Chinmay Deval

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Relevant Skills and Technical Proficiencies

Programming: Python, R, JavaScript, Bash, Git, Relational Databases, Markdown, HTML, CSS, MATLAB.
Hydrological models: PCR-GLOBWB, SWAT, WEPP, WEPPcloud, PCRaster.
Remote sensing and GIS: Google Earth Engine, ESRI Suite, ArcGISPro, ArcPy, QGIS, ENVI, ERDAS, GeoServer, OpenLayers.
Data manipulation libraries: Climate data operators (CDO), Geospatial Data Abstraction Library (GDAL), Xarray, Scipy, Numpy, GeoPandas, Shiny, scikit-learn.

Relevant Experience

Geospatial Data Analyst July 2022-Present
FM Global USA

- Implemented a python script for image processing to extract FEMA flood transect data using pytesseract and opencv libraries.
- Automated the natural hazard data cleaning and wrangling pipelines with Python and R.
- Developed Python scripts to automate the processing of global water polygon tiles extracted from google maps.
- Improved efficiency of flood data extraction from FEMA reports by developing an object-oriented Python script.
- Developed a visualization tool to facilitate speedy display of in-house geospatial data layers (GeoParquet) with R Shiny.
- Programmed the geospatial data engineering, ETL, and geospatial data quality control tasks using Python and R.
- Maintained geodatabases and digitized natural hazards data layers using ArcGIS to prepare inputs for prediction modelling.
- Implemented geostatistical and machine learning approaches in R to predict seismic hazard proxy variables.

Geospatial Data Analyst | Post-Doc Researcher July 2022-Present
University of Idaho USA

- Distilled large geospatial data on crop water use into a regional field-scale product for climate smart precision agriculture strategies using the R, OpenLayers, and Geoserver.
- Implemented an RMarkdown based product (WEPPcloudR) for automated analysis of geospatial hydrology model runs.
- Worked closely with USDA-Forest Service to develop a decision support tool (Viz-ERMiT) using R shiny to inform forest and water utilities managers about post-wildfire impacts using WEPPcloud simulations.

Geospatial Data Analyst | Hydrologic Modeler | PhD Candidate June 2017-May 2022
University of Idaho USA

- Collaborated with scientists in multidisciplinary settings and communicated research findings by publishing 5 peer reviewed scientific journal articles.
- Developed an interactive decision support tool (Pi-VAT) that synthesizes two commonly used geospatial hydrology models into practical information for guiding environmental managers.
- Applied feature engineering on large data for predicting sediment yield using Random Forest in R language.
- Evaluated the predictive capabilities of the water quality algorithms of WEPP model algorithms.
- Developed R code libraries (available on GitHub): Sorption to predict linear & non-linear isotherms & WEPPRecipes for post-processing, analysing, & visualizing WEPP model simulations.
- Assessed the effects of forestry operations on water quality and quantity using various statistical approaches.

Geospatial Data Analyst | Hydrologic Modeler November 2015-August 2016
UNESCO-IHE Netherlands

- Assessed streamflow prediction capability of a global distributed hydrological model (PCR-GLOBWB).

- Automated the geospatial data engineering tasks and prepared the model inputs using Python, ArcGIS, and command line suite like Climate Data Operators (CDO) & Bash Shell, PCRaster.
- Created ensemble evapotranspiration (ET) data from multiple products of surface energy balance models (such as ALEXI, CMRSET, SSEBop) using MATLAB and Python.
- Parameterized the model with MODIS LAI data. Incorporated gridded & remote sensing precipitation products CRU, APHRODITE, & CHIRPS as model forcing (GeoTIFF and NetCDF).
- Validated model performance with observed discharge data & GRACE satellite based DMT (Delft Mass Transport model) data using Python.

Water Resources Consulting Intern August 2015-November 2015
Sustainer Homes BV Netherlands

- Consulted this start-up company that reconstructs sea containers into mobile, self-sustaining, & off-grid houses with their drinking water system.
- Developed assessment reports with recommendations about their drinking water system in a multidisciplinary setting.

Geospatial Analyst January 2014 - July 2014
International Water Management Institute (IWMI) India

- Performed geospatial image classification to create temporal land use maps using Landsat data and tools like tools ERDAS, ENVI and ArcGIS.
- Compiled baseline hydrological data, water use, demand, and availability data.
- Assessed linkages between the upstream urban sprawl with the downstream agricultural water availability using regression analysis.
- Performed scenario analysis based on the water demand and its impact on downstream water availability.
- Communicated the findings derived from the analysis via maps created using QGIS and ArcGIS.

Sustainability Research Assistant July 2012-June 2014
TERI University India

- Consulted an industrial cluster to identify sustainability opportunities to create a cooperative network to exchange materials, energy, water, & by-products.
- Investigated the industrial symbiosis potential of an industrial cluster in the Indo-Gangetic plains famed for its sugar, steel, & paper industry in association with Tata centre-MIT, Cambridge, USA.
- Provided geospatial support and created maps of industrial clusters & their linkages.

Publications

- **Deval, C.**, Brooks, E.S., Dobre, M., Lew, R., Robichaud, P.R., Fowler, A., Boll, J., Easton, Z.M., Collick, A.S., 2022. Pi-VAT: A web-based visualization tool for decision support using spatially complex water quality model outputs. J. Hydrol. 607, 127529. https://doi.org/https://doi.org/10.1016/j.jhydrol.2022.127529
- Dobre, M., Srivastava, A., Lew, R., **Deval, C.**, Brooks, E.S., Elliot, W.J., Robichaud, P., In Press. WEPPcloud: An online watershed-scale hydrologic modeling tool. Part II. Model performance assessment and applications to forest management and wildfires. J. Hydrol. https://doi.org/10.1016/j.jhydrol.2022.127776
- Dobre, M., Srivastava, A., Lew, R., **Deval, C.**, Brooks, E.S., Elliot, W.J., Robichaud, P.R., 2022. WEPPcloud hydrologic and erosion simulation datasets from 28 watersheds in US Pacific Northwest and calibrating model parameters for undisturbed and disturbed forest management conditions. Data Br. 42, 108251. https://doi.org/10.1016/j.dib.2022.108251
- **Deval, C.**, Brooks, E.S., Gravelle, J.A., Link, T.E., Dobre, M., Elliot, W.J., 2021. Long-term response in nutrient load from commercial forest management operations in a mountainous watershed. For. Ecol. Manage. 494, 119312. https://doi.org/10.1016/j.foreco.2021.119312
- Heron, T., Strawn, D.G., Dobre, M., Cade-Menun, B.J., **Deval, C.**, Brooks, E.S., Piaskowski, J., Gasch, C., Crump, A., 2021. Soil Phosphorus Speciation and Availability in Meadows and Forests in Alpine Lake Watersheds with Different Parent Materials. Front. For. Glob. Chang. 3, 159. https://doi.org/10.3389/ffgc.2020.604200

- **Deval, C.**, Mane, A., N P Joshi, G.D.S., 2012. Phytoremediation potential of aquatic macrophyte Azolla caroliniana with references to zinc plating effluent. Emirates J. Food Agric. 24. https://www.ejfa.me/index.php/journal/article/view/850

Conference Talks and Posters

- Brooks, E.S., **Deval, C.**, Dobre, M., Roger, L., Long, J.W., Elliot, W.J., Robichaud, P.R., 2023. Targeted Forestry Management in the Lake Tahoe Basin with WEPPcloud and PI-VAT, in: Soil Erosion Research Under a Changing Climate, January 8-13, 2023, Aguadilla, Puerto Rico, USA. American Society of Agricultural and Biological Engineers, St. Joseph, MI. https://doi.org/10.13031/soil.23087
- Dobre, M., Srivastava, A., Lew, R., **Deval, C.**, Brooks, E.S., Elliot, W.J., Robichaud, P.R., 2023. Applicability of an Online Decision-Support Tool (WEPPcloud) to Watershed-Scale Forest Management in the Western US, in: Soil Erosion Research Under a Changing Climate, January 8-13, 2023, Aguadilla, Puerto Rico, USA. American Society of Agricultural and Biological Engineers, St. Joseph, MI. https://doi.org/10.13031/soil.23038
- Brooks, E., Dobre, M., Lew, R., **Deval, C.**, Srivastava, A., and Robichaud, P, 2021. Timely Decision Support for Watershed Management with WEPPcloud, 3rd ISMC Conference – Advances in Modeling Soil Systems, online, 18–22 May 2021, ISMC2021-61, https://doi.org/10.5194/ismc2021-61
- **Deval, C.**, Dobre, M., Brooks, E.S., Lew, R., 2020. Viz-WEPPcloud: A Web-based, Interactive, Hillslope Scale BMP Guiding Tool for the Water Erosion Prediction Project (WEPP) Model - NASA/ADS [WWW Document]. URL https://ui.adsabs.harvard.edu/abs/2020AGUFMH004.0032D/abstract (accessed 6.8.22).
- **Deval, C.**, Brooks, E., Heron, T., Strawn, D. G., Dobre, M., & Crump, A. (2019) Phosphorus Retention and Release in Forest-Meadow Systems of Lake Tahoe, California [Abstract]. ASA, CSSA and SSSA International Annual Meetings (2019), San Antonio, TX. https://scisoc.confex.com/scisoc/2019am/meetingapp.cgi/Paper/122171
- **Deval, C.**, Brooks, E.S., Strawn, D.G., Heron, T., Dobre, M., Crump, A., 2019. Retention and release of phosphorus in Forest-Meadow Systems of Lake Tahoe, California - NASA/ADS [WWW Document]. URL https://ui.adsabs.harvard.edu/abs/2019AGUFM.H33J2068D/abstract (accessed 6.8.22).
- **Deval, C.**, Brooks, E.S., Gravelle, J.A., Link, T.E., Dobre, M., 2018. Multi-Decadal Response of Stream Water Quality to Commercial Forest Management Operations in a Mountainous Watershed - NASA/ADS [WWW Document]. URL https://ui.adsabs.harvard.edu/abs/2018AGUFM.H52D..05D/abstract (accessed 6.8.22).

Education

Doctor of Philosophy – Water Resources – University of Idaho, USA.	2022
Master of Science – Water Science and Management – Utrecht University, The Netherlands	2016
Master of Science – Environmental Studies & Resource Management, TERI University, India	2014
Bachelor of Science – Environmental Science, Fergusson College, University of Pune, India.	2012

Awards and Honors

American Geophysical Union hydrology section grant	2020
Graduate and professional student association (GPSA) travel award, University of Idaho	2019
Nomination for Vliegenthart Thesis Award	2017
Utrecht Excellence Scholarship, Utrecht University Fund & Utrecht University	2014-2016

Professional Trainings/Certifications

- Python for Data Science and Machine Learning Bootcamp (2023), Udemy.
- Spatial Data Science: The New Frontier in Analytics (2022), ESRI.
- Using earth observation for pre-and post-fire monitoring (2022), NASA ARSET.
- Investigating Time Series of Satellite Imagery (2019), NASA ARSET.
- Master Class: Advanced Techniques in Watershed Science (2019), Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI).
- Applications of Remote Sensing for Soil Moisture & Evapotranspiration (2016), NASA ARSET.