Mukesh Rai

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Work Experiences

July 2016 – March 2018 **ICIMOD-Nepal, Research Assistant** Worked on the installation of black carbon (BC) monitoring station in a glacierized place [Langtang-Nepal]. Contributed to workshop and Science Policy Dialogue: Air Pollution, Climate, and Health in South Asia and the Hindu Kush Himalaya. Involved in research paper writing by using the real-time BC aerosol source, sink, their optical and physical properties, radiative forcing, heating rate, and its implication.

January 2015–March 2016 **MinErgy-Nepal, Research Assistant** Provided technical inputs on gaseous pollutants measurement campaign. Assisted program coordinator in finalizing emission monitoring project.

Education

September 2018 – May 2022 **PhD, University of Chinese Academy of Science, China** Analysis of aerosols transport, radiative perturbation and contribution using **WRF-Chem**
Thesis title: *Tracing aerosol concentrations, transport mechanism, and radiative perturbation over Pan-Third Pole region using multi-sensors satellite and models*

June 2015 – August 2017 **M.S by Research in Glaciology [Kathmandu University, Nepal]** Estimation of aerosol optical properties using **SBDART** and **OPAC** models
Thesis title: *Aerosol radiative forcing estimation over a remote high-altitude location (4900 masl) near yala glacier, nepal.*

February 2011 – January 2013 **M.Sc in Environmental Science [Tribhuvan University, Nepal]** Climate Change and pollution control

Research Publications

Published

1. Hu, Y., Kang, S., Yang, J., Chen, X., Ji, Z., & **Rai**, **M.** (2022). Transport of black carbon from central and west asia to the tibetan plateau: Seasonality and climate effect. *Atmospheric Research*, *267*, 105987.
doi:https://doi.org/10.1016/j.atmosres.2021.105987

2. Li, C., Yan, F., Zhang, C., Kang, S., **Rai**, **M.**, Zhang, H., … He, C. (2022). Coupling of decreased snow accumulation and increased light-absorbing particles accelerates glacier retreat in the tibetan plateau. *Science of The Total Environment*, *809*, 151095.
doi:https://doi.org/10.1016/j.scitotenv.2021.151095

3. Maharjan, L., Kang, S., Tripathee, L., Gul, C., Zheng, H., **Rai**, **M.**, & Santos, E. (2022). Atmospheric particle-bound polycyclic aromatic compounds over two distinct sites in pakistan: Characteristics, sources and health risk assessment. *Journal of Environmental Science*, *112*, 1–15.
doi:10.1016/j.jes.2021.04.024

4. **Rai**, **M.**, Kang, S., Yang, J., Chen, X., Hu, Y., & Rupakheti, D. (2022). Tracing atmospheric anthropogenic black carbon and its potential radiative response over pan-third pole region: A synoptic-scale analysis using wrf-chem. *Journal of Geophysical Research-Atmosphere*, *127*, e2021JD035772. doi:https://doi.org/10.1029/2021JD035772

5. Gul, C., Mahapatra, P. S., Kang, S., Singh, C., Kumar, R., **Rai**, **M.**, … Puppala, S. P. (2021). Black carbon concentration in the central himalayas: Impact on glacier melt and potential source contribution. *Environmental Pollution*, *275*, 116544. doi:https://doi.org/10.1016/j.envpol.2021.116544

6. Rupakheti, D., Rupakheti, M., Yin, X., Hofer, J., **Rai**, **M.**, Hu, Y., … Kang, S. (2021). Modifications in aerosol physical, optical and radiative properties during heavy aerosol events over dushanbe, central asia. *Geoscience Frontiers*, *12*(6), 101251. doi:https://doi.org/10.1016/j.gsf.2021.101251

7. Rupakheti, D., Yin, X., Rupakheti, M., Zhang, Q., Li, P., **Rai**, **M.**, & Kang, S. (2021). Spatio-temporal characteristics of air pollutants over xinjiang, northwestern china. *Environmental Pollution*, *268*, 115907. doi:https://doi.org/10.1016/j.envpol.2020.115907

8. Tripathee, L., Gul, C., Kang, S., Chen, P., Huang, J., & **Rai**, **M.** (2021). Transport mechanisms, potential sources, and radiative impacts of black carbon aerosols on the himalayas and tibetan plateau glaciers, 7–23. doi:10.1007/978-3-030-70509-1_2

9. **Rai**, **M.**, Mahapatra, P. S., Gul, C., Kayastha, R. B., Panday, A. K., & Puppala, S. P. (2019). Aerosol radiative forcing estimation over a remote high-altitude location (4900 masl) near yala glacier, nepal. *Aerosol and Air Quality Research*, *19*(8), 1872–1891. doi:10.4209/aaqr.2018.09.0342

Accepted

- Yang, J., Kang, S., Hu, Yuling., Chen, Xintong., **Rai, M** . (2022). Influence of South Asian biomass burning on ozone and aerosol concentrations over the Tibetan Plateau, *Advances in Atmospheric Sciences*
- Yang, M., Li, Z., Anjum, M., Kayastha, R., Kayastha, R.,**Rai, M.**, Zhang, X., Xu, C .(2022). Projection of Streamflow Changes under CMIP6 Scenarios in the Urumqi River Head Watershed, Tianshan Mountain, China, *Frontier Earth Science*

Submitted

- **Rai, M.**, Kang, S., Yang, J., Rupakheti, M.,Rupakheti, D., Tripathee, L., Hu, Y., Chen, X., (2022) Insight into seasonal aerosols concentrations, transport and meteorological influence over Pan-Third Pole region using multi-sensors satellite and model simulation. (2022). *Atmospheric Chemistry and Physics*
- Yang, J., Kang, S., Chen D., Lin, Z., Ji, Z., Duan, K., Deng, H., Tripathee, L., **Rai, M.**, Yan, Fangping, Y., Li, Y., Gillies, R. (2022). South Asian black carbon destroying the water sustainability over the Asian Water Tower, *Nature Communication*
- Dhital, Y., Tang, J., Pokharel, A., Tang, Q., **Rai, M**. (2022). Impact of aerosol concentration on elevation-dependent warming (EDW) pattern in the mountains of Nepal, 2021 *Atmospheric Science Letters*

In preparation

- Rupakheti, D., Rupakheti, M., **Rai, M.**, Yu, X., Yin, X., Kang, S., Orozaliev, m., Sinyakov, V., Abdullaev, S., Sulaymon, I., Hu.,J. (2022). Characterization of columnar aerosol over a background site in Central Asia: Results from Issyk-Kul Lake, Kyrgyzstan
- Rawat, B., Yin, X., Sun, X., Li, M., Sharma, C., Tripathee, L., Paudyal, R., **Rai, M.**, Tiwari, P., Pandey, A., Kandel, K., Kang., S., Zhang, Q. (2022). Variations and Influencing factors of Total Gaseous Mercury (TGM) in Kathmandu, A South Asian Metropolis

In preparation (continued)

- Regmi, J., Poudyal, K., Adhikari, N.P., Pokherl, A., Malakar, N., Tripathee, L., **Rai, M.**, Wilson, K., Aryal, R. (2022). Comparison of Surface Level Particulate Matter (PM2.5) and Atmospheric Column Aerosol Optical Depth over Kathmandu Valley

Skills

Languages	English, Nepalese, Kiranti, Mandarin Chinese.
Programming/Others	Python, R, Matlab, Linux, NCL, CDO, Bash, Github
Models/Tools	WRF-Chem, HYSPLIT/PySPLIT, SBDART, OPAC, ArcGis, TrajStat
Misc.	Academic research, High performance computing, Satellite data handling, LaTeX, publishing.

Training and Conferences

- 12-15 January 2016 — **Data Analysis with R**
  Organised by **ICIMOD, Nepal**
- 21-25 November 2016 — **Air Quality Instrument Operation and Maintenance**
  Organised by **ICIMOD, Nepal**
- 23-24 October 2016 — **Field Techniques and Data Tools for Monitoring High Mountain Environments**
  Organised by **University of Zurich, Switzerland**
- 12-23 August, 2019 — **Climate Change and Social Impact on the Third Pole**
  Organiseg by **TPE,TranTip, China**
- 22 October 2020 — **NASA'S Applied Remote Sensing Training Program on MODIS to VIIRS Transition for Air Quality Applications**
  Organised by **NASA**
- 13-17 September 2021 — **Capacity Development Program on Air Quality Management and Emission Reduction on PM2.5 for Asian Countries**
  Organised by **Regional Resource Centre for Asia and the Pacific, Thailand**
- 22 October 2021 — **Atmospheric Chemistry and Aerosols in the Asian Monsoon region using Satellite and Model data**
  Organised by **ACAM, ICIMOD, ECMWF**
- 06 June 2021 — **Air Quality using Copernicus Sentinel data**
  Organised by **WEKEO, Mercator Ocean International**
- 01 March 2022 — **Tools for Analyzing NASA Air Quality Model Output**
  Organised by **ARSET NASA**

Awards and Achievements

- 2018 — **President's Fellowship**, CAS-TWAS President's Fellowship awardee, Trieste, Italy
- 2015 — **M.S Thesis grant**,Cryosphere Monitoring Project (CMP) fellowship, Norwegian Embassy and ICIMOD-Nepal
- 2013 — **M.Sc Thesis grant**,Grant from SEAM-Nepal/Government of Finland.