



Mr. Asid Ur Rehman

Specialties: Geographic Information Science, Earth Observation Science, Remote Sensing, Land Cover Dynamics, Satellite Climatology, Climate Change
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About

Mr Asid Ur Rehman
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Asid received his master's degree (MS) in Remote Sensing and Geographic Information Science from the Institute of Space Technology Islamabad, in 2017. In his master's dissertation work, he evaluated the efficacy of satellite sensor-derived three-hourly precipitation products (namely TMPA near-real-time and research versions) by using telemetric rain gauge observations at 10-minute temporal resolution. He got his thesis work published in a Q1 rank international journal – Remote Sensing (IF 4.509). Currently, not only he is collaborating with various researchers but also serving as a scientific reviewer for the Journal of Applied Remote Sensing (JARS). His research interests include studying land cover dynamics, habitat and biodiversity modelling, multispectral/hyperspectral remote sensing, synthetic aperture radar (SAR) applications, climate change impact assessment, ecohydrological modelling, flash flood modelling, and cloud computing and artificial intelligence.

Apart from his research activities, Asid has been working professionally in geospatial discipline from past 11 years. He has accomplished his duties with different organizations such as World Wide Fund for Nature Pakistan (WWF-P), United Nations Human Settlements Programme (UN-Habitat), and Hagler Bailly Pakistan. He possesses vital skill in preparing, processing, linking, and assimilating heterogeneous datasets (primary, modelled, reanalysis, satellite-derived, and non-spatial datasets) to input earth system models. Further, he has strong expertise in optical satellite image interpretation, remotely sensed atmospheric data processing, climate and weather data analysis, topographic data integration, spatio-temporal analysis, and batch processing/algorithms automation using scientific scripting.

Asid shares his thoughts and updates on Twitter (@spatialized)

Publications

Journal Publications

- **Rehman, A.U.**, Chishtie, F., Qazi, W. A., Ghuffar, S., Shahid, I., & Fatima, K. (2018). Evaluation of 3-Hourly TMPA Rainfall Products Using Telemetric Rain Gauge Observations at Lai Nullah Basin in Islamabad, Pakistan. *Remote Sensing*, 10(12), 2040
- **Rehman, A.U.**, Chishtie, F., Qazi, W. A., Ghuffar, S., Shahid, I., & Fatima, K. (2018). Validation of TRMM 3B42 Rainfall Product at Lai Nullah Basin, Islamabad, Pakistan. *Journal of Space Technology*, 8(1), 59-64
- Naeem, S., Cao, C., Qazi, W. A., Zamani, M., Wei, C., Acharya, B. K., & **Rehman, A. U.** (2018). Studying the Association between Green Space Characteristics and Land Surface Temperature for Sustainable Urban Environments: An Analysis of Beijing and Islamabad. *ISPRS International Journal of Geo-Information*, 7(2), 38
- Fatima, K., Khattak, M. U. K., Kausar, A. B., Toqeer, M., Haider, N., & **Rehman, A. U.** (2017). Minerals identification and mapping using ASTER satellite image. *Journal of Applied Remote Sensing*, 11(4), 046006

Book Chapters

	<ul style="list-style-type: none"> • Methodological Framework for Evaluating Satellite Remote Sensing-Derived Precipitation, Elsevier's 'Precipitation Science' Book (<i>under compilation, expected to be published in 2021</i>) <p>Conference Posters</p> <ul style="list-style-type: none"> • Naeem, S., Cao, C., Khan, A., Rehman, A. U. (2017). Impacts of Climate Change on Peatlands in Qarumbar National Park Gilgit-Baltistan, Pakistan. <i>In International Conference on Mountain People Adapting to Change Solutions Beyond Boundaries Bridging Science, Policy, and Practice; at ICIMOD, Kathmandu, Nepal.</i>
Key Scientific Projects	<ul style="list-style-type: none"> • <u>Revitalizing the Ecosystem of Ravi River Basin, Punjab, Pakistan:</u> Developed objective methodology to produce high precision habitat mapping, formulated vegetation indices in conjunction with machine learning algorithms for crops (diffuse pollution sources) classification using high-resolution multispectral images, carried out multi-sensor modelling of temporal dynamics of river morphology using historic aerial photographs and recent high-resolution satellite imagery, expedited spectral profiles of multispectral imagery for modelling river water quality parameters, assimilated various datasets (pollution sources, wastewater parameter concentration, water-flows, and agricultural-runoff) to model basin-wide pollution hotspots, computed potential evapotranspiration and aridity index (through Penman-Monteith equation) for the climate classification of the Indus Basin, undertook climate change assessment by utilizing IPCC CMIP5 GCMs with associated downscaled RCMs i.e. Coordinated Regional Climate Downscaling Experiment (CORDEX) (WAS-44) dynamically downscaled projections, processed and collated spatial and non-spatial dataset (land use, water quality, river flows, climate change, etc.) for hydrological (GoldSim) and environmental flow (DRIFT DSS) modelling, developed comprehensive GIS inventory for the project • <u>Forest Monitoring, Pakistan:</u> Utilized time-series Landsat imagery to assess deforestation with a special focus on commercial-scale illegal clear-cutting in Swat District. Also used high-resolution SPOT-5 images to detect and quantify high-scale changes in forest ecology. • <u>Temporal Patterns of Crops in Pakistan:</u> Processed NDVI time-series data to analyze temporal patterns in the selected crops of Pakistan. • <u>Land Cover Assessment of Kallar Kahar Lake:</u> Processed latest QuickBird satellite images, conducted field surveys, performed object-based image analysis to assess spatial patterns of Land cover. • <u>Post-Flood Ecological Assessment of Swat River, Pakistan:</u> Detailed land cover change assessment using high-resolution satellite images to find disturbance in ecology • <u>Spatio-temporal Land Cover Dynamics of Salt Range Wetlands Complex:</u> Processed historic aerial photographs and latest QuickBird satellite images, conducted field surveys, performed Object-Base Image Analysis for the Land cover mapping, modelled long term spatial and temporal dynamics of land cover change • <u>Rapid Damage Assessment Due to Flood 2011:</u> Extracted water extent from MODIS Terra/ Aqua images through NDWI, masked permanent waterbodies to delineate flood water, utilized Google Earth imagery with the synergy of Landsat imagery to estimate sector-wise damages due to flood. • <u>Flood Inundation Mapping:</u> Carried rapid flood mapping mainly using Landsat 5 TM and Terra MODIS images during the calamity (Aug. – Sep. 2010) • <u>Pakistan Wetlands Inventory:</u> Participated in development of GIS-based National Wetlands Inventory and field surveys of alpine lakes in Pakistan. Developed series of detailed land use maps using high-resolution satellite imagery • <u>Demarcation of Forest Boundary:</u> Used very high-resolution temporal QuickBird Imagery to identify illegal encroachment in Murree forest, utilized Differential GPS (DGPS) to demarcate precise forest boundary. • <u>Water Vulnerability Study for Cement Plant in Sindh:</u> Conducted remote sensing

	<p>analysis to develop regional-scale land use map, used geospatial science to delineate watershed and sectoral water demand, used modelled climate datasets to undertake water vulnerability analysis by considering land use alteration and future water demand.</p> <ul style="list-style-type: none"> • <u>Basin-Wide Studies in the Jhelum-Poonch Basin for Sustainable Hydropower, Pakistan</u>: Modelled land cover/ land use change dynamics using spectral indices and object-based image analysis on moderate resolution Landsat images, modelled current and future sedimentation load based on land cover/ land use changes • <u>Numerous Environmental and Social Impact Assessments for Hydropower, Pakistan</u>: Carried out Climate Change Risk Assessment (CCRA), modelled the impact of land use alteration and climate change on river basin processes, socioeconomics, and water conditions, contributed to river hydraulic modelling (HEC-RAS & HEC-GeoHMS) to analyze dam break scenarios (this included modelling river bathymetry from cross-section data and then assimilating river bathymetry, high-accuracy elevation contours, and digital elevation model to develop a fine resolution digital surface model for flood modelling). • <u>Multi-Hazard Vulnerability and Risk Assessment (MHVRA), Pakistan</u>: Used remote sensing and geospatial techniques along with climate data for land sliding and flood risk assessment. • <u>Flood Disaster Vulnerability Assessment on Policy Options for Adaptation, Pakistan</u>: Contributed to devising evidence-based policy for Disaster Risk Management by making use of remote sensing and GIS techniques • <u>Evaluation of Satellite Image Classification Techniques for Urban Land Use</u>: Developed a methodological framework to assess different image classification techniques for very-high-resolution satellite imagery (GeoEye) of an urban area • <u>Time Series Climate Data Analysis</u>: Evaluated historic climate trends, performed hypothesis testing (Chi-square test, Central Limit Theorem), and undertaking autospectral and frequency analysis. • <u>System Study of Radar Subsystem of Tropical Rainfall Measuring Mission (TRMM)</u>: Detailed study of working of precipitation radar mounted on TRMM.
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