

1. Record Nr.	UNINA9910617303703321
Titolo	Satellite monitoring of water resources in the Middle East // Amin Shaban, editor
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	9783031155499 9783031155482
Descrizione fisica	1 online resource (414 pages)
Collana	Springer water
Disciplina	363.7387463
Soggetti	Artificial satellites in remote sensing Water levels Water levels - Measurement
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Foreword -- Preface -- Contents -- Fundamentals of Satellite Remote Sensing -- 1 General Overview -- 2 Characteristics of Satellite Images -- 3 Processing of Satellite Images -- 4 Geo-Information System -- References -- Water Resources in the Middle East -- 1 General Overview -- 2 Water Availability/Supply and Demand -- 3 Challenges on Water Resources -- 3.1 Increased Population -- 3.2 Climate change -- 3.3 Transboundary Water Resources -- References -- The Suitability of Satellite Remote Sensing and GIS Technologies for Mapping, Monitoring and Managing Water Resources in the Middle East -- 1 Introduction: Water Resources in the Middle East -- 1.1 Tigris and Euphrates -- 1.2 Jordan River -- 2 Water Resources Issues and Challenges in the Middle East -- 2.1 Tigris and Euphrates -- 2.2 Jordan River -- 3 Satellite Remote Sensing and Geographic Information System (GIS) Technologies, the Fundamentals -- 3.1 Remote Sensing (RS) Technology -- 3.2 Satellite Remote Sensing (RS) Technology Applications in Water Resources -- 3.3 Geographical Information Systems (GIS) Technology -- 3.4 GIS Technology Applications in Water Resources -- 4 The Suitability of Satellite Remote Sensing and GIS Technologies for Mapping, Monitoring and Managing Water Resources

in the Middle East -- 4.1 An Evaluation of the Suitability of Satellite Remote Sensing and GIS in the Middle East -- 4.2 Potential Application of Satellite Remote Sensing and GIS in the Middle East -- 5 Discussion -- References -- Atmospheric Rivers and Precipitation in the Middle East -- 1 Introduction -- 1.1 Precipitation in the Middle East and North Africa -- 1.2 Extreme Precipitation and Atmospheric Rivers -- 1.3 Uncertainty in Estimates of Future Climates -- 2 Materials and Methods -- 2.1 MENA Domain -- 2.2 Observed Precipitation, Winds, and Mean Sea Level Pressure. 2.3 Integrated Water Vapor Transport (IVT) -- 2.4 AR Detection Algorithm -- 2.5 Climate Model Simulations of ARs and Precipitation -- 3 Results -- 3.1 Individual AR Events in MENA -- 3.2 Climatology of ARs and Precipitation in the MENA Region -- 3.3 Model Simulations of Historic and Future Climate -- 3.4 Future Change in AR Frequency and Precipitation in MENA -- 3.5 Significance of Expected Changes Based on Latitude -- 4 Summary and Discussion -- References -- Inventory of Shared Water Resources in Western Asia: Selected Aquifer Systems in the Arabian Peninsula for the Application of Remote Sensing Techniques -- 1 Introduction -- 2 Methodology and Information Sources -- 3 Shared Aquifer Systems Identification Process -- 4 Overview of the Aquifer Systems -- 5 Selected Aquifer Systems for the Applications of RS Techniques -- 6 Conclusions -- Bibliography -- GIS-Based Multi-criteria Approach to Assess Water Resources Vulnerability in a Changing Climate over the Arab Domain -- 1 Introduction -- 2 Vulnerability Assessment Methodology -- 2.1 Determine Objectives and Scope -- 2.2 Impact Chain Development -- 2.3 Indicator Selection -- 2.4 Indicator Normalization and Classification -- 2.5 Indicator Weighting -- 2.6 Indicator Aggregation -- 2.7 Presentation of Results -- 3 Results from RICCAR -- 4 Concluding Remarks -- References -- Unraveling the Spatiotemporal Dynamics of Satellite-Inferred Water Resources in the Arabian Peninsula -- 1 Introduction -- 2 Inter-comparison of Precipitation Products and their Interactions with Water Budget Components over the AP -- 3 Climatological Time Series Analysis and Statistical Change Point Detection -- 3.1 Study Area and Datasets -- 3.2 Time Series and Change Point Analyses -- 4 Soil Moisture-Precipitation Interactions and Reverse Hydrology -- 4.1 Feedforward ANN-MLP Architecture: UAE Case Study -- 5 Conclusion. References -- A Technical Note on Least Squares Mascon Fitting to GRACE Satellite Data to Estimate Total Water Storage Changes in the Middle East -- 1 Introduction -- 2 GRACE Data -- 2.1 Low Degree Stokes Coefficients ($n = 0, 1, 2$) -- 2.2 Ocean's Gravity Contributions on Lakes and Water Reservoirs -- 3 Least Squares Mascon Fitting (LSMF) Solution -- 4 Results -- 4.1 Time Series Estimates in the Middle East -- 4.2 Time Series Estimates in Iran's Water Main Basins -- 4.3 Time Series Estimates of TWS from GRACE and GRACE FO in Iran's Main Water Basins -- 5 Summary and Conclusions -- References -- Spatial-Temporal Change of a Dam Lake Using Remote Sensing and Meteorological Drought Indices -- 1 Introduction -- 2 Materials and Methods -- 2.1 Study Area -- 2.2 Meteorological Data and Pre-processing -- 2.3 Remote Sensing Data and Pre-processing -- 2.4 Data Analysis -- 3 Results and Discussion -- 3.1 Meteorological Drought Analysis -- 3.2 Determination of Lake Area Using Remote Sensing and Its Correlation with Drought -- 4 Conclusions -- References -- Forecasting Domestic Water Demand Using Meteorological and Satellite Data: Case Study of Greater Beirut Area -- 1 Introduction -- 2 Methods and Materials -- 2.1 Study Area -- 2.2 Water Demand Data -- 2.3 Weather Data Acquired by Ground

Stations -- 2.4 Land-Surface Temperature Acquired Using Satellite Data -- 2.5 Model Structure and Performance -- 2.6 Climate Change Projections -- 3 Results and Discussion -- 3.1 Water Demand Models -- 3.2 Forecasted Water Demand -- 3.3 Impacts on Total Demand -- 4 Conclusions and Recommendations -- References -- MODIS Satellite Images and TRMM Products to Compare Rainfall and Streamflow Along the Coastal Rivers of Lebanon -- 1 Introduction -- 2 Tools and Methods -- 2.1 TRMM -- 2.2 MODIS-Terra Images -- 2.3 Rainfall Peaks Versus Plume Area -- 3 Results.

3.1 Rainfall from Gauges (Rg) and TRMM Data (RTR) -- 3.2 Plumes Area (PA) and Rivers Discharge (Qm) -- 3.3 Lag Time () and Residence Time (Tr) -- 4 Conclusion -- References -- Water Balance and Demand for Different Environmental Changes and Management Scenarios in the Hasbani Basin Using a WEAP Model and Geospatial Data -- 1 Introduction -- 2 Study Area Description -- 2.1 General Settings -- 2.2 Climate -- 2.3 Land Cover/Use -- 2.4 Geology and Hydrogeology -- 2.5 Water Resources -- 3 Materials and Methods -- 3.1 Data Collection -- 3.2 Model Setup -- 3.3 Model Parameters -- 3.4 Soil Moisture Method -- 3.5 Optimization -- 3.6 Scenarios -- 4 Results and Discussions -- 4.1 Model Efficiency -- 4.2 Annual Water Balance -- 4.3 Water Demand -- 5 Conclusions -- References -- Agricultural Water Management in the Nile Delta Using Remote Sensing Techniques -- 1 Introduction -- 1.1 Irrigation Water Performance Assessment (IWPA) -- 1.2 Remote Sensing Techniques in the IWPA -- 1.3 IWPA in the Nile Delta -- 2 Materials and Methods -- 2.1 Study Area -- 2.2 Data Description -- 2.3 Methodology -- 3 Results and Discussion -- 3.1 Land Surface Temperature and Reference Evapotranspiration -- 3.2 SSEBop Algorithm -- 3.3 Assessment of the Irrigation Water Performance -- 4 Conclusions and Recommendations -- References -- Studying the Water Resources and Hydrological Characteristics of the West Bank and Gaza Strip, Palestine Using GIS and Remote Sensing Data -- 1 Introduction -- 2 Study Area -- 3 Water Resources of the West Bank and Gaza Strip -- 4 Hydrological Characteristics of the West Bank and the Gaza Strip Watersheds -- 4.1 Material and Methodology -- 5 Results and Discussion -- 5.1 Linear Morphometric Parameters -- 5.2 Areal Morphometric Parameters -- 5.3 Relief Morphometric Parameters -- 6 Conclusion -- References.

Landsat Satellite Images for Lineaments Detection: A Tool to Identify Groundwater Productivity in Lebanon -- 1 Introduction -- 2 Lineaments -- 3 Groundwater and Fracture Systems -- 4 Tools of Analysis -- 4.1 Water Wells Productivity -- 4.2 Extraction of Lineaments from Satellite Images -- 4.3 Dimensional Analysis of Lineaments -- 4.4 Lineaments and Groundwater -- 5 Results and Conclusion -- References -- Using Information from Remote Sensing to Estimate Groundwater: GRACE and Sentinel-1 Satellites -- 1 Introduction -- 1.1 Background -- 1.2 Measuring Groundwater -- 1.3 Loss of Freshwater Storage -- 1.4 Using Satellites to Estimate Groundwater -- 2 Freshwater Data for Beqaa Plain, Lebanon -- 2.1 GRACE Data -- 2.2 GLDAS data -- 2.3 Qaraaoun Reservoir Data -- 3 Calculating Groundwater Storage in the Beqaa Plain, Lebanon -- 4 Sentinel-1 InSAR and In-Situ Wells Data -- 4.1 Sentinel-1 InSAR Signals of Land Subsidence -- 4.2 Monitoring Wells -- 5 Summary and Discussion -- References -- Volcanic Terrains Reveal Bright Hydrogeological Prospects in Saudi Arabia: A GIS & -- RSA Linked Research on Harrat Rahat -- 1 Introduction -- 2 Methodology -- 3 General Setup of Volcanic Terrains in Saudi Arabia -- 3.1 Setup of Harrat Rahat -- 4 Characteristics of Volcanic Rocks -- 4.1 Number of Eruptive Events -- 4.2 Volcanic Eruption and Basaltic Lava-Flow Trends -- 4.3 Coalesced Behaviour of Lava-Flows -- 4.4 Thickness

of Volcanic Terrain -- 4.5 Surface Nature of Basaltic Lava-Flow Terrains
-- 4.6 Volcanic Rocks and Associated Structures -- 5 Enhanced
Satellite Image Models of Harrat Rahat -- 5.1 Enhanced Image
and Rahat Volcanic System -- 5.2 Thermal Band Enhanced Image Model
-- 6 GIS-Linked Hydrogeo-Model -- 7 Discussion -- 8 Conclusion --
References.
Regional Mapping of Groundwater Potential Zones in the Saudi Arabia
Using Remote Sensing and Machine Learning Algorithms.
