



## Water Quality across the River Ganga Basin in India: Trends, Dominant Geochemical Processes and Impacts

Laura A. Richards<sup>1</sup> and the Team SAPTANADI\*

<sup>1</sup>University of Manchester, Department of Earth and Environmental Sciences, Manchester, United Kingdom of Great Britain – England, Scotland, Wales (laura.richards@manchester.ac.uk)

\*A full list of authors appears at the end of the abstract

In a basin-wide survey of the River Ganga and key tributaries, from the Himalayan source to the Bay of Bengal in India, we aim to improve the conceptual understanding of downstream water quality trends along > 2000 km. Here we explore the spatial distribution of a suite of inorganic and organic chemicals, nutrients and wastewater indicators to determine the dominant geochemical process controls across the basin. Sampling was undertaken at 81 sites in the post-monsoon period of 2019. We use chemical signatures to identify likely sources, characterise potential higher-pollution zones and to determine the relative importance of regional versus localized controls on the observed water quality parameters, including in relation to contaminant type. The influence from key tributaries is determined. We seek to unravel the relative importance of mechanisms such as dilution, evaporation, water-rock interactions and anthropogenic inputs in controlling contaminant distribution. We assess the representativeness of river bank sampling in comparison to cross-river transects in select locations. We compare our data to historical records across previous annual cycles, noting differences in extent of agreement according to contaminant type. This coordinated, catchment-wide survey presents a much broader and more comprehensive dataset than typically reported, hence leading to substantially improved process understanding of dominant controls on contaminant distribution across the catchment. This work may have implications on informing future monitoring efforts and in identifying future remediation priorities.

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**Team SAPTANADI:** University of the West of England (UK): Darren M Reynolds, Robin MS Thorn, Gillian E Clayton, Eva Perrin, Bethany G Fox; Bose Institute, Kolkata (India): Tapan K Dutta; UKCEH (UK): Michael J Bowes, Daniel S Read, David J.E. Nicholls, Linda K Armstrong; IIT Roorkee (India): Moushumi Hazra, Himanshu Joshi; University of Manchester (UK): Laura A Richards, David A Polya; Mahavir Cancer Sansthan (India): Ashok Ghosh, Arun Kumar, Rupa Kumari, Aman Gaurav, Siddhu Kumar; National Institute of Hydrology (India): Sumant Kumar, Biswajit Chakravorty; British

Geological Survey (UK): Daren Gooddy; University of Birmingham (UK): Stefan Krause, Kieran Khamis, Holly Nel, Uwe Schneidewind, Ben Howard, Danielle Mewes, David Hannah; University of Lincoln (UK): Daniel Magnone.