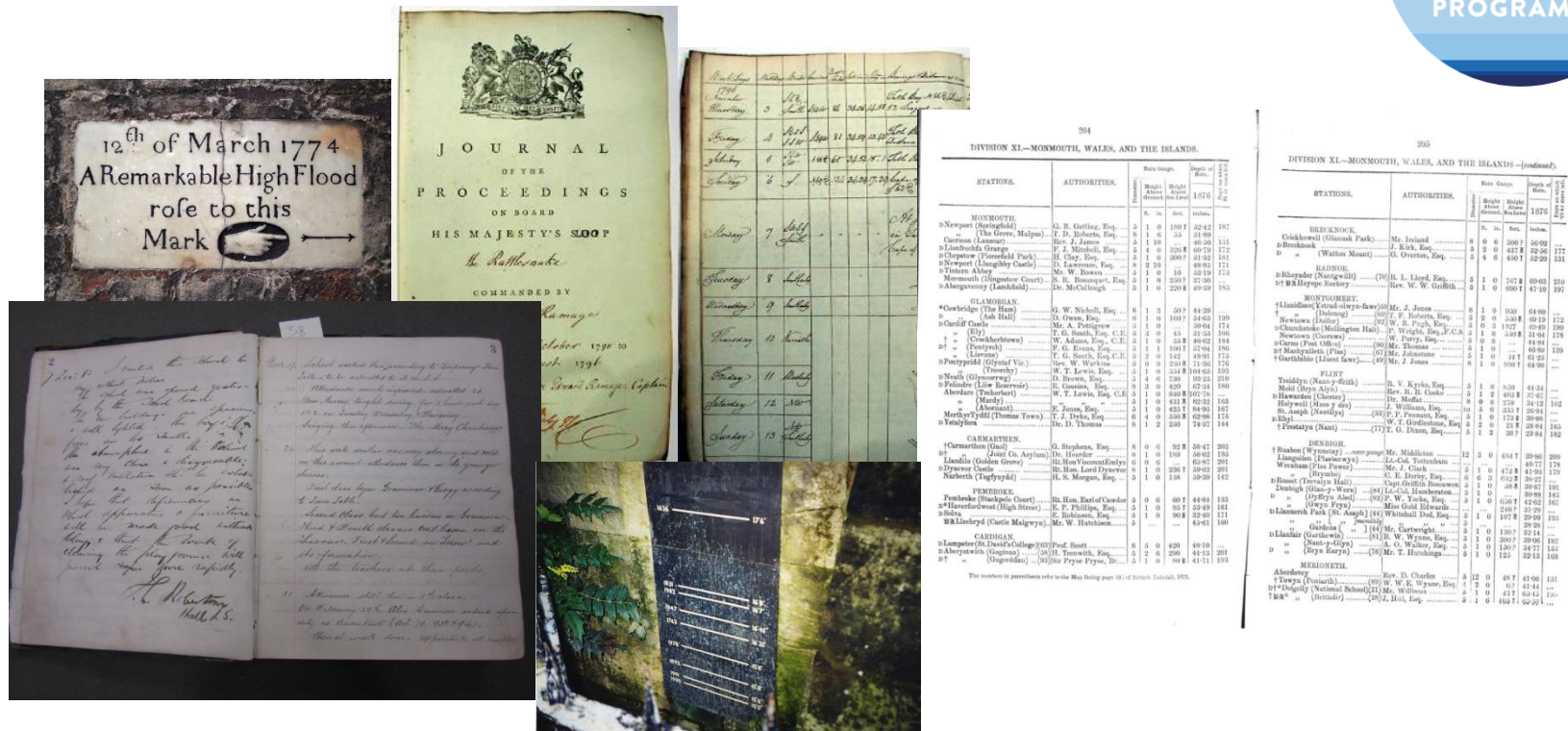


# Building UK climate resilience through bridging the qualitative-quantitative data divide

UK  
CLIMATE  
RESILIENCE  
PROGRAMME



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## **‘Building UK climate resilience through bridging the qualitative-quantitative data divide’**

is supported by a UKRI grant funded through the Strategic Priorities Fund (SPF) lead by NERC and the Met Office.

It was a 1-year project that seeks to capitalise on expertise in developing, using and blending existing datasets and in historical climatology and hydrological research in the UK. To date, research in climate resilience has placed emphasis on enhancing and improving climate models and seasonal to decadal forecasting capabilities.

The network aimed to adopt the principals of ACRE’s (**Allan et al., 2016**) ‘melded’ approach and develop a new protocol for working across different types of historical qualitative and quantitative information.

The protocol will bring a novel dimension to climate service provision by incorporating historical quantitative data, supported by physical weather reconstructions and narrative accounts of the impacts and responses associated with past climate variability and extreme weather events.

Such historically informed and culturally and spatially contingent information could make an invaluable contribution to climate service provision, helping vulnerable communities prepare for future climate risks.

## **What is the qualitative-quantitative data divide, and why does it need bridging?**

This project established an interdisciplinary scoping network that examined approaches for bridging the qualitative quantitative, the 'data gap' in the climate and hydrological sciences, to bring historical data and information into modern climate resilience building.

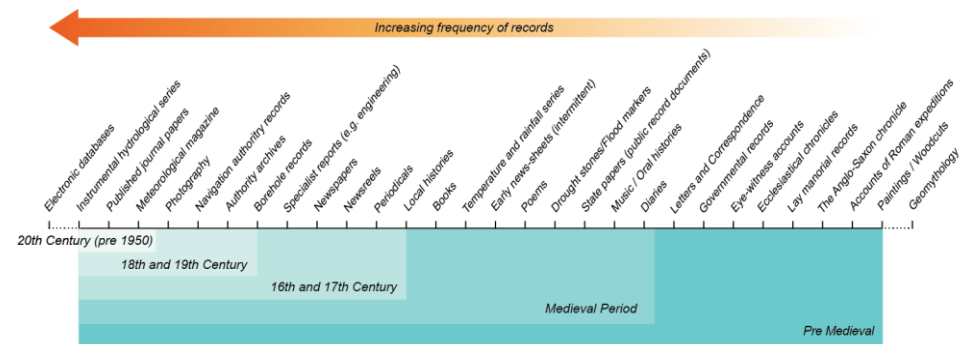
It sought to develop a framework for bringing the knowledge and experiences contained within qualitative information (e.g. books, letters, diary's) detailing past extreme and mundane events together with existent quantitative information.

This information can inform climate service provision by charting the effects of past climate variability and extreme weather events, offering different means of communication, ultimately helping to improve the resilience of the most vulnerable communities to future climate change risks.

# Our key objectives were to:



1. To identify existing datasets used by different organisations and practitioners, and those datasets currently developed within the different disciplines detailing past climatological and hydrological events. It will also determine what and where data gaps exist and how can these be addressed.
2. To explore current approaches to bridging across the qualitative-quantitative data divide (e.g. the application of indices to qualitative data). Identify whether new approaches can be applied to bridging the data divide from other disciplines (e.g. engineering).
3. In consultation and working with project partners, to determine the mechanism and forms of data that would be of greatest utility to practitioners for improving climate resilience.
4. Through co-production develop and share a protocol for all disciplines to work with in bridging across the qualitative-quantitative divide
5. To make this protocol available for a wide range of practitioners and stakeholders to facilitate the development of historically informed climate services



Sangster et al., 2018



These objectives were in part achieved through three workshops:

## Workshop 1 (April 2019 @ UoL)

Focus on determining and documenting existing databases available, detailing both natural events and social responses that exist within different disciplines. Examining how these are interacted with, and are used by, both academics and stakeholders.

## Workshop 2 (June 2019 @ RGS London)

Focus on understanding and exploring existing approaches used to classify and bridge across the qualitative-quantitative divide, whilst also exploring new possibilities. Will also examine potential for the greater use of indices in understanding both the impacts of (vulnerability) and responses (resilience) to past events, using overlapping periods as calibration for methods explored.

## Workshop 3 (Dec 2019 @ Met Office)

Explore concepts of communication, risk and application, bringing together the outcomes from the previous workshops and focus on the co-production of the protocol. This protocol will be supportive of, and applicable to, the Climate Change Risk Assessment (CCRA4), and a wider range of beneficiaries.

# Workshop 1: Databases

Group discussion of existing climate/weather/hydrology databases of value:

## Climate/Weather/Hydrology

[TEMPEST](#), [CBHE](#) (Chronology of British Hydrological Events)

[EURO-CLIMHIST](#); <https://www.tambora.org/>; <https://www.oldweather.org/>

## Social science

[London Lives](#); [Welsh Tithe Index](#); [Old Bailey online](#); [Mass Observation Archive](#); [Sound Archives](#); [Online Newspaper databases](#); <https://storiesofchange.ac.uk/>

**Existing database challenges:** not downloadable; search function(s); manageability; movement through database; clunky; absence of a map interface; use of different datasets

Who are the stakeholders, designed by and for whom?

**Why do we use databases** – Centralisation, synergies, ease, comparison

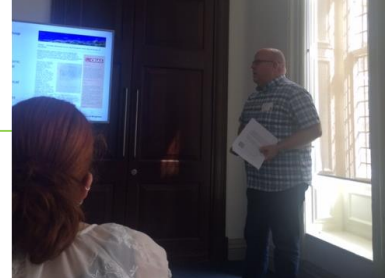
**Limitations** – loss of information and/or context

## Data or information?





# Workshop 2: Indices



## **Disciplinary utility, value and limitations/strengths:**

Commonly used in scientific community. Offers simplification and standardisation of information, for comparison and communication. However, need to still demonstrate their strength in climatology when derived from qualitative sources.

Social science perspective on indices, not normally used as a simplification of qualitative information, need to be explicit about loss of complexity and nuance. Issues around how events are recorded, critical approach needed, recognise value in making sources accessible across disciplines.

Is standardisation of (weather) indices desirable regionally/nationally/globally?

Problems with the concept of 'normal'. Takes us further away from the lived experience.

Lose emotional impact/context by converting qualitative to quantitative, which is important for looking at impact and resilience to extreme events.

Different audiences - storytelling for public engagement vs indices/graphs etc for policy



# D.O. Jones diary's, Snowdon example

Diaries from Ysbyty Ifan (nr Bala), however limited local upland meteorological data.

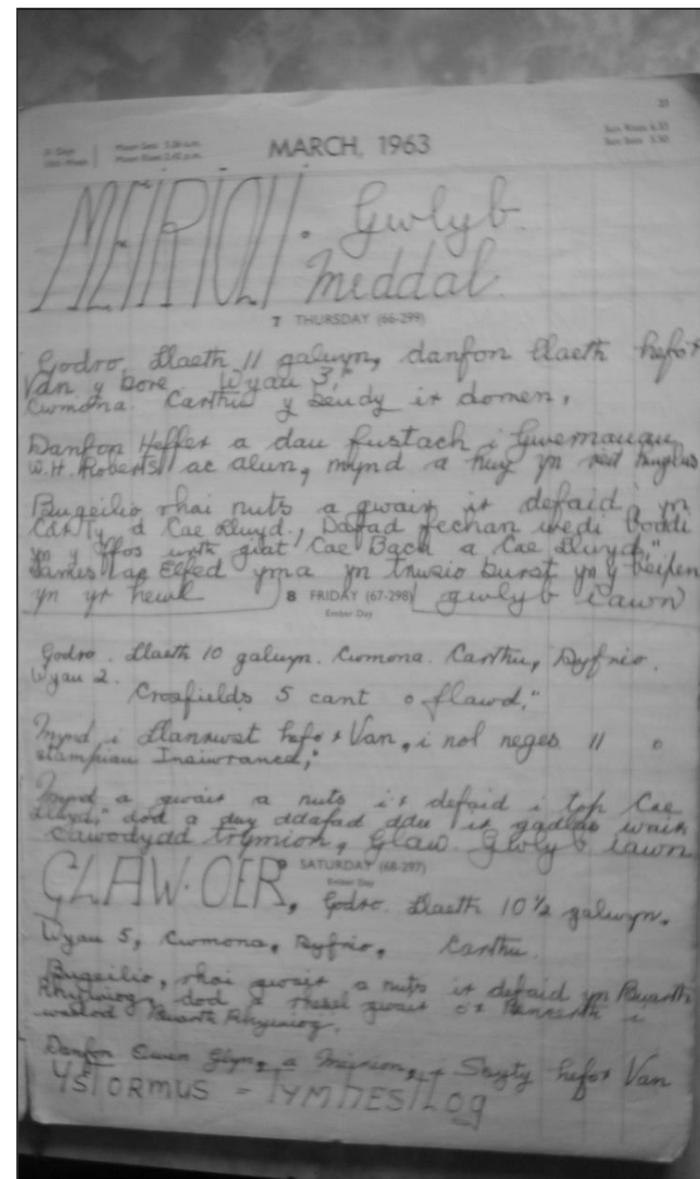
Wealth of information on daily weather, farm practices and 'other stuff'.

Conversion to indices permitted comparison across time and space

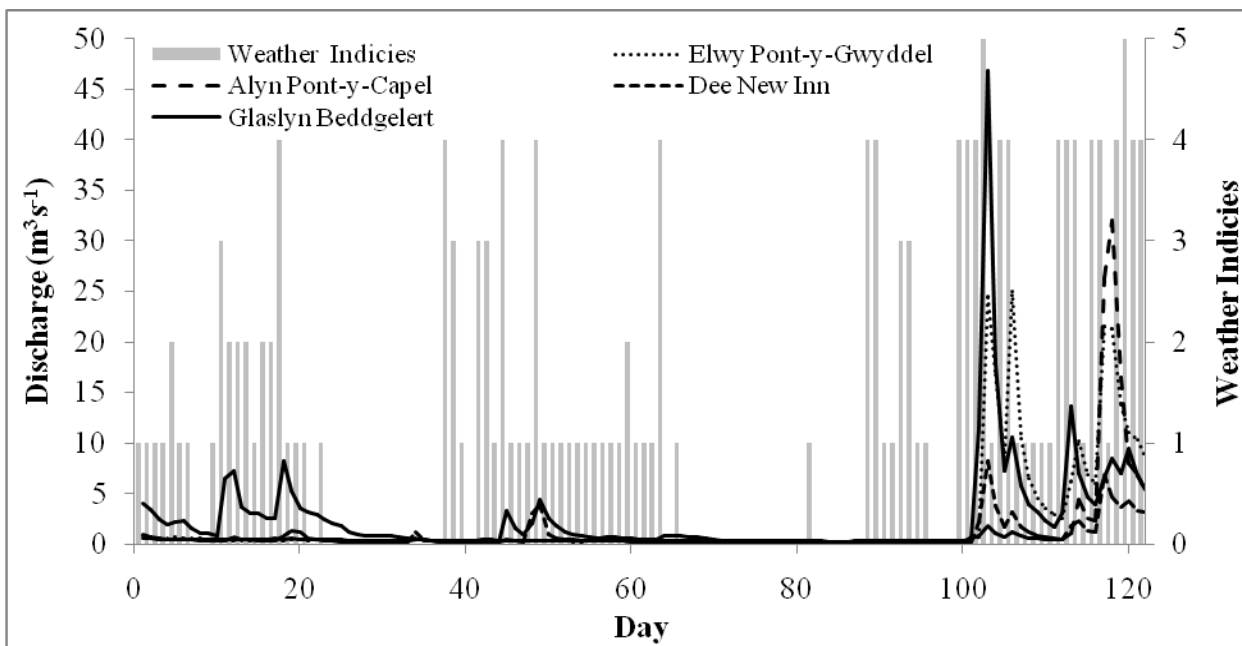
- 3, 5 or 7 point scales generally accepted (5 used)

However, there are losses to consider in converting.... the personal narrative and context of the weather in the daily life of the farm.

D.O. Jones diary, nr Snowdon  
1934-2000

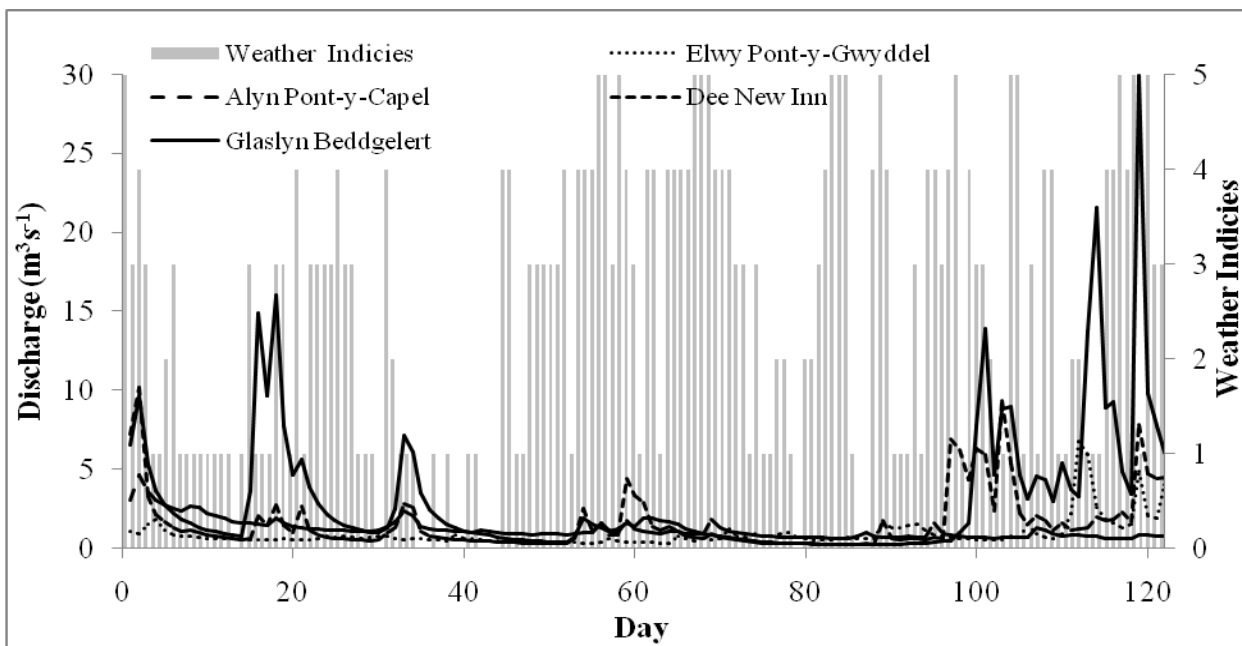






Relationship between weather indices derived from D.O. Jones diary and regional river discharges

(dry) (1<sup>st</sup> June – 30 September, 1976)



Weather indices (the numerical range applied in Figures 3 and 4).	
Weather type	Indices value
Drought / Hot	0
Dry / Fair / Close	1
Drizzle / Foggy	2
Showers	3
Rain / Wet	4
Storm	5

(wet) (1<sup>st</sup> June – 30 September, 1988)

# D.O. Jones diary's, Snowdon example

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## Multi-source reconstruction

Summer storms recorded as significant to farmers, but short in duration (**Importance of recorder perception**). Diaries from summer 1988 often state that 'days would be warm and dry with afternoon or evening storms'.

The addition of descriptive information to instrumental data provides a valuable insight into the human impacts and improved understanding, stemming from multiple sources.

- Need for more studies examining concurrent descriptive sources (e.g. diaries)

Historical records and early instrumental series are key to extending our current knowledge, particularly outside Central England area, where records are rarely >150 yrs

Interdisciplinarity brings challenges, but adds value and understanding, wealth of opportunities for public engagement in other forms (not numbers), can be presented as a 'reality that has been lived' (storytelling).

# Workshop 3: Communication

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## *The application of qualitative data in climate science communication*

Historical records provide an opportunity to engage the public, potentially more than models or probabilities, helping to communicate climate science policy, but also help shape awareness and integrate understanding.

Accounts often incorporates details not just of the physical aspects of an event, but also the community and societal responses and how they can be mitigated for, information potentially lost during periods of few high magnitude events, but of value in understanding past responses

Qualitative information's value to climate science – a tool for facilitating wider engagement... offering an opportunity to engage with 'lived' qualitative information that can be used as an important tool for communication to different audiences.

Potential for using case studies as a tool for demonstrating and engaging with the richness of qualitative accounts



1. As a result of the three workshops a protocol to be published in a leading journal, providing a framework for bridging across the qualitative-quantitative data divide.

All contributors to the three workshops will be invited to be co-authors of the protocol.

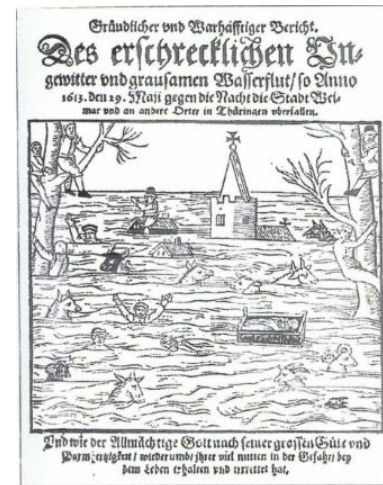
1. A key outcome of this project will be the development of a strong interdisciplinary research network capable of tackling the complex issues associated with climate resilience that can adapt and address future calls coming forth from UKRI.

## Protocol

Structure and notes in place, currently being drafted. Reflections by those attending the workshops are currently being sought, this will contribute to the protocol directly.

*Developing the protocol is important because it helps to make the **process more rigorous and makes it more likely to receive uptake.***

Aim to have this submitted early 2021.



Unrealistische Darstellung der „Thüringischen Sintflut“ auf dem Titelblatt einer im Jahr 1613 in Schmalkalden gedruckten Schrift  
(Quelle: Hellmann 1913 [55])

Bristol Channel (1607) & Thuringian (1613)



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47 different participants attended from 28 organisations

\* Speakers

Workshop 1: Existing databases and uses		Workshop 2: Indices		Workshop 3: Communication, Risk and Application	
1	Jamie Hannaford (CEH Wallingford)	1	Rudolf Brazdil (Masaryk University, Czech Republic)*	1	Ed Hawkins (Reading)*
2	Lindsey McEwen (UWE)*	2	David Nash (Brighton)*	2	Rob Allan (Met Office)*
3	Andrew Black (Dundee)*	3	Cerys Jones (Aberystwyth)*	3	Lindsey McEwen (UWE)*
4	Georgina Endfield (Liverpool)*	4	Sarah Davies (Aberystwyth)*	4	Richard Betts (Met Office)*
5	Sarah Davies (Aberystwyth)*	5	Lindsey McEwen (UWE)	5	Matthew Lickiss (Reading)*
6	Suraje Dessai (Leeds) UK Climate Resilience Champion	6	Georgina Endfield (Liverpool)	6	Peter Stott (Met Office)*
7	Matthew Blake (Staffordshire Record Office)	7	Thomas Kjeldsen (Bath)	7	Leona Skelton (Northumbria)*
8	Scott Ferson (Liverpool)	8	Andrew Black (Dundee)	8	Andrew Russell (CCRA)*
9	Aideen Foley (Birkbeck)	9	Heather Sangster (Liverpool)	9	Alice Harvey-Fishenden (Liverpool)
10	Victorina Gonzalez-Diaz (Liverpool)	10	Lukas Dolak (Masaryk University, Czech Republic)	10	Helen Houghton-Foster (Liverpool)
11	Richard Gosling (SEPA)	11	LingYun Tang (Liverpool)	11	George Adamson (KCL)
12	*George Adamson (KCL)	12	Jamie Hannaford/Cath Sefton (CEH Wallingford)	12	Sean Longfield (EA)
13	Alice Harvey-Fishenden (Liverpool)	13	Alice Harvey-Fishenden (Liverpool)	13	Richard Kevern (Met Office)
14	Ed Hawkins (NCAS)	14	Neil Macdonald (Liverpool)	14	Andrea Kiss (TU Vienna)
15	John Hillier (Loughborough)	15	Helen Houghton-Foster (Liverpool)	15	Neil Macdonald (Liverpool)
16	Helen Houghton-Foster (Liverpool)	16	George Adamson (KCL)	16	Dan Bernie (Met Office)
17	Candice Howarth (Surrey)	17	Sean Longfield (EA)	17	Jason Lowe (Met Office)
18	Andrea Kiss (TU Vienna)	18	Brendan Freeman (CCRA)	18	John Hillier (Loughborough)
19	Thomas Kjeldsen (Bath)	19	Andrea Kiss (TU Vienna)	19	Michael Spencer (SRUC)
20	Cerys Jones (Aberystwyth)	20	Aideen Foley (Birkbeck)	20	David Nash (Brighton)
21	Matthew Lickiss (Reading)	21	Leona Skelton (Northumbria)	21	Andrew Black (Dundee)
22	Sean Longfield (EA)	22	Matthew Lickiss (Reading)	22	Kate Lonsdale (Leeds) UK Climate Resilience Champion
23	Kate Lonsdale (Leeds) UK Climate Resilience Champion	23	Jason Lowe (Met Office)	23	Rebecca Pearce (Exeter)
24	Neil Macdonald (Liverpool)	24	Richard Gosling (SEPA)	24	Ewan Woodley (Exeter)
25	Rob Allan (Met Office)	25	Rhian Meara (Swansea)	25	Emma Wills (Met Office)
26	John Morgan (Manchester)	26	Samuel Solnick (Liverpool)	26	Sarah Davies (Aberystwyth)
27	Conor Murphy (Maynooth)			27	Stewart Barr (Exeter)
28	David Nash (Brighton)			28	John Morgan (Manchester)
29	Simon Naylor (Glasgow)			29	Simon Naylor (Glasgow)
30	Andrew Russell (CCRA)			30	Therese Palmer (Met Office)
31	Samuel Solnick (Liverpool)			31	Thomas Kjeldsen (Bath)
32	Heather Sangster (Liverpool)				
33	Leona Skelton (Northumbria)				
34	John Wardman (AXA)				



## A successful network

A broad church of attendees crucial, reflecting a wealth of disciplines.

Core group (~10) at each meeting, but others joining for one or more workshops

A clear structure, but flexibility is key, permitting opportunity to explore and discuss freely

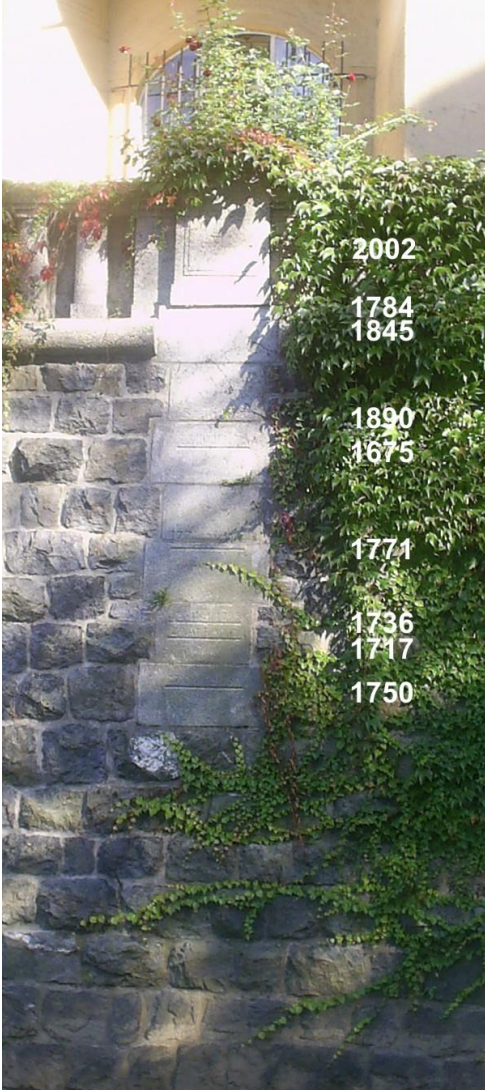
*“As a network for getting people together and talking, it introduced me to people that I probably wouldn't have met, that I've communicated with further, so yeah it's served its purpose very nicely there because that is a lot of it isn't it, as well as the collective effort it's also that individual connection.” (project reviewer)*

My learned experience: Make it possible to attend remotely. Don't hold a workshop on general election day (if possible).

Building on this project, a new transdisciplinary team funded from the UK Climate Resilience Programme for an AHRC-led project : Building climate resilience through community, landscapes and cultural heritage was achieved.

Thanks to all those that attended and contributed at the workshops





2002

1784  
1845

1890  
1875

1771

1736  
1717

1750

