REMOTE SENSING NEWSLETTER

- MOHAMMED BIN RASHID SPACE CENTRE (MBRSC)

CONTENT

Introduction	01
Whiting Phenomenon	02
KhalifaSat Applications	05
Disasters Management	06
TAMKEEN Program	08
YPinSpace in Memory	09
IAC 2021: Call for papers	10







Initially, the Applications Development and Analysis Section (ADAS) members are honored and pleased to welcome you to the third issue of the Remote Sensing Newsletter. This work is an initiative by the Remote Sensing Department to raise the awareness of the tasks, activities, projects along with the future plans and research trends. It aims at enabling you realize the actual benefits that our community can gain out of the MBRSC earth observation satellites series along with the value added products and services.

MBRSC is serving plethora of governmental entities, the private sector as well as academic institutions with a diversity of services starting from providing high resolution satellite imagery all the way to sharing analytical reports and web apps with decision makers.

Generally, MBRSC provides value added services in the following domains: land use/land cover mapping, change detection, environment monitoring, projects monitoring, disaster management, air quality, AI solutions, 3D mapping, data fusion and many more.

For more information about the MBRSC R&D activities, kindly visit the following link: a

adas.mbrsc.ae

REMOTE SENSING NEWSLETTER



THINK OUT OF THE B O X

"Since **71%** of our earth is water, isn't it more convenient to be called an **ocean**?!"



MBRSC ENVIRONMENTAL PROJECTS



Spatiotemporal Mapping and Monitoring of Whiting in the Semi-Enclosed Gulf

Whiting events in seas and lakes are a natural phenomenon caused by suspended calcium carbonate (CaCO3) particles. The Arabian Gulf, which is a semi-enclosed sea, is prone to extensive whiting that covers tens of thousands of square kilometers. Despite the extent and frequency of whiting events in the Gulf, studies documenting the whiting phenomenon are lacking. Therefore, the primary objective of this study was to detect, map and document the spatial and temporal distributions of whiting events in the Gulf using daily images acquired by the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra and Aqua satellites from 2002 to 2018.



Figure 1. Spectral response of various surface features in a sample MODIS product (MOD09GA) for the Gulf



Figure 2. MODIS images and their classification results: (a,b) 2 March 2003, (c,d) 4 March 2012, (e,f) 10 February 2016 and (g,h) 3 October 2018



Figure 3. High spatial frequency of whiting events overs 17 years



Figure 4. Generic statistics of whiting occurrence: (a) total frequency per year, (b) total frequency per month, (c) total number of days per year and (d) total number of days per month

Conclusions

Previous studies mapping whiting events from satellite images, specifically in the Bahama Banks and in the coast of Southwest Florida, relied on the manual delineation of whiting based on spatial contrast, spectral behavior of whiting and derived spectral indices. Considering the limited studies on whiting event mapping in the Gulf, the present study aimed to document the spatial extent and the seasonal variability of whiting events in the Gulf between 2002 and 2018 using MODIS data.

- The adopted model showed an outstanding and expeditious approach to extracting and characterizing whiting events quantitatively from time series images.
- Whiting events in the Gulf occurred during the winter season (November to March) and were extensively located in the southwestern section of the Gulf, mainly along the UAE coast.
- During the study period (2002–2018), the whiting events occurred exclusively for 5 to 34 days per year and covered areas ranging from 12,000 km² to 60,000 km².
- These events require further investigations for in-situ measurements and laboratory analysis, on the basis of the common spatial distribution of whiting. Therefore, whiting in the Arabian Gulf merits further attention from the scientific community to examine biophysical, biogeochemical and environmental factors that may reveal the causes of the whiting occurrences.





KhallaSat Applications Automatic Airplanes Detection from KhalifaSat Imagery Using **Deep Learning Approach**

Example 1



Example 2



Example 3

Example 4



REMOTE SENSING NEWSLETTER





TAMKEEN PROGRAM

IN GEO-SCIENCE & REMOTE SENSING

Voung Professionals Developments An Overview about the Program:

Tamkeen program is an initiative by MBRSC to involve the Emirati academic institutions' students in the active research topics in the field of geoscience and remote sensing. It has been designed to help the engineering students to gain knowledge and get the best use of all the available resources to design and develop the efficient tools to serve the UAE governmental bodies working in this line of business. Tamkeen program has been officially launched in February 2020 with the first



selected students from all the UAE universities based on certain criteria. They joined the internship program at MBRSC Lab for 8 weeks. During their internship, they worked with the senior engineers from the remote sensing department at MBRSC and MBRSC Lab on diverse projects such as image classification, GIS and smart cities, objects and oil spills detection as well as extracting the coastline from satellite images and many more. Nowadays, they are working on their senior design project at their universities.

The Program Phases & Timeline:



Internship Students' Testimonials:



The 8 weeks online internship was very useful to us as we gained many beneficial experiences, new skills, and achievements. Working on new software is not easy since we faced many difficulties and challenges from which we learned a lot such as self-reliance, punctuality, working under stress, random group work in addition to teamwork. Every new experience will teach us something new.

Maryam Ahli, Senior Student (BSc – Electrical Engineering)



The virtual internship was an ideal opportunity to earn various valuable knowledge, skills and experiences. It also provided us with a sense of acquaintance with highly different working environment. The focus of the internship project was to be introduced to the GIS & Remote sensing field. The internship taught me how to take risks, overcome obstacles and accept feedbacks in order to get the most out of the experience.

Senior Student (BSc – Electrical Engineering)

batch consisting of 20 carefully ...



YPinSpace in Memory

Dear Valuable Colleagues,

As you know that the Mohammed Bin Rashid Space Centre (MBRSC) hosted the IEEE Young Professionals in Space Conference (YPinSpace) in Dubai, November 2019. The MBRSC organizing committee successfully managed to bring scientists, practitioners, engineers, startups along with leaders of space industry and agencies together in a single platform to discuss the recent research breakthroughs, technical advances, existing opportunities and emerging space technologies. Such platform provided the young generation with a holistic view of the science, engineering and space technology fields and provided access to professionals and experts from all over the globe.

We received an extremely positive feedback and hot appreciation from various professional international organizations such as the Institute of Electrical and Electronics Engineers (IEEE) since they shortlist YPinSpace 2019 as one of the best technical conferences for the young professionals in the Middle East and the African region in 2019. In January 2020, the IEEE UAE Chapter conducted a ceremony to award the organizing committee for their professionalism and dedication in hosting this outstanding and memorable event.

I would like to thank all of you who made YPinSpace 2019 successful and amazing. <u>Today you will receive a golden</u> medal for memories to always remind you of your great efforts and dedication.

Best Regards,

H.E. Yousuf Hamad Al Shaibani Director General, Mohammed Bin Rashid Space Centre (MBRSC)



REMOTE SENSING NEWSLETTER

ISSUE 3 (OCTOBER 2020)

ORGANIZED BY





Mark your Calendar!







INC 72nd INTERNATIONAL DUBAI 2 0 2 1 ASTRONAUTICAL CONGRESS

25 – 29 October 2021 | Dubai, United Arab Emirates

CALL FOR PAPERS

On behalf of the International Programme Committee, it is a great pleasure to invite you to submit an abstract for the 72nd International Astronautical Congress IAC 2021 that will be held in Dubai, United Arab Emirates. The IAC is an initiative to bring scientists, practitioners, engineers and leaders of space industry and agencies together in a single platform to discuss recent research breakthroughs, technical advances, existing opportunities and emerging space technologies.

IMPORTANT DATES		
Abstracts Submission Period	4 th Nov. 2020 – 28 th Feb. 2021	
Notification to Authors	21 st April 2021	
Presentation Submission Period	2 nd May – 8 th Oct. 2021	

Abstracts Submission Website: www.iafastro.net

For more information, please contact: saeed.almansoori@mbrsc.ae

