

Vivek Kumar Yadav

Joint PhD Candidate · Indian Institute of Science (IISc), Bengaluru & The University of Melbourne

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PROFILE

Joint PhD candidate in the interdisciplinary domain of hydrology and geodesy, enrolled under the Melbourne–India Postgraduate Academy (MIPA) — a jointly awarded doctoral program between the Indian Institute of Science (IISc), Bengaluru and the University of Melbourne — and currently based at the University of Melbourne. My research investigates the impacts of climate change, human interventions, and natural climate variability on terrestrial water systems, drawing on remote sensing, hydrological and geophysical modelling, and machine learning.

RESEARCH

Terrestrial Water Storage (TWS) — the total surface and subsurface water — is a key component of the water cycle and a WMO-designated Essential Climate Variable. TWS is shaped by climate change, local human intervention, and natural climate variability, and disentangling these coupled drivers requires a long, consistent record. My work reconstructs TWS to separate these climate–human dynamics, supporting improved understanding of the food–energy–water nexus and of changing catchment characteristics under a changing climate.

EDUCATION AND TRAINING

Joint PhD Candidate — Hydrology & Geodesy

Indian Institute of Science (IISc), Bengaluru & The University of Melbourne — Melbourne–India Postgraduate Academy (MIPA) Jul 2021 – Present

- Field of study: Environmental Sciences (Natural Sciences, Mathematics and Statistics).
- Current grade: 8.25 / 10 (CGPA).
- Jointly supervised across IISc and the University of Melbourne; doctoral degree to be jointly awarded by both institutions.

B.Tech in Civil Engineering

Bundelkhand Institute of Engineering and Technology (BIET), Jhansi Jul 2013 – May 2018

- Final grade: 71.84%.
- Thesis: Design of a Raw Water Treatment Plant for BIET — water-quality sampling and testing informing the treatment-plant design.

Internship — Public Works Department, Jhansi

May 2017 – Jul 2017

- Assisted with the design and construction of culverts, laying of CC pavement, and survey of rural roads.

PUBLICATIONS

1. **Yadav, V. K.**, Peel, M. C., Fowler, K., Ryu, D., & Vishwakarma, B. D. (2026). Cause-effect discovery in hydrometeorological systems: evaluation of causal discovery methods. *Hydrology and Earth System Sciences*, 30, 3455–3496. <https://doi.org/10.5194/hess-30-3455-2026>
2. **Yadav, V. K.**, Shakya, A., Mhamane, A., Walling, T., Chander, S., Nikam, B. R., Dasika, N. K., & Vishwakarma, B. D. (2026). PySHbundle: A Python tool for processing GRACE gravimetry data into global surface mass change datasets. *Journal of Open Source Software*, 11(121), 7550. <https://doi.org/10.21105/joss.07550>

RESEARCH PROJECTS

Evaporation response to monsoon rainfall over India

Course project Mar 2022 – Apr 2022

- Identified regions of monsoon moisture recycling using evaporation as a proxy across dry and wet spells.
github.com/lsmvivek/monsoonrecycle

Streamflow analysis of North American streams

Course project Mar 2022 – Apr 2022

- Analysed trend, seasonality, and sub-seasonality in USGS streamflow gauge time series over a 71-year period.
github.com/lsmvivek/analysisof_streamflow

TECHNICAL SKILLS

Programming & scientific computing: Python (xarray, dask, NumPy, pandas), MATLAB

Geospatial & climate data: Climate Data Operators (CDO), Geographic Information Systems (GIS), satellite / remote-sensing data processing

Research computing: High-performance computing on cluster networks, Linux, version control (Git)

Machine learning: Time-series modelling (LSTM, Transformer), causal discovery methods

QUALIFYING EXAMINATIONS & COURSEWORK

GATE 2021: Environmental Science — 728; Civil Engineering — 591.

PhD coursework (grade): Surface Water Hydrology (A), Geodetic Signal Processing (A), Introduction to Satellite Geodesy (B+), Atmospheric Thermodynamics (B+), Stochastic Hydrology (B+), Hydroclimatology (B+), Mathematics for Engineers (B+), Remote Sensing and GIS for Water Resources Engineering (B+).