

REYADH RADHY (ALBARAKAT)

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ACADEMIC BACKGROUND

Ph.D., Geological Sciences	University of South Carolina, USA	Year completed:2019
M.Sc., Geology	University of Pune, India	Year completed:2011
B.Sc., Geology	University of Baghdad, Iraq	Year completed:2003

WORK EXPERIENCE

FAB. 2023 – Present	Lecturer at the Department of Geology – Science of Collage – University of Wasit – Iraq
JAN. 2020-JAN. 2022	Research Associate at the University of Virginia, Charlottesville
DEC. 2019	Research Assistant, School of the Earth, Ocean, and Environment, University of South Carolina
AUG-DEC 2019	Teaching Assistant, School of the Earth, Ocean, and Environment, University of South Carolina
June 2016	Volunteer to support NASA's Soil Moisture Active Passive Validation Experiment 2016 (SMAVEX16) in Iowa
2012 – 2014	Iraqi Geological Survey, Remote Sensing Department
Oct 2011– Apr 2012	Track and Log Operational Systems in Chinese Oil Company, China National Logging Corporation (CNLC)
2004 - 2008	BLP Training and Services (BLP) as Administrator for database oversight with Australian staff

PROFESSIONAL DEVELOPMENT

- Experience with MATLAB, Python software,
- SWAT model,

- ArcMap GIS and ERDAS IMAGINE tools for spatial data analysis.

JOURNAL PUBLICATIONS

- (1) **Albarakat, R.**; Lakshmi, V.; Tucker, C.J. Using Satellite Remote Sensing to Study the Impact of Climate and Anthropogenic Changes in the Mesopotamian Marshlands, Iraq. *Remote Sens.* 2018, 10, 1524.
- (2) **Albarakat, R.**; Lakshmi, V. Comparison of Normalized Difference Vegetation Index Derived from Landsat, MODIS, and AVHRR for the Mesopotamian Marshes Between 2002 and 2018. *Remote Sens.* 2019, 11, 1245.
- (3) **Albarakat, R.**; Lakshmi, V. Monitoring Dust Storms in Iraq Using Satellite Data. *Sensors* 2019, 19, 3687.
- (4) Gemitzi, A., **Albarakat, R.**, Kratouna, F. and Lakshmi, V., 2021. Land cover and vegetation carbon stock changes in Greece: A 29-year assessment based on CORINE and Landsat land cover data. *Science of The Total Environment*, 786, p.147408.
- (5) **Albarakat, R.**, Albarakat, R., Le, M.H. and Lakshmi, V., 2022. Assessment of drought conditions over Iraqi transboundary rivers using FLDAS and satellite datasets. *Journal of Hydrology: Regional Studies*, 41, p.101075.
- (6) **Albarakat, R.**, and Lakshmi, V. Modeling hydrological response of the Tigris River Basin, Under preparation.
- (7) **Albarakat, R.**, Lakshmi, V., Le, Manh-Hung, and Kansara, P. Using FLDAS and Satellite Datasets to Assessment of drought conditions over Tigris and Euphrates Reiver basins and Nile River basin, Almashreq region, Under preparation.

CONFERENCE PRESENTATIONS

- (1) **Albarakat, R.** and Lakshmi, V. Using satellite remote sensing to study the impact of climate and human changes in Mesopotamian Marshlands, Iraq, American Geophysical Union Fall Meeting, December 14-18, 2015, San Francisco CA
- (2) **Albarakat, R.**, and Lakshmi, V. Long-term of analysis of MODIS, NDVI and NDWI for the Mesopotamian Marshlands, Iraq, American Geophysical Union Fall Meeting, December 12-16, 2016, San Francisco CA.
- (3) Flores, A. N.; Lakshmi, V.; **Al-Barakat, R.**; Maksimowicz, M. Characterizing decadal-scale vegetation and ecohydrologic change associated with the Mozambican civil war via multiple-sensor remote sensing datasets, American Geophysical Union Fall Meeting, December 12-16, 2016, San Francisco CA.
- (4) **Albarakat, R.**, Lakshmi, V., and Tucker, C. Comparison and Evaluation of Long-Term NDVI product Derived from the NOAA AVHRR, MODIS and Landsat ETM+ Over the Mesopotamian Marshlands. American Geophysical Union Fall Meeting, 11-15 December 2017, New Orleans, Louisiana

- (5) Flores, A. N.; Lakshmi, V.; **Al-Barakat, R.**; Maksimowicz, M. Characterizing Impacts of Land Grabbing on Terrestrial Vegetation and Ecohydrologic change in Mozambique through Multiple-sensor Remote Sensing and Models. American Geophysical Union Fall Meeting, 11-15 December 2017, New Orleans, Louisiana.
- (6) Kansara, P. H.; Mishra, V.; Lakshmi, V.; **Al-Barakat, R.** Evolution of groundwater resources in response to pumping, land use change and rainfall in India, American Geophysical Union Fall Meeting, 11-15 December 2017, New Orleans, Louisiana.
- (7) **Albarakat, R.**, Lakshmi, V. Evaluation of NDVI Downscaling 5-km AVHRR Growing Season based on Long Term of Landsat Images in Mesopotamian Marshlands, Iraq, American Geophysical Union Fall Meeting, 10-14 December 2018, Washington D.C.
- (8) **Albarakat, R.**, Lakshmi, V., Le, Manh-Hung. Using time series of Meteorological and Normalized Difference Vegetation Index data for Monitoring Drought over Iraq. It has been accepted by American Geophysical Union Fall Meeting, December 9-13, 2019, San Francisco CA.
- (9) **Albarakat, R.**, Lakshmi, V. Using Soil and Water Assessment (SWAT) Model to Evaluate the Satellite and Gauges Based Precipitation Data and Understand the Hydrologic Impacts of Human Activities in the Tigris and Euphrates River Basins. AGU Fall Meeting Abstracts, 2020.
- (10) Gemitzi, A., Lakshmi, V., **Albarakat, R.** Assessment of spatio-temporal land-use changes over Greece from 2001 to 2018. AGU Fall Meeting Abstracts, 2020.
- (11) **Albarakat, R.**, Lakshmi, VV., Le, MH., Kansara, PH. Using Soil and Water Assessment (SWAT) Model and FLDAS and satellite datasets to Evaluate Drought Propagation for Multiple Drought Indices. AGU Fall Meeting 2021.
- (12) **Albarakat, R.**, Lakshmi, Alqurashy, R. Groundwater Monitoring Analysis Using Satellite Remote Sensing Data in Iraq. AGU25, 2025 Related articles

Research Statement

As an environmental researcher, my area of focus is specifically in hydrology and remote sensing of water resources, and drought events for different parts of the world. Droughts are a major natural disaster in almost every region of the world, causing negative impacts on water basin management. However, it is challenging to understand drought mechanisms in transboundary rivers where hydrometeorological network observations are often not available due to lack of data or limited due to administrative issues. Recently, I have applied the remote sensing satellites data to 1- Assess the drought conditions at transboundary river basins between Iraq, Turkey, Syria, and Iran. 2- To investigate the relationship between drought conditions and reservoirs in Iraq. We focus on annual variation in reservoir surface areas because in a semi-arid country such as Iraq, reservoirs play an important role in supplying drinking water, irrigating agricultural crops, and generation of hydropower. In this study, we used Landsat images to monitor and estimate annual reservoir area. With respect to the drought, we assessed drought conditions through multiple drought indices, including SPI, SPEI, SSI, and SVI. The Famine Early Warning Systems Network (FEWS NET) Land Data Assimilation System (FLDAS) and satellite data have been applied for estimating these above drought indices. This research is under revision with the Journal of Hydrology.

My dissertation involves the three main topics. The first topic is intitled “Using Satellite Remote Sensing to Study the Impact of Climate and Anthropogenic Changes in The Mesopotamian Marshlands, Iraq”. This topic presents the statistical analyses between Normalized Differences Vegetation Index (NDVI) and meteorological data to demonstrate the sensitivity of vegetation index. Since the Mesopotamian marshes have been subjected to extremely drastic events through a long time series (i.e., 36 years), I examined the relation between different water cycle variables and the examination of vegetation and water coverage changes and concentrate on the outcome of climate change and human actions on the Iraqi marshes and considered additional ground observations alongside the satellite datasets. NDVI derived from Advanced Very High-Resolution Radiometer (AVHRR), and meteorological data have been analyzed to evaluate the fluctuation and trends in water and vegetation coverage. The statistical analysis showed the decreases in NDVI were 86.78%, 98.73%, and 83.71% for Al-Hammar, The Central, and Al-Huwaiza marshes, respectively. These percentages illustrate the intensity of the decline in the vegetation coverage area over 36 years (1982–2017). The degradation of vegetation was due to the statistically significant negative trend in the mean annual discharge of the Tigris and Euphrates rivers. The annual discharge of the Tigris declined from ~2500–3000 m³/s to ~500 m³/s. The annual discharge of the Euphrates River declined from ~1500 m³/s to less than 500 m³/s. The first topic work has been published in the Remote Sensing Journal. The Second object focuses on the NDVI that is derived from different sensors (MODIS and Landsat 7 the Enhanced Thematic Mapper Plus (ETM+)) are evaluated versus NDVI derived from AVHRR for the Mesopotamian marshlands, Iraq, by using the time series trend analysis. Additionally, this chapter aims to evaluate the accuracy of time series fluctuations trends analysis of AVHRR NDVI comparison the 1 km in spatial resolution from Terra MODIS (MOD13A2) NDVI data and, 30 m Landsat 7 ETM+ NDVI data. Then the relationship between the NDVI values from the three different sensors will be examined to understand the spatial patterns and the correlation of the NDVI values. This paper explores the utility of matching low spatial resolution with good temporal repeat and long-term coverage, and a high spatial resolution with low temporal repeat and similar long-term coverage. Finally, this study also proves that we can use the low-resolution AVHRR data for land cover change studies, as it shows a similar trend to the high-resolution Landsat over the same time period. The second topic was published in the Remote Sensing Journal. The third topic titled as “Monitoring Dust Storms in Iraq Using Satellite Data”. This topic uses MODIS Surface Reflectance Daily L2G Global data to calculate the Normalized Difference Dust Index (NDDI). The MYD09GA V006 product was utilized to monitor, map, and assess the development and expansion of Sand and Dust Storms (SDS) over arid and semiarid lands of Iraq. Besides, Brightness Temperature (TB) from the Aqua/ MODIS thermal band 31 were utilized to distinguish atmospheric dust from the sand on the land surface. The MODIS Level 2 MYD04 deep blue 550nm Aerosol Optical Depth (AOD) data have been used in this research. It keeps precision even over incandescent desert surfaces. the main reasons that led to the worst dust storms that swept over Iraq in July specifically in summer 2009 were lack of rain, high temperature in the neighboring countries and mismanagement of water and lack of irrigation of agricultural lands and due to the marshlands having been subjected to many drastic conditions over a long time. All these factors created the drought in the summer of the year 2009 led to dust storms. Additionally, the strong Northwesterly Shamal winds

promote erosion from the alluvial deposits in the Tigris and Euphrates basin. The third topic was published in the Sensors Journal.