

Late-Holocene flood dynamics, drivers and uncertainties inferred from Cumbrian lake sediments

Dr Daniel Schillereff

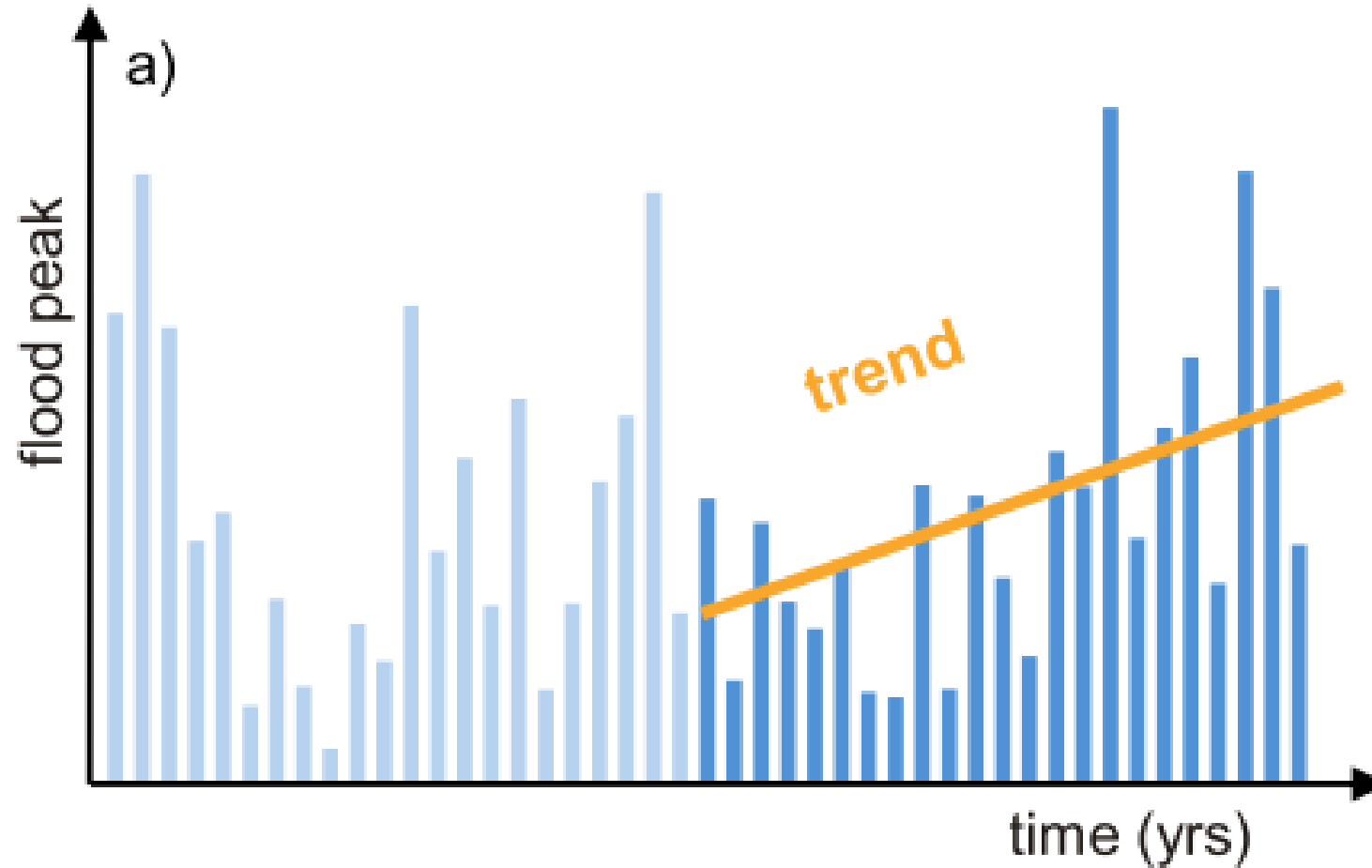
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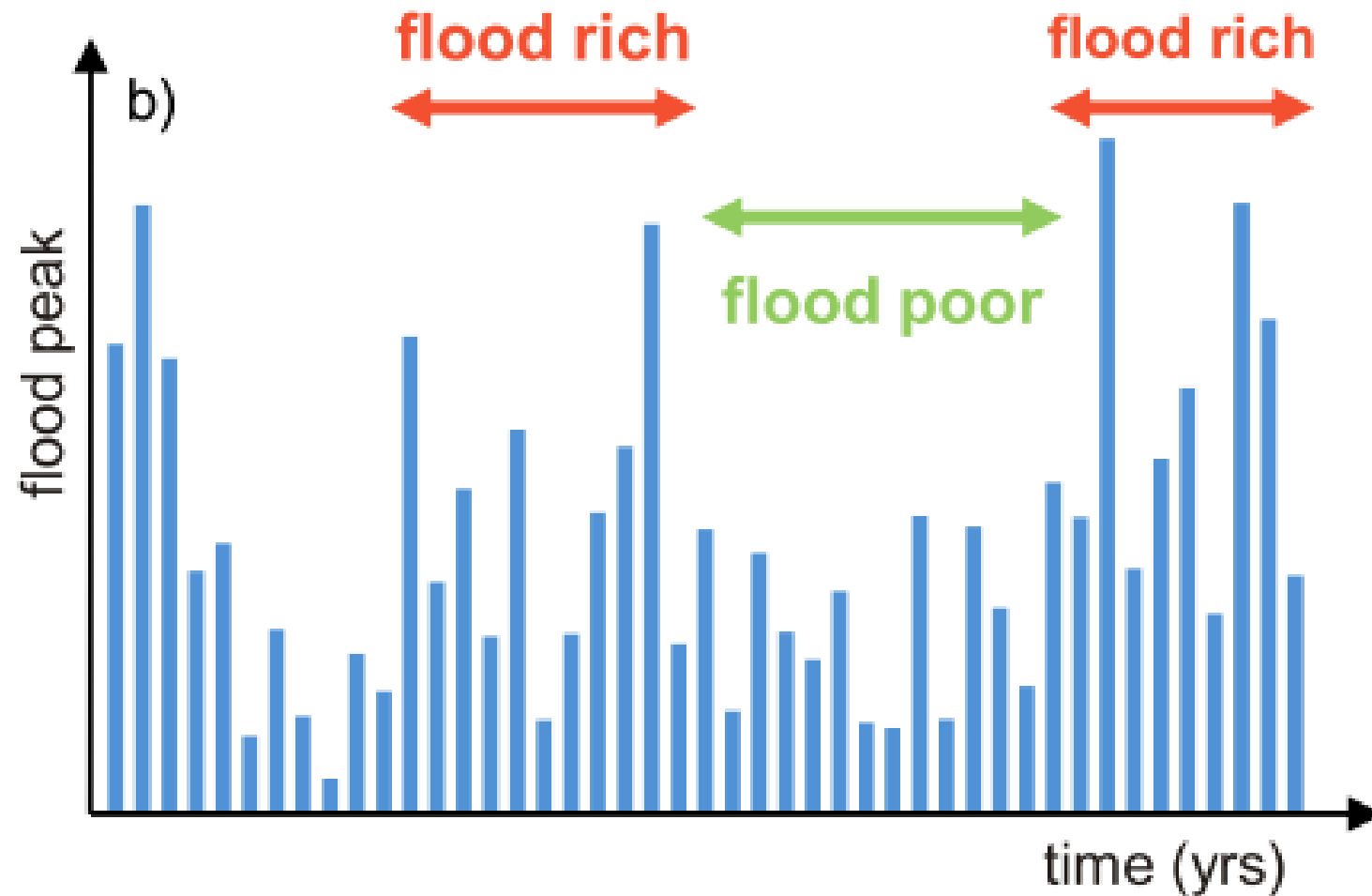
Many research contributors: Jenny Bradley, Richard Chiverrell, Jennifer Clear, Ian Croudace, John Dearing, Neil Macdonald, Hazel Phillips, Heather Sangster, David Sear, Jeff Warburton



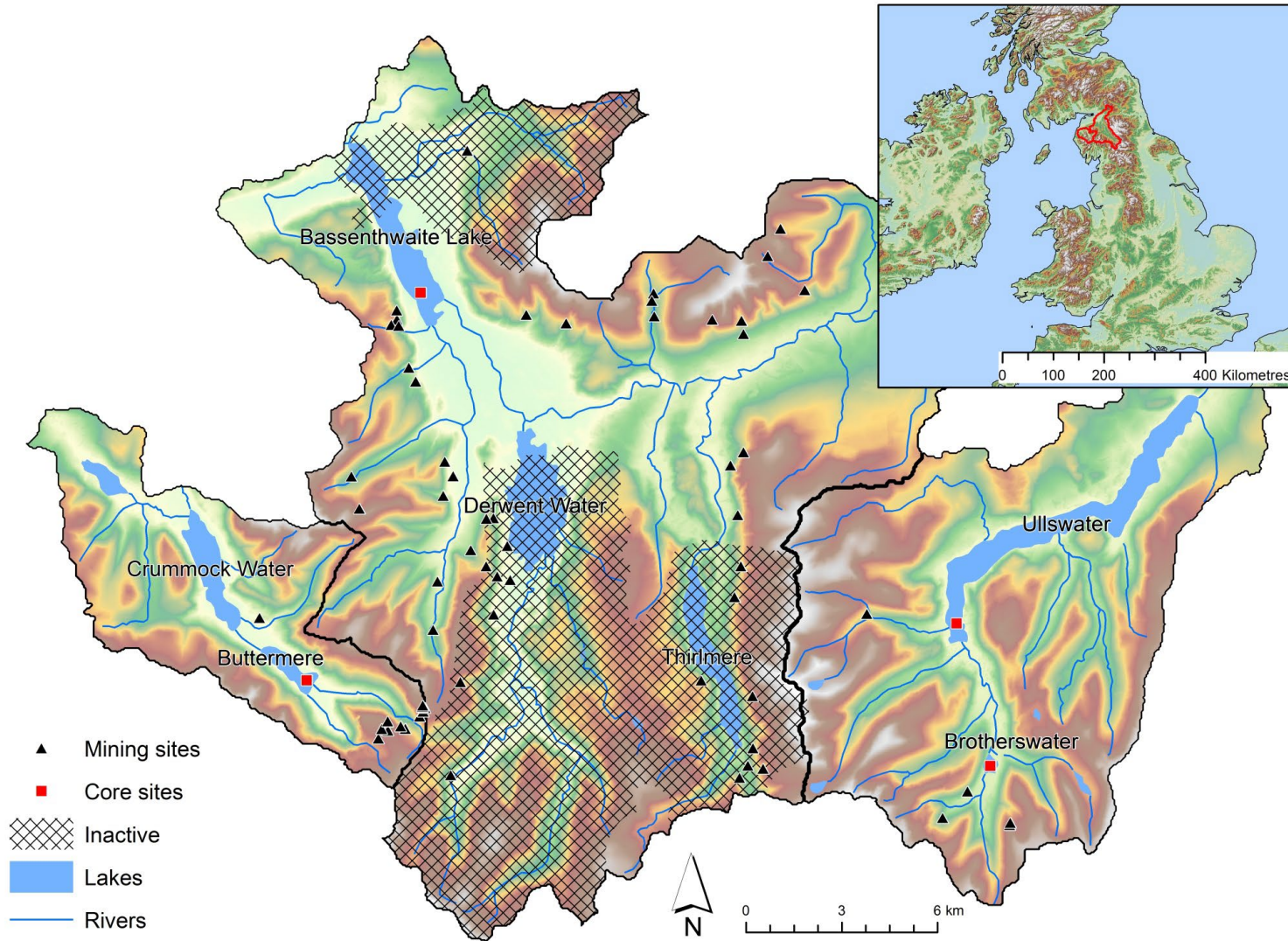
Why seek to reconstruct longer flood histories?



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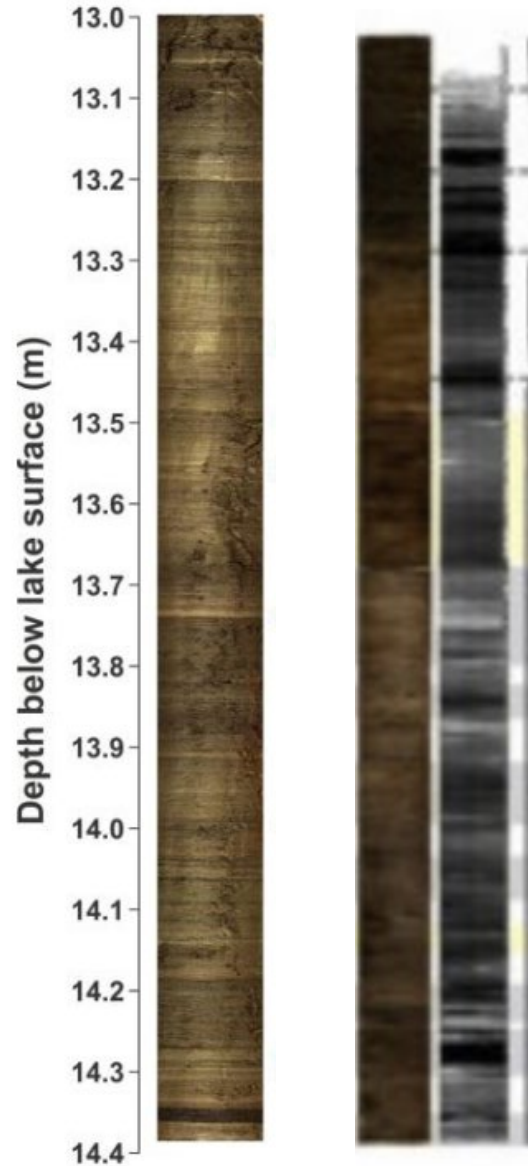


Where have we worked?

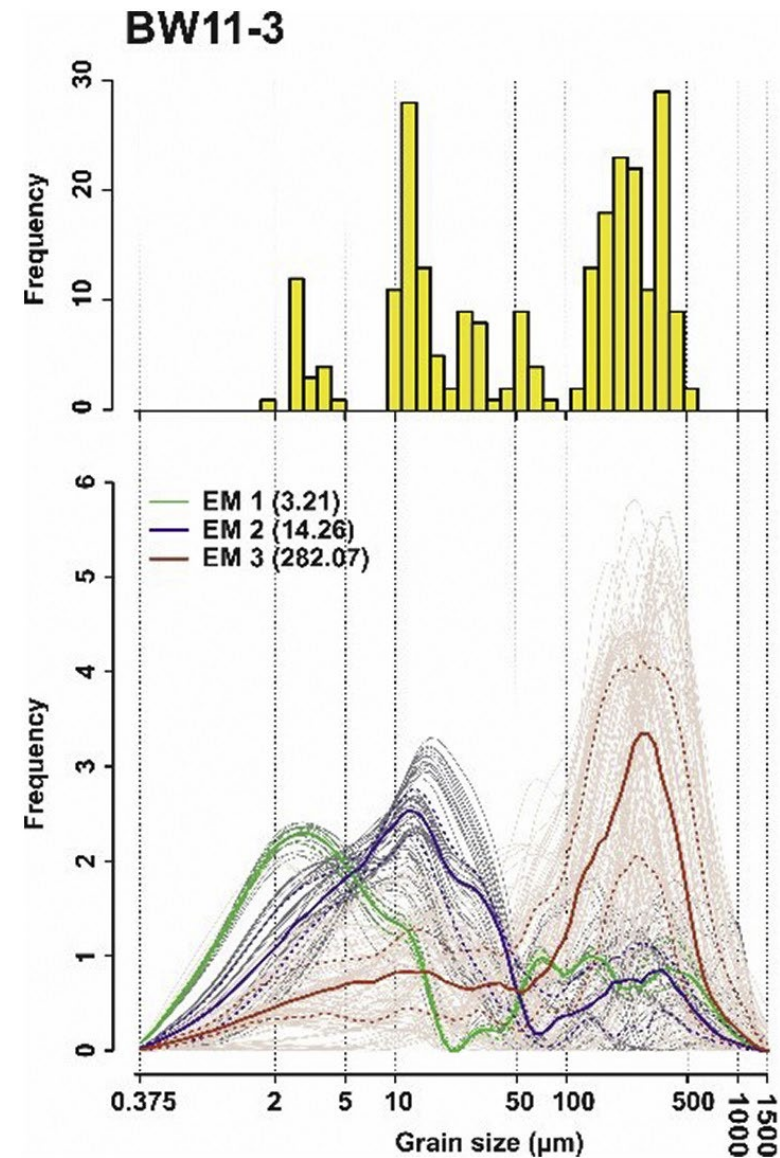
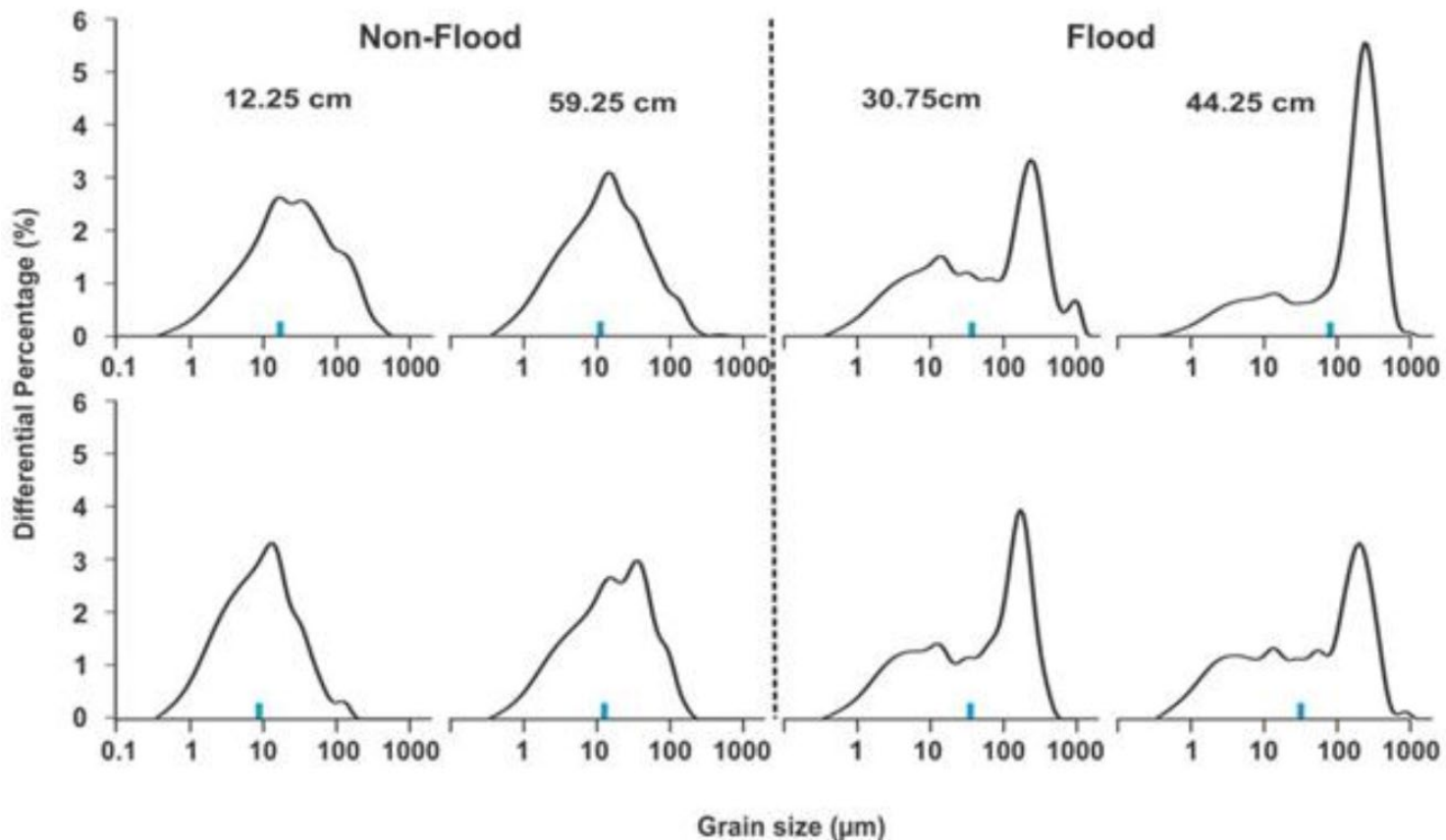


How do we identify a flood deposit?

- Stratigraphy
- X-ray imaging
- Geochemical composition
- **Particle size**



What does a flood signature look like?



Using modern lake processes to confirm floods are recorded

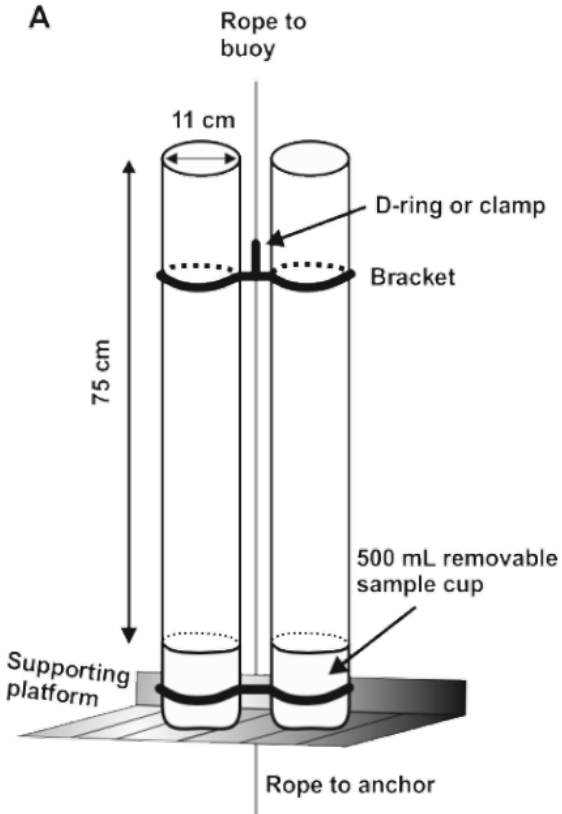
1) Tracing flood laminations through repeat coring

(this core was taken in January 2016)

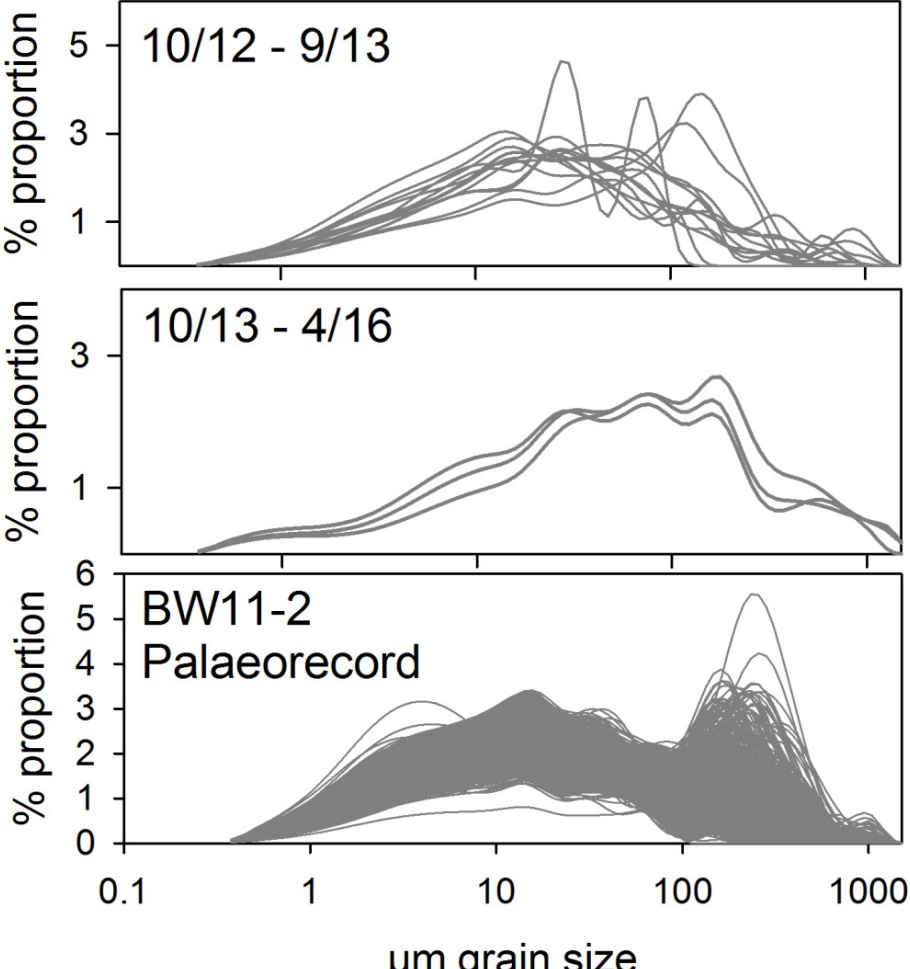


Using modern lake processes to confirm floods are recorded

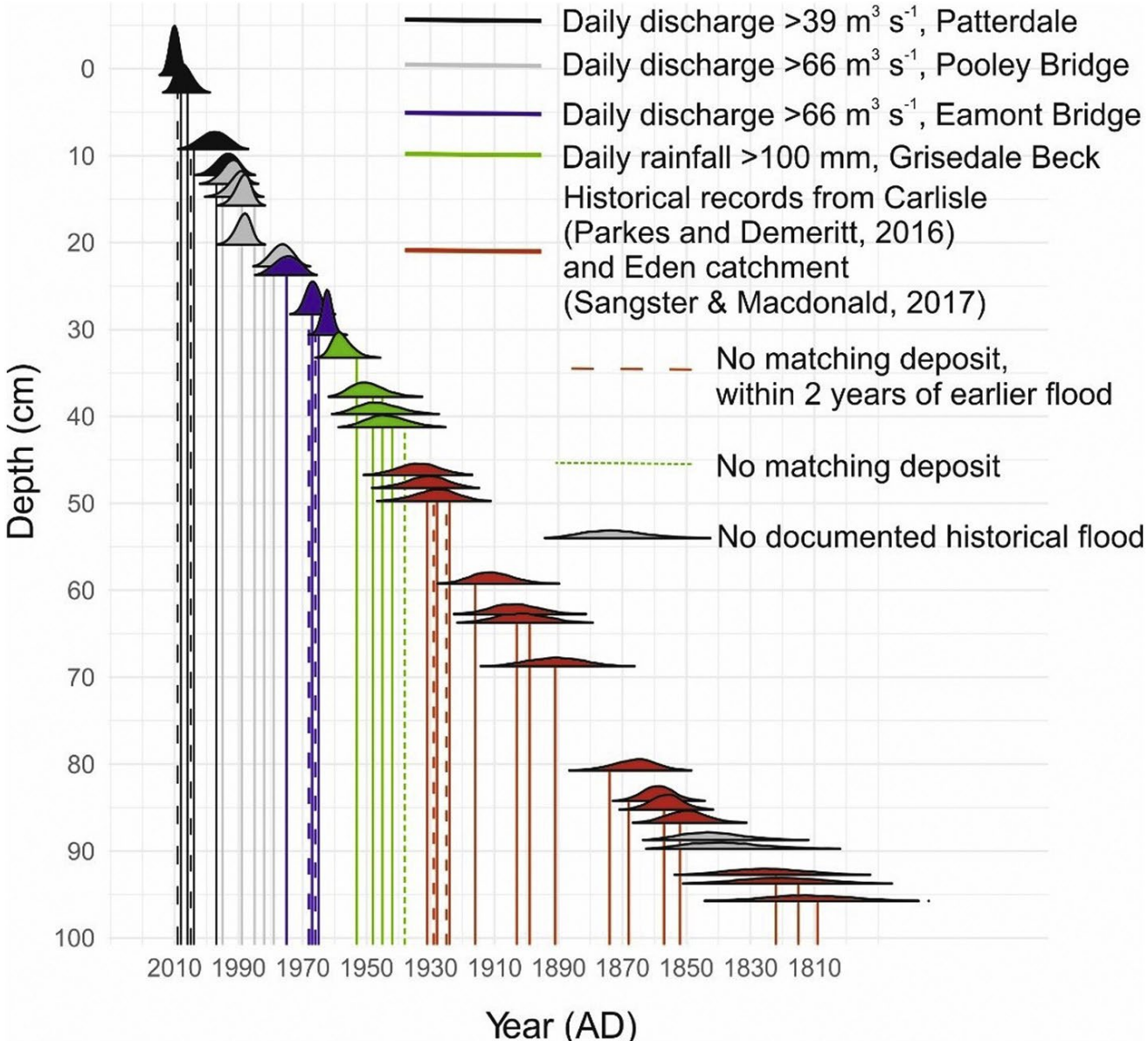
1) Tracing flood laminations through repeat coring



2) Sediment trap deployment

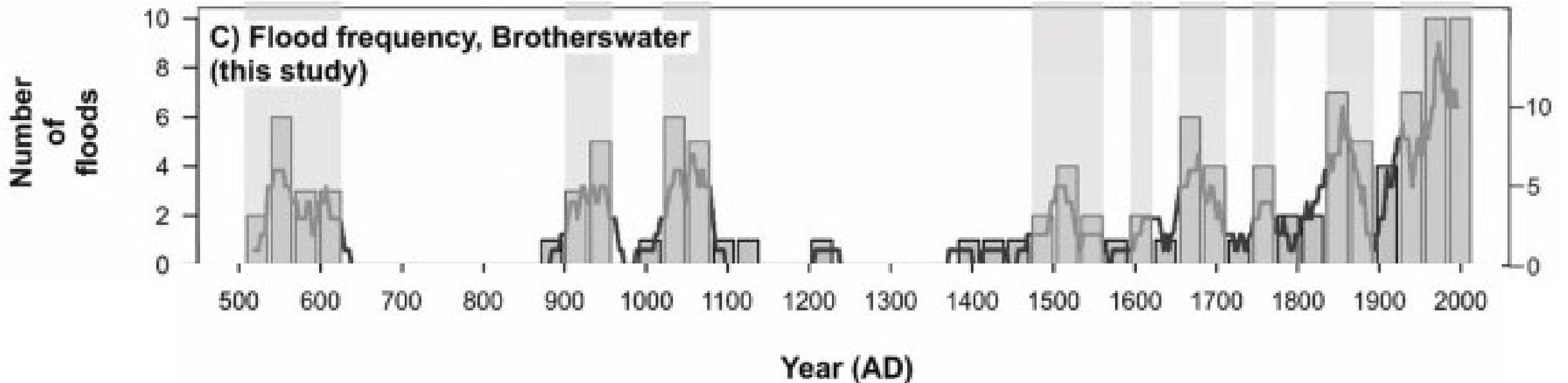


Does every flood leave a sedimentary imprint?

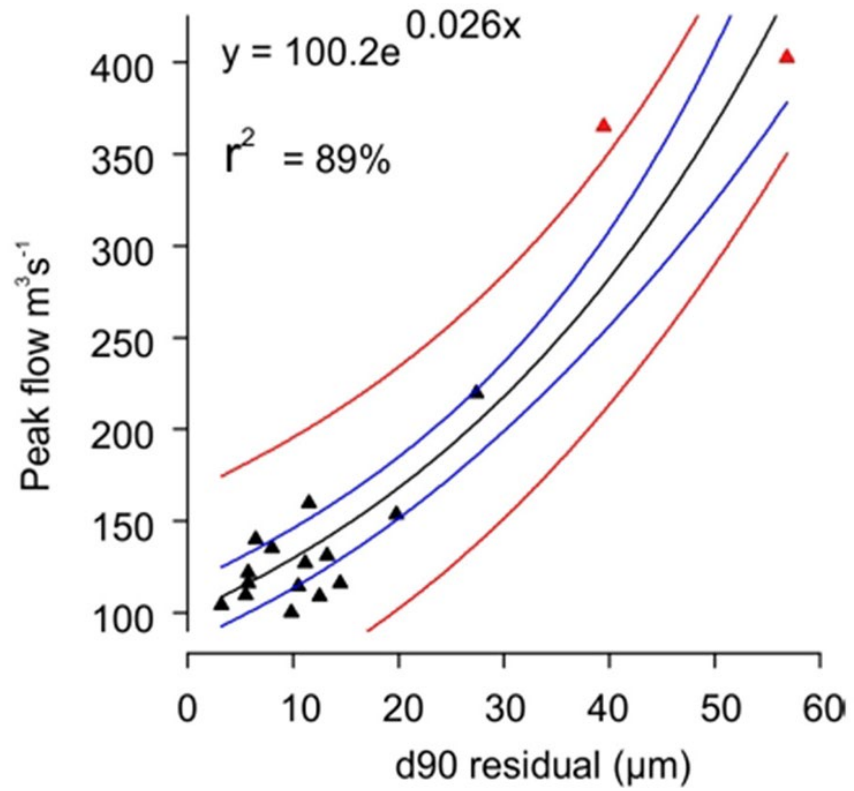


Developing late-Holocene palaeoflood records for Cumbria

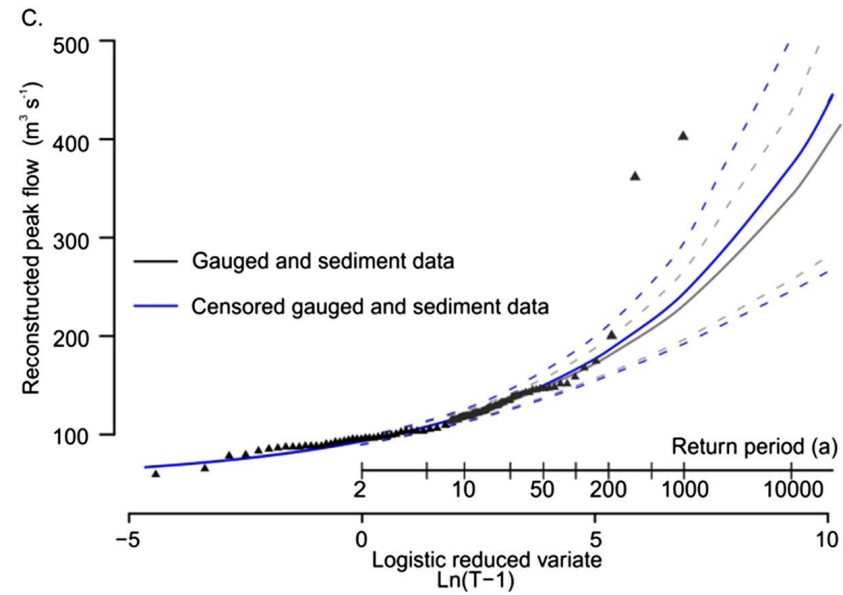
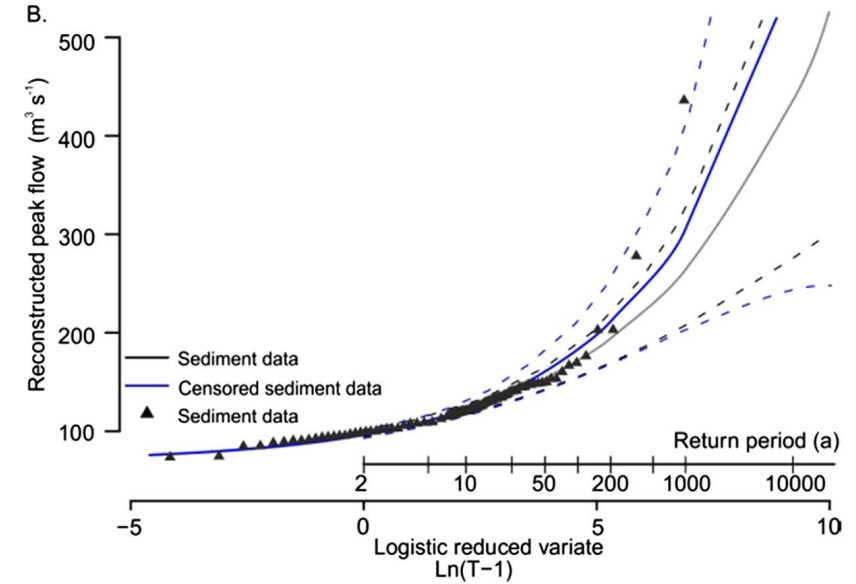
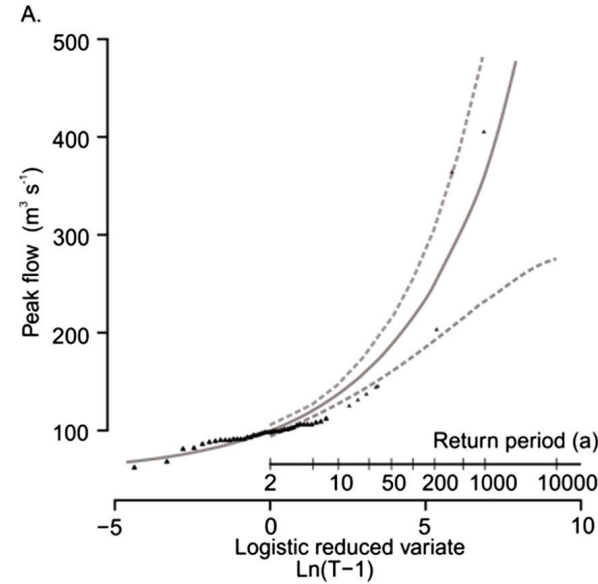
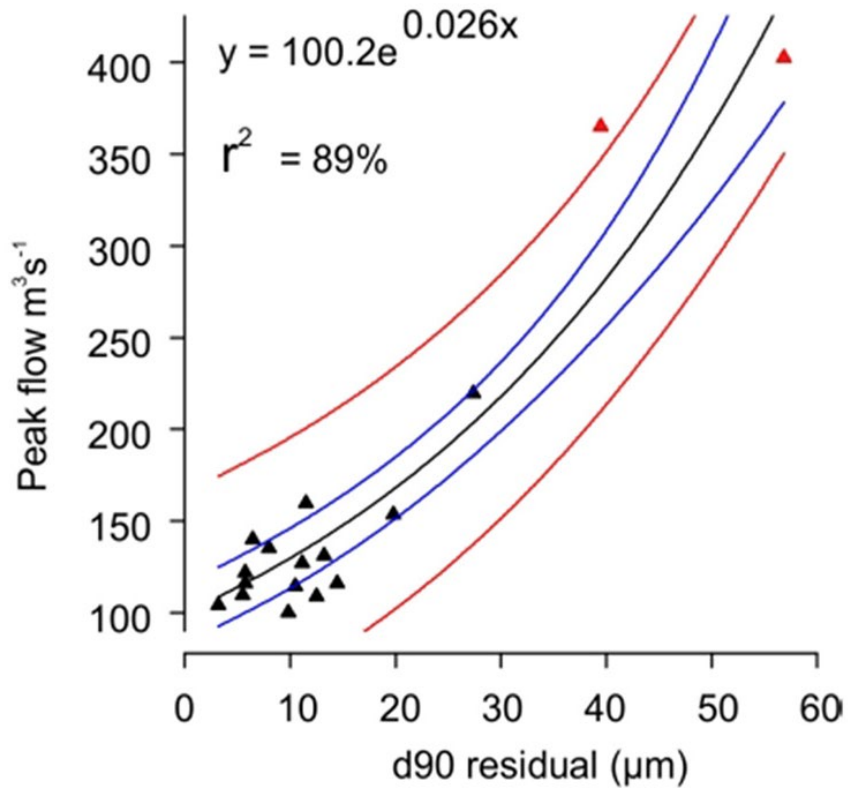
- Our records span a few hundred to the the last 1500 years
- Dated using radiocarbon, ^{210}Pb , mining markers
- Phases of frequent and less frequent flooding



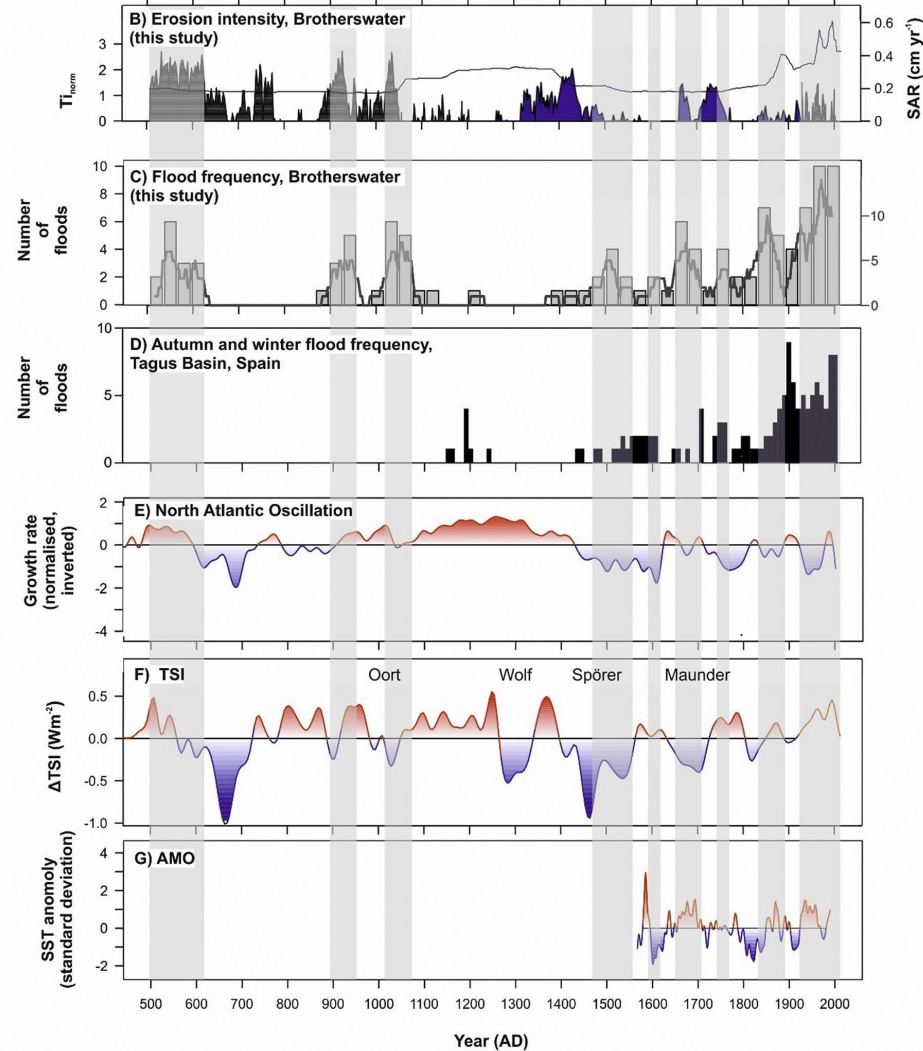
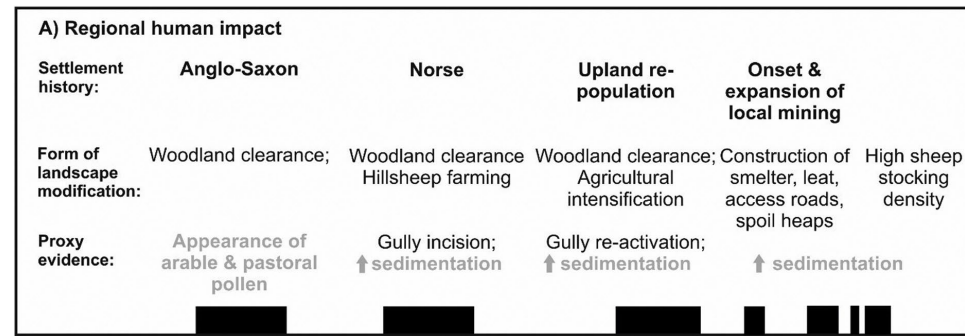
Augmenting flood frequency analysis



Augmenting flood frequency analysis



What are the drivers of flooding in Cumbria?



Where are we now and next steps

“Should consider novel sources of data such as historical and prehistorical records” - DEFRA, 2016

Hydrol. Earth Syst. Sci., 21, 1631–1650, 2017
www.hydrol-earth-syst-sci.net/21/1631/2017/
doi:10.5194/hess-21-1631-2017
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Hydrology and Earth System Sciences 

High-magnitude flooding across Britain since AD 1750

Neil Macdonald and Heather Sangster



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Quaternary Science Reviews

Volume 262, 15 June 2021, 106963



A 1400-years flood frequency reconstruction for the Basque country (N Spain): Integrating geological, historical and instrumental datasets

J.P. Corella ^{a, b}, G. Benito ^c, A.P. Monteoliva ^d, J. Sigro ^e, M. Calle ^f, B.L. Valero-Garcés ^g, V. Stefanova ^h, E. Rico ^{i, j}, A.-C. Favre ^a, B. Wilhelm ^a

delivering benefits through evidence



Making better use of local data in flood frequency estimation

 HM Government

National Flood Resilience Review



September 2016

 Department for Environment Food & Rural Affairs

 Llywodraeth Cymru Welsh Government

 Cyfoeth Naturiol Cymru Natural Resources Wales

 Environment Agency

Thank you for listening

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