

DEPARTMENT OF GEOLOGY

ALAGAPPA UNIVERSITY

State University | A+ Grade by NAAC (CGPA : 3.64) in the 3rd Cycle | Category - I

University by MHRD - UGC

KARAIKUDI - 630 003, TAMIL NADU, INDIA

Lapides Loquuntur (The Stones Speak)

E-MAGAZINE



Vaidal Dr. S.M. Alagappa Chettiar



Academic Year 2020 – 2021, Issue - 3



Head of the Department Desk



Dr. V. SUGUMAR
ASSISTANT PROFESSOR & HEAD I/C

As the Head of this prestigious Department, I am proud and happy to see the success and growth of our E-magazine. It is a testament to the passion, talent, and originality of our students, and a reflection of the diverse perspectives, experiences, and voices that make our Department a vibrant and dynamic community.

Over the years, our Department has strived to provide a nurturing environment that fosters holistic development and prepares students to become leaders in their fields of study. We believe that education is not just about acquiring knowledge, but also about cultivating critical thinking, empathy, and a sense of responsibility to society.

I extend my sincere congratulations to the editorial team and all those who have contributed to this E-magazine. Your efforts have resulted in a beautiful compilation of literature in different languages, photography, artwork, and overall creativity that truly captures the essence of our Department.

May this E-magazine inspire you to reach new heights and serve as a reminder of the incredible potential that lies within each of us.

Advisory Board



Dr. K. PRABAKARAN
ASSISTANT PROFESSOR



Dr. V. PERUMAL
TEACHING ASSISTANT



Dr. T. KONGESWARAN
TEACHING ASSISTANT

Editorial Desk



*With great pleasure, I extend my warm greetings through the pages of our Department e-magazine, **Lapides Loquuntur (The Stones Speak)**, a beautiful embodiment of our Department spirit.*

At the Department of Geology, we believe that education goes beyond textbooks and lecture halls. Each student has unique talents, passions, and interests, and we are dedicated to fostering an environment that encourages their exploration and growth. We encourage our students to pursue their passions in various areas, whether sports, arts, music, theater, debates, community service, or anything else. Engaging in extracurricular activities helps them excel in diverse fields and contributes significantly to their personal development.

In today's digital age, it is essential to embrace innovative ways of sharing knowledge and ideas. Our Department E-magazine serves as a virtual platform for expressing our thoughts and learning from one another. I encourage all students and faculty members to actively participate in and contribute to this enriching endeavor.

*I express my heartfelt appreciation to the editorial team and everyone involved in creating **Lapides Loquuntur (The Stones Speak)**. Your hard work and dedication have resulted in a remarkable collection of stories, articles, and creative expressions that truly capture the spirit of our Department community.*

CHIEF EDITOR

EDITOR

Editorial Board...



Sivakumar K
Muruganantham A
Bangarupriyanga S

Research Scholar

DESIGN HEAD

Prem Kumar M

Sathish S

John Vino C

IInd M.Sc

CHIEF EDITOR

Jenifer Roslin A

Abishake S

Gokul LM

Jaganraj S

Ist M.Sc

EDITOR

CONTENTS

1. தமிழ்
2. ENGLISH
3. ART
4. PHOTOGRAPHY
5. EVENTS
6. PUBLICATIONS

தமிழ்

நிஜம் என்பதற்கும் கனவு நிலை என்பதற்கும்
வேறுபாடு என்னில் இல்லை...

நீ என்னோடு இருப்பது கனவு நிலையாகி,
நீ அருகே இல்லாத போது உன் நினைவில்
நிஜமாகி போகிறேன்

மெல்ல திறக்கும் எந்தன் கனவுகளில்...

மீண்டும் துளிர்க்கும் உயிர் மூச்சின்
நினைவுகள்...!

நிலவினோடும் நிலத்தினோடும்

காலங்களில் கரைந்த பாடல்களின் ஊடே நம்
காவியம்!!!

அன்று நம் முதல் வருகையின் போது பூக்கள்
தூவிய மரம்,

இன்று சருகாகி போனதென்ன?

நம்மைப்போல..?

அங்கு இலையுதிர் காலம் என்பதா?..

இங்கு நம் இடைவெளி காலம் என்பதால்...

உன் வருகை கண்டு பூக்கும் என் மனம்

இன்று உன்னை கண்டும் காணாது

போனதென்ன...

மெல்லிய திரை நமக்குள்,என்று விலகும்...

முதன் முறையாக சில அனுபவங்கள்...

முழுதாய் ரசிக்க வேண்டும் என விருப்பம்...

முதன் முறையாக சில தடுமாற்றம்,

மாற்றம் வேண்டியே விருப்பம்...

முதன் முறையாக சில விருப்பம்...

விருப்பமலே சிறு விருப்பம்...

Ms. S. BANGARU PRIANGA
Ph.D., RESEARCH SCHOLAR



2)

தமிழ்

கனவுகள் உருவாக்கி

கவலைப்படாதே...

உறக்கத்தைக் கொள்ளித்து விட்டா

கண்கள்!

நினைவுகள் மறந்துவிடுவன

என்று பயந்தே....

நேசத்தை தவறவிடாதே...

இதயம்!?

பயலுக்கு பயந்து

புதுகூலி புதுகூலி கொண்டு

சுய்கொளையம் போல...!



S. SATHISH

Ind M.Sc Applied Geology



ENGLISH

The Heavens above the Ocean



I've seen stars fall, but when they fall and
die,
No star is lost from the entire star-sown
sky.

The toil of all that is does not help the
original fault;
It pours into the sea, and the sea remains
salt.

In the distant past, a mystery awaits
Another enormous and lofty,
The endless sky and the infinite Ocean
waves collide.



Ms. S. BANGARU PRIANGA
Ph.D., RESEARCH SCHOLAR

A close-up photograph of a brick wall. The bricks are painted in a vibrant, multi-colored pattern. A large, semi-circular graphic in a bright pink color is painted over the wall, starting from the bottom left and curving towards the top right. The word "ART" is written in a bold, white, serif font, centered on the pink graphic. The letters are stacked vertically, with "AR" on top and "T" below it. The background consists of blue and teal bricks, some of which are partially covered by the pink graphic. The overall aesthetic is modern and artistic.

**AR
T**



L.M GOKUL
1ST M.SC., APPLIED GEOLOGY



L.M GOKUL
1ST M.SC., APPLIED GEOLOGY

A textured wall with a grid pattern, featuring a large pink circular shape and a teal circular shape. The word "PHOTOGRAPHY" is written in white, bold, serif capital letters across the center of the pink circle.

PHOTOGRAPHY



R. KUMARASAMY
IIInd M.Sc., Applied Geology



KR. RAJAPANDI
IIInd M.Sc., Applied Geology

A close-up photograph of a brick wall. The bricks are painted in a vibrant, multi-colored pattern. A large, semi-transparent pink circle is overlaid on the right side of the image, partially covering the bricks. The word "EVENTS" is written in a white, serif font across the center of the pink circle.

EVENTS

FIELD VISIT AT ANDHRA PRADESH MINES





A close-up photograph of a brick wall. The bricks are painted in a vibrant blue color. A large, semi-transparent pink circle is overlaid on the wall, starting from the bottom left and extending towards the top right. The word "PUBLICATIONS" is written in a white, serif font across the center of the pink circle.

PUBLICATIONS



Short Communication

A study on the evolution of coastal geomorphology between Rameshwaram and Kilakkarai, east coast of India

T Kongeswaran* & R Karikalan

Department of Geology, Alagappa University, Karaikudi,
Tamil Nadu – 630 003, India

*[E-mail: kongesgeo@gmail.com]

Received 01 June 2018; revised 06 September 2018

This research focuses on coastal geomorphology change analysis using remote sensing and GIS (Geographical Information System) which is sturdily correlated with ecological, environmental, social, and socio-economic significance to coastal mechanism. These significances are differing apparently and will help understanding the probable responses for the varying boundary conditions because of anthropogenic interventions in climatic changes. The applications of hazard studies are integrated to coastal zone management plan and cannot be omitted. The present study estimates the changes in coastal geomorphological features along the study area due to natural causes from 2007 to 2017. The geomorphological maps were generated by follow-on map products and were displayed using ArcGIS 10.2 software. Multi-temporal satellite data of Landsat ETM (Enhanced Thematic Mapper) 2007 and 2017 images were used for generating coastal geomorphology maps.

[Keywords: ArcGIS 10.2, Change detection, Coastal Geomorphology

littoral currents bring sediments in Periyapattinam area due to the absence of river discharge, which causes spit development in the area. Longitudinal dunes were present about 75 meters length and 15-30 meter height in the inlands of Mandapam and Vedalai coastal region which is barren, prominent and partly stabilized. Sand dunes in Valinokkam and Sippikulam area are partially stabilized by covering of thorny bushes.

Estimate of Geomorphic features

The coastal stretch of Rameshwaram to Kilakkarai is 51 km long and it extends between 9° 24' and 9°30' N longitude and between 78° 40' and 79° 20' E latitude (Fig. 1). The shoreward face is traversed by complex drainage pattern and coastal construction which also experiences the convergence by wave action. The major part of the study area consists of narrow wetlands that are developed by splitting of river branches of Vaigai river delta. Tributaries of Vaigai river namely Varshalei, Pambar, Kottakkarai and Gundar rivers supports irrigation system in the study area.

Materials and Methods

The data products are multi spectral satellite data of Landsat ETM 2007 and 2017 images which were used



www.gi.sanu.ac.rs, www.doiserbia.nb.rs
J. Geogr. Inst. Cvijic. 2021, 71(3), pp. 249–263



Original scientific paper

UDC: 911.2:627.5:007(540)
<https://doi.org/10.2298/IJGI2103249T>

Received: September 14, 2021

Reviewed: October 13, 2021

Accepted: November 26, 2021



ASSESSMENT OF SHORELINE POSITIONAL UNCERTAINTY USING REMOTE SENSING AND GIS TECHNIQUES: A CASE STUDY FROM THE EAST COAST OF INDIA

Kongeswaran Thangaraj^{1}, Sivakumar Karthikeyan¹*

¹Alagappa University, Faculty of Science, Department of Geology, Karaikudi, India; e-mails: kongesgeo@gmail.com; siva.karthi90@yahoo.com

Abstract: The focus of this research was to assess the shoreline changes by comparing the satellite data from 1980 to 2020. The study area falls in the region between Kodiakkarai and Nagapattinam of the east coast of India, which has frequently been distressed by storm surges and cyclones in the Bay of Bengal. The Digital Shoreline Analysis System (DSAS) detects and measures the erosional and accretional shoreline positions through the statistics of the Shoreline Change Envelope, Net Shoreline Movement, End Point Rate, Linear Regression Rate, and Weighted Linear Regression. The results show that the shoreline from Kodiakkarai to Nagapattinam suffered severe erosion of 17.7% in total with an average annual erosion rate of 3.4 m/year from 1980 to 2020 and the rate of erosion ranged between 0.1 m/year to 19.8 m/year. About 90.5% of the total shoreline was faced high erosion during the period between 2000 and 2010. The maximum erosion was about 1061 m from 2000 to 2010, the maximum accretion was found to be 1002 m in transects at Kodiakkarai during 2010 to 2020. After the effect of 2004 tsunami, the corresponding changes in littoral currents caused the drastic erosion and accretion in this shoreline. The DSAS prediction model shows that 19.3% of the current shoreline will erode in 2030. The maximum predicted erosion is 406 m at Kodiakkarai and the maximum predicted accretion is 148 m at Nagapattinam region. The coastal zone from Kodiakkarai to Nagapattinam needs special attention to prevent the erosion and it is recommended to build suitable coastal protection structures along the coast for sustainable development and to execute the coastal zone management for this region.

Pankaj Kumar
Gaurav Kant Nigam
Manish Kumar Sinha
Anju Singh *Editors*

Water Resources Management and Sustainability



Chapter 14 Application of Remote Sensing and GIS in Floodwater Harvesting for Groundwater Development in the Upper Delta of Cauvery River Basin, Southern India



Kongeswaran Thangaraj and Sivakumar Karthikeyan

Abstract People living in semiarid areas with inadequate rainfall are frequently affected by water scarcity. Upper delta region of Cauvery River Basin (CRB) in southern India was selected to search suitable areas for floodwater harvesting to induce artificial recharge that improves the groundwater level. The aim of this study is floodwater harvesting based on the technical design and identification of the appropriate locations for artificial recharge structures. Remote sensing and Geographic Information System (GIS) were used to produce the flood hazard map and recommend suitable areas for floodwater harvesting. Thematic layers were prepared and overlaid to determine the flood vulnerable zones and suitable recharge structures were identified based on the hazard map. Burrowing and flooding are the most favorable artificial recharge structures should be implemented in all parts of CRB, whereas battery wells near to the river banks should be built to improve the groundwater level. Hydrologists, decision-makers, and planners will use this appropriate map to quickly identify the locations with the greatest potential for flood water collection. This study concludes that geospatial technology becomes very effective for flood vulnerable zone mapping, floodwater harvesting, and suggesting management plans to improve groundwater level for sustainable development.

Keywords Floodwater · Harvesting · GIS · Semi-arid · Sustainable and development

Hydrogeochemical Analysis for Groundwater Suitability Appraisal in Sivagangai, an Economically Backward District of Tamil Nadu

Muruganantham Arumugam¹, Sivakumar Karthikeyan¹, Kongeswaran Thangaraj^{1,*}, Prabakaran Kulandaisamy¹, Bangaru Priyanga Sundaram¹, Karikalan Ramasamy¹, Agastheeswaran Vellaikannu^{1,2} and Perumal Velmayil¹

¹Department of Geology, Faculty of Science, Alagappa University, Karaikudi – 630 003, India

²Department of Geology, Alagappa Govt. Arts College (Affiliated to Alagappa University), Karaikudi - 630 003, India

*E-mail: kongesgeo@gmail.com

ABSTRACT

Hydrogeochemical analysis was carried out to assess the suitability of groundwater for drinking, domestic, agriculture and industrial purposes in Sivagangai district, which is economically backward district of Tamil Nadu, India. Seventy ground water samples were collected during pre and postmonsoon season in the year 2017 from all over the district and analyzed for hydrogen ion activity, electrical conductivity, total dissolved solids, total hardness, Ca, Mg, Na, K, Cl, CO₃, HCO₃, SO₄, total nitrate, and F. All the analytical results are compared with the corresponding guideline values of drinking water standards and the results show that groundwater in most part of the study area is potable except for a few locations in both seasons. The groundwater geochemistry is mostly controlled by rock water interaction and evaporation processes in both seasons as revealed from the Gibbs plot. The irrigation water quality parameters such as SAR, Na% and RSC results show that some of the groundwater samples are fit for agriculture. It is ascertained through hydrogeochemical analysis that the quality of groundwater is appropriate for drinking, domestic use, agriculture as well as industrial purpose and it can be utilized for industrial development to improve the socio-economic status of the study area.

INTRODUCTION

Groundwater quality has physical, chemical and biological character. The physical water quality parameters are temperature, turbidity, colour, taste, and odour. Groundwater is generally colourless, odourless and does not have specific taste. Groundwater naturally contains dissolved ions, which are slowly derived from soil particles, sediments and rocks as they travel through the unsaturated zone and into the mineral surfaces in the pores or structures of the aquifer. The important decisions regarding the available fresh water resources will determine the future environmental, economic and politics of any region in the world (Sivakumar et al. 2016; Ramachandran et al. 2020). Earth water resources have been classified as groundwater and surface

changes in groundwater quality can be understood through the geochemical studies (Arumugam and Elangovan, 2009; Chandrasekar et al., 2013). The geochemical processes such as dissolution, dispersion, sorption, precipitation, condensation, volatilization, oxidation and reductions are responsible for seasonal and spatial variations in groundwater chemistry (Magesh and Chandrasekar, 2011; Krishnakumar et al., 2012; Magesh et al., 2012; Ramachandran et al., 2019). The important controlling factors of groundwater chemical composition are soil type, precipitation, infiltration, and groundwater flow pattern (Jeyaprakash et al., 2008; Chandrasekar et al., 2013; Selvam et al., 2013). This study aims to investigate the groundwater quality of Sivagangai district that confronts growing population, industrial activities and agriculture.

STUDY AREA

Sivagangai district is economically backward district of Tamil Nadu, India. It covers an area of 4,189km². The geographical location of Sivagangai district falls between latitudes 9°43' and 10°22' N and longitudes 77°47' and 78°49' E. Sivagangai district has two revenue divisions and eight subdivisions. The majority of works in the district are dependent on the source of agriculture (72.8%). Paddy is the primary crop of the district; other cultivated cereals include sugarcane, groundnut, pulses and millet. Normally the whole district is surrounded by palm trees and landscape is of palm and acacias. The soil types in this district are lateritic, red, black, red loam, graphite; black and white granite is also available. During the summer periods (April to June) the weather is dry and sultry due to its tropical climate condition and the temperature reaches its maximum of 43° C (CCC&AR and TNSCCC, 2015). The normal annual rainfall ranges between 861.8 mm and 988.6 mm. The normal south west monsoon rainfall varies from 275.8 to 401.1 mm while the north east monsoon normal rainfall varies from 382.5 to 442.8 mm. The groundwater level in shallow aquifer ranges from 30 to 32 mbgl in sedimentary formation, whereas 15 to 20 mbgl in hard rock. In deeper aquifer of sedimentary formation, the groundwater level is at 150 to 225 mbgl, whereas 65



**EDUCATING THE YOUNG MINDS
TRAINING THE TECHNOCRATS
EMPOWERING THE GEOLOGISTS**



EMPOWERING YOUNG MINDS

DEPARTMENT OF GEOLOGY

ALAGAPPA UNIVERSITY

State University | A+ Grade by NAAC

**(CGPA : 3.64) in the 3rd Cycle | Category - I University by
MHRD - UGC**

KARAIKUDI - 630 003, TAMIL NADU, INDIA