of the public who don't have any context for kind of the work that you're doing?
Or are they educated, non experts and it's the educated non experts that I think a lot of people have the most opportunities to communicate with. I would then go on to think about what they already know and what they don't already know because you don't want to pitch something.
In too simple a manner, when you have the opportunity to kind of communicate more or communicate in more detail. If you have that possibility so you can ask yourself questions like do they have a general understanding of the science already? Do they understand the context and do they perhaps know more than you about certain things?
So sometimes he might be speaking to someone. Perhaps he works in the civil

service. He works in government, he knows much more about other people who are working in this industry. For example, what policy changes might be being considered.
That you yourself may not know about, and that's important to kind of think about how broadly you're pitching your ideas and your research and what opportunity do you give them to ask For more information as well. I'd also think about different barriers that you might face if, for example, you're getting someone to change their mind on something.
That they have quite a fixed opinion about and I think COVID the coronavirus pandemic is a kind of a very, very good example of a challenge that was posed there. How much other information they have already, you know, whether they have a broader context for this and where this item is on their priority list as well.
Because if you go back to the first point, which is thinking about what results you're trying to achieve, sometimes simply raising this idea within someone's awareness is really, really important, even if you're not asking them for a specific action. Now, with any kind of written communications piece.
For a non expert audience, I would always make sure that I add in a call to action at the end. So sometimes you don't need them to do anything right now. So if I was writing the report to the UKCH trustees on some of the research that we've been doing, I don't really need them to do anything apart from having a.
If the impact that we've been having and the value of the research that's going on on this project, however, I may be just building their awareness so that I can call on them for support. If I then go and have a conversation with a funder like NAC about. What kind of the feature funding for hydrology research might look like in the future? So this kind of generally falls into the categories of asking someone to stop doing something, to start doing something, to find out more about something. And within this, I kind of include.
Further research is needed in this area and also just simply saying no action is needed for now that can sometimes be really helpful, so I recently wrote a summary for the trustees on a paper that came out of the Hydra Jewels projects on distribution trends and driving.
Of flash droughts in the United Kingdom. That was the lead author is Ivan Negara. He works on. He works with Jamie Hannaford. I don't know if he's done any.
You might have come across them already on this course. You might not have done.

Samantha Rees 49:05
Later on.

Manuela de Mendonça 49:06
Later on. Hold that thought. So with this and I can send you this summary for you to read after just to kind of give you a bit more context, we'd start out with a hook, which is why they should care and give them the context. I'd also talk about in the kind of the middle bit of this section.
What happened? What was discovered to make this paper really interesting? And I'd also throw in a few key statistics and probably images as well that tend to speak for themselves, but keep it quite light on the numbers if you can. And then your final paragraph being on something like, why does this matter and what?
Should be done next and I think if you just stick with the top two and kind of tell them whether they should care and then some interesting things that happened, it never quite has as much impact as ending with a. So what? And giving them somewhere to take their thoughts in the future. And if they're going to go and speak about this research to someone else.
You kind of want to lead them into saying the sorts of things that you would want to say if you happen to be present for those conversations as well. So that's a bit of a whistle stop tour for layperson communication and the management and communication opportunities that big projects.
That we run at UKCH provide. I'm happy to take any questions or you can e-mail me or e-mail hydra jewels if you have any more questions about things like the Royal Society event and working on science festivals in the future as well.

Samantha Rees 50:40
Thank you mamala. That was fab. Do we have any questions? Sorry, I've got a dead leg. Do you have any questions at all?

Manuela de Mendonça 50:48
OK.

Samantha Rees 50:53
Feel free to post them in the chat or pop your hand up.

Hywel Lloyd 50:59

Yeah, I I have a a question. Do you have any tips for dealing with maybe slightly antagonistic audiences? We particularly deal with farmers and water quality at the moment.
Which is quite a talent in N Maryland.
Yeah.

Manuela de Mendonça 51:21

Yeah, I actually also used to work with farmers in a previous job as well. I worked on the farm advisory service and the future Farming Resilience Fund as well. So I spent a lot of time speaking with farmers, I think.
My main tip for a group like that is to find other stakeholders and actors that already have the ear of that industry in the 1st place. So if we were trying to communicate something around like sustainable farming for example, we would try and make sure that we partnered up with a farm advisor.
Kaiser, who was already known in that local area or perhaps someone from the NFU or sometimes you have like slightly bigger personalities and farming that tend to be known either like online or in social media or just our kind of big players within a certain geographical space.
And to use those stakeholders that are already respected and embedded in that community to kind of be the vessel for the message that you want to put out and it's I think always going to be a struggle if you as kind of a technical expert who doesn't have a background in farming, stand up in front of people.
People and try and get your message out and I think you always kind of have to make sure that you're paired up with other people in the industry that already that already have their ear. And I think if you're struggling to get those people on board in the 1st place, that's when you have to kind of go back to the drawing board and say OK, like, do I need to change my offering a little bit and just?
Change the phrasing to make sure that I'm like definitely presenting it as something that's relevant.

Hywel Lloyd 53:00

Thank you. That's really good. Thank you.

Samantha Rees 53:09

Thank you.

Any other questions at all?

If not, then I might.

Stop there and yeah, I will. Thank you so much. Manuela, I think Steve's left, but thank you to Steve as well. We really appreciate you both of your time today. And if I could get, I will get the PowerPoints out to you, if not the end of today then it will be tomorrow. Like I say, I'm just trying to get the recordings working. So I'm just fiddling with that.

Background.

I will post the next link to the next session in the chat, but I don't think it starts until I was. I accidentally joined Tuesday's meeting this morning, so I'm having a great morning so far. Yes. So our next is at 10:30 and it's workshop for with sort of.

Same people as yesterday, but I think Tom Kill is leading this one, so I'll just put a link to that meeting and it doesn't start until half 10. So you've got a nice 35 minute break now. And yeah, if you've got any questions or anything, you know, just give me a shout. But other than that?

Thank you. And see you at half, 10.

Ashling Laffey 54:25

Thank you.

Samantha Rees 54:25

Thank you.

Samantha Rees stopped transcription