



**Dr Gemma Coxon**  
**PhD**

Lecturer

**Area of research**

Integrating drought hydrology to the national scale

Office B33  
School of Geographical Sciences,  
University Road, Bristol BS8 1SS  
([See a map](#))

+44 (0) 117 33 17382  
[gemma.coxon@bristol.ac.uk](mailto:gemma.coxon@bristol.ac.uk)

**Summary**

**Biography**

My PhD research focused on developing a diagnostic framework for the evaluation of multiple hydrological model structures. My PhD utilised UK datasets to quantify and better understand uncertainties in hydrological model structure and discharge data, as well as assessing the value of different model diagnostics for discriminating between model structures and determining how different discharge uncertainties affect model selection.

My current research is part of the MaRIUS project (Managing the risks, impacts and uncertainties of droughts and water scarcity) and aims to integrate drought hydrology to the national scale. The main focus of my work is to apply Dynamic TOPMODEL across the UK and provide enhanced modelling capability to represent drought processes in present and future climatic conditions. My research interests include uncertainty in data and hydrological models, hydrological modelling in human impacted catchments and data visualisation.

**Keywords**

- Hydrological Modelling
- Uncertainty Analysis
- Flexible Model Structures
- Visualisation of national datasets
- Rainfall runoff modelling in human impacted catchments

**Memberships**

**Organisations**

[School of Geographical Sciences](#)

**Research groups**

- [Hydrology Group](#)

**Recent publications**

- Lane, R, Coxon, G, Freer, J, Wagener, T, Johnes, P, Bloomfield, J, Greene, S, Macleod, C & Reaney, S, 2019, '[Benchmarking the predictive capability of hydrological models for river flow and flood peak predictions across over 1000 catchments in Great Britain](#)'. *Hydrology and Earth System Sciences*, vol 23., pp. 401174032

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- Lewis, E, Quinn, N, Blenkinsop, S, Fowler, HJ, Freer, J, Tanguy, M, Hitt, O, Coxon, G, Bates, P & Woods, R, 2018, '[A rule based quality control method for hourly rainfall data and a 1 km resolution gridded hourly rainfall dataset for Great Britain: CEH-GEAR1hr](#)'. *Journal of Hydrology*, vol 564., pp. 930-943
- Brenner, S, Coxon, G, Howden, NJK, Freer, J & Hartmann, A, 2018, '[Process-based modelling to evaluate simulated groundwater levels and frequencies in a Chalk catchment in south-western England](#)'. *Natural Hazards and Earth System Sciences*, vol 18., pp. 445-461
- Zischg, AP, Felder, G, Weingartner, R, Quinn, N, Coxon, G, Neal, J, Freer, J & Bates, P, 2018, '[Effects of variability in probable maximum precipitation patterns on flood losses](#)'. *Hydrology and Earth System Sciences*, vol 22., pp. 2759-2773
- Fowler, K, Coxon, G, Freer, J, Peel, M, Wagener, T, Weston, A, Woods, R & Zhang, L, 2018, '[Simulating Runoff Under Changing Climatic Conditions: A Framework for Model Improvement](#)'. *Water Resources Research*.
- Bermúdez, M, Neal, JC, Bates, PD, Coxon, G, Freer, JE, Cea, L & Puertas, J, 2017, '[Quantifying local rainfall dynamics and uncertain boundary conditions into a nested regional-local flood modeling system](#)'. *Water Resources Research*, vol 53., pp. 2770-2785

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