Thematic Sessions Speakers

Assoc. Prof. Alireza Rashki
Ferdowsi University of Mashhad, Iran

Speech Title: Enhancing Dust Emission Source Detection Through Integrated Satellite Remote Sensing Data

Biography: Dr. Alireza Rashki is an accomplished associate professor at Ferdowsi University of Mashhad (Iran), specializing in atmospheric sciences, air pollution, and environmental dynamics, Environmental Remote Sensing, with a particular focus on air pollution (aerosol/dust) research. His work explores the sources, transport mechanisms, and impacts of airborne particulate matter, including natural phenomena like dust storms, which are prevalent in arid regions such as the Middle East and Central Asia. Utilizing advanced methodologies such as remote sensing, satellite data analysis, and atmospheric modeling, Dr. Rashki investigates how aerosols influence air quality, climate systems, and public health. His research holds significant regional relevance, addressing environmental challenges in Iran and neighboring areas, where dust emissions exacerbate pollution levels. His published research underscores the intersection of natural aerosol processes and anthropogenic pollution, offering insights crucial for informing regulatory frameworks and health advisories. He was recognized as a Top Researcher at Ferdowsi University in 2019. With over two decades of experience, he has built an impressive international publication record, including more than 100 peer-reviewed articles. His research impact is reflected in an H-index of 27 (based on Web of Science and Scopus) and over 3,000 citations. Additionally, he serves as an editorial board member for three academic journals.

Speech Title: Enhancing Dust Emission Source Detection Through Integrated Satellite Remote Sensing Data

Abstract: Identifying dust emission sources accurately is essential for understanding their effects on air quality and developing effective control strategies. However, traditional methods using single-source satellite data often face challenges due to limitations in spatial resolution, temporal coverage, or spectral sensitivity. To address these issues, we introduce a multi-sensor approach that integrates data from SEVIRI, MODIS, and Sentinel-2 satellites. This approach enhances the precision and reliability of dust source detection. Sentinel-2's high spatial resolution (10–20 m) enables precise mapping of localized dust hotspots, while MODIS offers daily observations to monitor transient dust events. By combining spectral indices, such as the brightness temperature adjusted dust index (BDI), with thermal infrared bands, we can effectively differentiate dust-laden areas from bare soil or cloud cover. Machine learning algorithms, trained on multispectral and temporal features, further boost classification accuracy by minimizing false positives in complex terrains. The inclusion of SEVIRI data improves regional specificity at high temporal resolution. Validation with ground-based measurements demonstrates a significant increase in detection accuracy compared to methods using single-sensor data.