ASSESMENT OF GROUND WATER POTENTIAL ZONES USING GEOGRAPHIC INFORMATION SYSTEM IN KODUNGALLUR TALUK, THRISSUR, KERALA

project report submitted to Christ College (Autonomous), University of Calicut in partial fulfilment of requirements for the award of degree in

BACHELOR OF SCIENCE

IN

GEOLOGY

By

ATHIRA M S

Reg No: CCAUSGL001

(2020-2023)

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE

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UNDER THE GUIDANCE OF

Mr. THARUN R

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CERTIFICATE

I hereby declare that the work, which is being present in this dissertation, entitled "**ASSESMENT OF GROUND WATER POTENTIAL ZONES USING GEOGRAPHIC INFORMATION SYSTEM IN KODUNGALLUR TALUK, THRISSUR, KERALA**" by Ms. ATHIRA M S (CCAUSGL001) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of **Mr. Tharun R**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

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It is certified that the above statement made by the candidate is true to the best of my knowledge.

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Date: External Examiners:

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IRINJALAKUDA ATHIRA M S

DATE: Reg No: CCAUSGL001

ACKNOWLEDGEMENT

This report is a certified documentation of Assessment of groundwater potential zones of Kodungallur- Taluk Thrissur, Kerala This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

First and foremost, I would record my deep sense of gratitude and indebtedness to my guide Mr. Tharun R. Assistant Professor, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for designing the framework of the project and providing constant support and supervision throughout the entire course of study.

I am deeply thankful to Dr. Linto Alappat, HOD, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for his support and guidance throughout the academic year.

I express my sincere thanks to Dr. Swetha T.V., Ms. Shaima M.M, Dr. Resmy K.J, Ms. Sweeshma P.D, Assistant Professors, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, and Mr. Ayyappadas C. S. Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work. I am thankful to all the other faculties of Dept. of Geology and Environmental Science, Christ College, for their helping hands at times of need.

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And above all, I thank with utmost sincerity to God, the Almighty for his divine benevolence and blessing showered on me. Last but not least, I thank all those who have directly or indirectly helped me in various stage of this work till its successful completion.

Ms. ATHIRA M S

ABSTRACT

Ground water is an important resource contributing in annual supply. Now a days ground water is decreasing which increases the demand of water. The objective of this paper is to review the techniques along with methodologies applied to identify the ground water potential zones in Kodungallur Thaluk using GIS. The methods involve for mapping ground water zones and controlling them are drainage density, lithology, slope, geomorphology, and elevation. The source for these mapping techniques is derived from satellite imaginaries and additional data sources that include Geological Survey of India (GSI) and carto DEM. These maps were converted to raster format in Arc Map 10.8. These thematic maps were combined by weighted overly analysis by assigning weightage to different thematic maps in order to yield a ground water prospect map. Most of the areas falls in the High groundwater potential zones and lithology and drainage density were proved the dominant parameter.

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LIST OF TABLES

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Ms. SHAIMA M.M

CERTIFICATE

I hereby declare that the work, which is being present in this project, entitled "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" by Mr. Athul V Anil (Reg No: CCAUSGL002) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the joint supervision of **Dr. Linto Alappat**, Assistant Professor and Head, Dept. of Geology and Environmental sciences and **Ms Shaima M.M**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

Athul V Anil

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IRINJALAKUDA — Athul V Anil

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ACKNOWLEDGEMENT

This report is a certified documentation of Environmental changes at Vallarpadam Island during Quaternary period. This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

First and foremost, I would record my deep sense of gratitude and indebtedness to my guides Dr. Linto Alappat, Assistant Professor and Head, Department of Geology and Environmental Science & Mrs. Shaima M M, Assistant professor, Department of Geology and Environmental science, Christ College (Autonomous) Irinjalakuda, for designing the framework of the project and providing constant support and supervision throughout the entire course of study.

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I express my sincere gratitude to the authorities of National shrine Basilica of Our Lady of Ransome-Vallarpadam church for giving permission to collect core samples and assistance for my project.

I also take this opportunity to thank all my classmates and friends who directly or indirectly helped me complete this dissertation work. I extend my gratitude to the entire Christ College family for their support, guidance, and love.

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Athul V Anil

ABSTRACT

Sea-level along the coast of Kerala have not been constant, it oscillated throughout the Quaternary and the present-day features of the coast are resulted from the transgression and regression events of Late Quaternary. The core sediments from Valarpadam Island analysed in the present study using sub-surface stratigraphy, textural analysis and palaeontological evidences implied the presence of varied depositional environments in the Island including intertidal, littoral and supratidal conditions. Fossil shell of marine occurrences (Pirenella cingulata, Timoclea cochinensis, Mereteix aurora) indicate the depositional conditions of marginal marine to marine conditions prevailed in the area in the quaternary period due to marine transgression and later sea receded, and the area is now inhabited to inland islands. Presence of peat layers, fossil shells and leaf impressions in the strata gives indication on the geomorphic history of the region that was initiated by transgression and followed by a regressive phase and showed that the shoreline initially migrated towards the east and was later shifted towards the west in the later stage of deposition.

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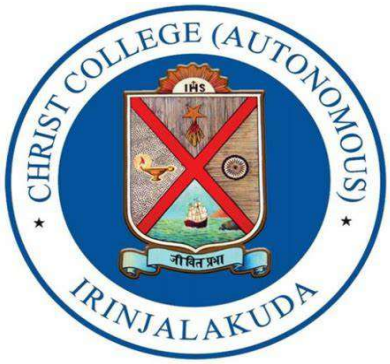

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Dr. RESMY K.J

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CERTIFICATE

I hereby declare that the work, which is being present in this dissertation, entitled "POTHOLE SEDIMENT CHARACTERIZATION WITH AN IMPLICATION ON FERRIMAGNETIC MINERALS IN PART OF CHALAKUDY RIVER, A TRIBUTORY OF PERIYAR RIVER, KERALA" by MS. LAKSHMIPRIYA S MENON (CCAUSGL004) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of Dr. Resmy K.J , Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

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ACKNOWLEDGEMENT

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First of all, I would like to thank God Almighty for all the blessings.

I would like to express my sincere gratitude to Dr. Resmy K.J, Assisstant Professor, Department of Geology and Environmental Science, Christ College (Autonomous), Irinjalakuda, for her dynamic effort in guiding and instructing me for the completion of this work successfully. Without her, the successful completion of this study without have been possible.

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ABSTRACT

Pothole sediment samples were collected from the young to early mature stages of Chalakudy River and analyzed the granulometry as well as the ferrimagnetic mineral content. From the granulometric studies, greater affinity of sediments towards sand fraction could be noticed. In all samples, the ferrimagnetic minerals were found to be highest in sand fraction with a maximum value of 21% and minimum 2%. However, ferrimagnetic minerals constitutes a small fraction of total heavy minerals, (THM) its content in the pothole samples were really substantial, and can be expected a higher amount of THM in all of the samples.

Pothole formations might be resulted due to the higher energy fluvial action, on the gneissic bed rock, as the area receives plenty of annual rainfall. The less resistant mineral's alternative layers of gneissic rock might have caused for the triggering of the pothole formation. Humid tropic condition in the area also might have contributed for the formation of potholes in the area. All the potholes in the river was not found to be trapping the sediments, and this may be related due to the factors like, aging of the potholes, morphological characters like depth, diameter of the opening etc, and the distribution of pothole in the river cross section. For a better vision on the sediment trap as well as the formation of potholes in the area, through field study need to be done.

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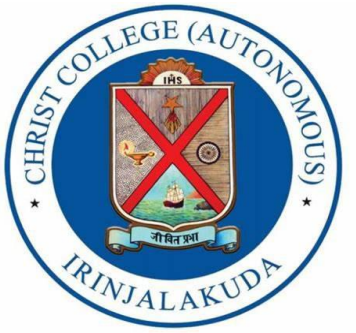

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(MUHAMMED HISHAM K P)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

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MUHAMMED HISHAM K P

ABSTRACT

Pothole sediment samples were collected from the young to early mature stages of Chalakudy River and analyzed the granulometry as well as the ferrimagnetic mineral content. From the granulometric studies, greater affinity of sediments towards sand fraction could be noticed. In all samples, the ferrimagnetic minerals were found to be highest in sand fraction with a maximum value of 21% and minimum 2%. However, ferrimagnetic minerals constitutes a small fraction of total heavy minerals, (THM) its content in the pothole samples were really substantial, and can be expected a higher amount of THM in all of the samples.

Pothole formations might be resulted due to the higher energy fluvial action, on the gneissic bed rock, as the area receives plenty of annual rainfall. The less resistant mineral's alternative layers of gneissic rock might have caused for the triggering of the pothole formation. Humid tropic condition in the area also might have contributed for the formation of potholes in the area. All the potholes in the river was not found to be trapping the sediments, and this may be related due to the factors like, aging of the potholes, morphological characters like depth, diameter of the opening etc, and the distribution of pothole in the river cross section. For a better vision on the sediment trap as well as the formation of potholes in the area, through field study need to be done.

CONTENTS

QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM

Project report submitted to Christ College (Autonomous), University of Calicut in partial fulfilment of requirements for the award of degree in

BACHELOR OF SCIENCE

IN

GEOLOGY

By

RIYA C R

Reg No: CCAUSGL006

(2020-2023)

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UNDER THE JOINT SUPERVISION OF

Dr. LINTO ALAPPAT

&

Ms. SHAIMA M.M

CERTIFICATE

I hereby declare that the work, which is being present in this project, entitled "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" by Ms. ATHIRA M S (CCAUSGL001) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the joint supervision of **Dr. Linto Alappat**, Assistant Professor and Head, Dept. of Geology and Environmental sciences and **Ms Shaima M.M**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

RIYA C R

It is certified that the above statement made by the candidate is true to the best of my knowledge.

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Date:

External Examiners:

DECLARATION

I hereby declare that the dissertation work "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

IRINJALAKUDA RIYA C R

DATE: Reg No: CCAUSGL006

ACKNOWLEDGEMENT

This report is a certified documentation of Assessment changes at Vallarpadam Island during Quaternary period. This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

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And above all, I thank with utmost sincerity to God, the Almighty for his divine benevolence and blessing showered on me. Finally, I thank all those who have directly or indirectly helped me in various stage of this work till its successful completion.

RIYA C R

ABSTRACT

Sea-level along the coast of Kerala have not been constant, it oscillated throughout the Quaternary and the present-day features of the coast are resulted from the transgression and regression events of Late Quaternary. The core sediments from Valarpadam Island analysed in the present study using textural analysis and palaeontological evidences implied the presence of varied depositional environments in the Island including intertidal, littoral and supratidal conditions. Fossil shell of marine occurrences (Pirenella cingulata, Timoclea cochinensis, Mereteix aurora) indicate that marine conditions prevailed in the area in the quaternary period due to marine transgression and later sea receded, and the area is now inhabited to inland islands. Presence of peat layers, fossil shells and leaf impressions in the strata indicated the geomorphic history of the region that was initiated by transgression and followed by a regressive phase and showed that the shoreline initially migrated towards the east and was later shifted towards the west in the later stage of deposition.

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project report submitted to Christ College (Autonomous), University of Calicut in partial fulfilment of requirements for the award of degree in

BACHELOR OF SCIENCE

In

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Dr. SWETHA T V

CERTIFICATE

This is to certify that the project work entitled – **"Assessment of Physical and chemical Quality Parameters of the Groundwater system in the Residential confluence area of Irinjalakuda Municipal town, Thrissur district, Kerala, India."** by **Ms. SANDRA SAVIO** (Reg No. CCAUSGL007) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of **Dr. SWETHA T V**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this project work has not been submitted for any award of degree.

(SANDRA SAVIO)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

Signature of project in charge

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DECLARATION

I hereby declare that the project work **"Assessment of Physical and chemical Quality Parameters of the Groundwater system in the Residential confluence area of Irinjalakuda Municipal town, Thrissur district, Kerala, India."** is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

IRINJALAKUDA

DATE:

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ACKNOWLEDGEMENT

This report is a certified documentation of "Assessment of Physical and chemical Quality Parameters of the Groundwater system in the Residential confluence area of Irinjalakuda Municipal town, Thrissur district, Kerala, India." This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

First and foremost, I would record my deep sense of gratitude and indebtedness to my guide. Dr. Swetha T V, Assistant Professor, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for designing the framework of the project and providing constant support and supervision throughout the entire course of study.

I am deeply thankful to Dr. Linto Alappat, HOD, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for his support and guidance throughout the academic year.

I express my sincere thanks to Mr. Tharun R, Dr. Resmy K.J, Dr. Anso Antony, Assistant Professors, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, and Mr. Ayyappadas C. S. Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work. I am thankful to all the other faculties of Dept. of Geology and Environmental Science, Christ College, for their helping hands at times of need.

I also take this opportunity to thank all my classmates and friends who directly or indirectly helped me complete this project work. I extend my gratitude to the entire Christ College family for their support, guidance and love.

I thank the authorities of the Christ College (Autonomous) Irinjalakuda for providing the Laboratory and the necessary environment and tools for successful completion of my degree. I also acknowledge with reverence, my warm regards towards my parents and my family members for their constant support and prayers in my life.

And above all, I thank with utmost sincerity to God, the Almighty for his divine benevolence and blessing showered on me. Last but not least, I thank all those who have directly or indirectly helped me in various stage of this work till its successful completion.

Ms. SANDRA SAVIO

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I hereby declare that the work, which is being present in this dissertation, entitled "**ASSESMENT OF GROUND WATER POTENTIAL ZONES USING GEOGRAPHIC INFORMATION SYSTEM IN KODUNGALLUR TALUK, THRISSUR, KERALA**" by Mr. ADARSH K P (CCAUSGL008) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of **Mr. Tharun R**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

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It is certified that the above statement made by the candidate is true to the best of my knowledge.

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DECLARATION

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IRINJALAKUDA ADARSH K P

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ACKNOWLEDGEMENT

This report is a certified documentation of Assessment of groundwater potential zones of Kodungallur- Taluk Thrissur, Kerala This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

First and foremost, I would record my deep sense of gratitude and indebtedness to my guide Mr. Tharun R. Assistant Professor, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for designing the framework of the project and providing constant support and supervision throughout the entire course of study.

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I express my sincere thanks to Dr. Swetha T.V., Ms. Shaima M.M, Dr. Resmy K.J, Ms. Sweeshma P.D, Assistant Professors, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, and Mr. Ayyappadas C. S. Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work. I am thankful to all the other faculties of Dept. of Geology and Environmental Science, Christ College, for their helping hands at times of need.

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ADARSH K P

ABSTRACT

Ground water is an important resource contributing in annual supply. Now a days ground water is decreasing which increases the demand of water. The objective of this paper is to review the techniques along with methodologies applied to identify the ground water potential zones in Kodungallur Thaluk using GIS. The methods involve for mapping ground water zones and controlling them are drainage density, lithology, slope, geomorphology, and elevation. The source for these mapping techniques is derived from satellite imaginaries and additional data sources that include Geological Survey of India (GSI) and carto DEM. These maps were converted to raster format in Arc Map 10.8. These thematic maps were combined by weighted overly analysis by assigning weightage to different thematic maps in order to yield a ground water prospect map. Most of the areas falls in the High groundwater potential zones and lithology and drainage density were proved the dominant parameter.

LIST OF FIGURES

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CERTIFICATE

I hereby declare that the work, which is being present in this project, entitled "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" by Mr. AGNEL C V (Reg No: CCAUSGL009) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the joint supervision of **Dr. Linto Alappat**, Assistant Professor and Head, Dept. of Geology and Environmental sciences and **Ms Shaima M.M**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

AGNEL C V

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Date:

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DECLARATION

I hereby declare that the dissertation work "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

IRINJALAKUDA AGNEL C V

DATE: Reg No: CCAUSGL009

ACKNOWLEDGEMENT

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I express my sincere gratitude to the authorities of National shrine Basilica of Our Lady of Ransome-Vallarpadam church for giving permission to collect core samples and assistance for my project.

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Agnel C V

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Sea-level along the coast of Kerala have not been constant, it oscillated throughout the Quaternary and the present-day features of the coast are resulted from the transgression and regression events of Late Quaternary. The core sediments from Valarpadam Island analysed in the present study using sub-surface stratigraphy, textural analysis and palaeontological evidences implied the presence of varied depositional environments in the Island including intertidal, littoral and supratidal conditions. Fossil shell of marine occurrences (Pirenella cingulata, Timoclea cochinensis, Mereteix aurora) indicate the depositional conditions of marginal marine to marine conditions prevailed in the area in the quaternary period due to marine transgression and later sea receded, and the area is now inhabited to inland islands. Presence of peat layers, fossil shells and leaf impressions in the strata gives indication on the geomorphic history of the region that was initiated by transgression and followed by a regressive phase and showed that the shoreline initially migrated towards the east and was later shifted towards the west in the later stage of deposition.

TABLE OF CONTENT

Textural characterisation of beach sediments of Azhikode at the mouth of River Periyar

A project report submitted to university of Calicut in partial fulfilment of requirements for the award of

BACHELOR OF DEGREE

In

GEOLOGY

By

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(2020-2023)

Under the guidance of

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CERTIFICATE

This is to certify that the Dissertation entitled **Textural characterisation of beach sediments of Azhikode at the mouth of River Periyar"** is a bonafide record of work done by MS. ANAMIKA A (Reg No. CCATSGL013), B.Sc. Geology Christ College (Autonomous), Irinjalakuda, under my guidance in partial fulfillment of requirements for the Bachelor of Science Degree in Geology during the year 2020 -2023.

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Assistant Professor,

Dept of Geology and EnviornmentalScience

Place: Irinjalakuda

Date:2/05/2023

External Examiners;

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2 …….

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DECLARATION

I hereby declare that the project work entitled – **Textural characterisation of beach sediments of Azhikode at the mouth of River Periyar** is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found plagiarized, I shall take the full responsibility for it.

IRINJALAKUDA Reg no

DATE:

ACKNOWLEDGEMENT

Following the successful completion of this project, we would like to express my heartfelt appreciation to the following individuals, without whom the work would not have been possible.

First and foremost, we would like to thank God Almighty for allowing us to complete this project on time and for the favourable circumstances that have resulted.

We would like to express our heartfelt gratitude to Miss. Sweeshma P V, Assistant Professor, Department of Geology, Christ College, Irinjalakuda, for her guidance and for providing necessary advice, for her patience in bearing our ideas, and for all the efforts she made to see this project through to completion. This study would not be possible without her tremendous help and guidance.

We would like to express our gratitude to Dr Linto Alappat, Head of the Department of Geology, Christ College Irinjalakuda, as well as all other teaching and non-teaching department personnel, for the suggestions.

We are also grateful to Rev. Dr Jolly Andrews CMI, Principal of Christ College Irinjalakuda, for providing all available resources for this project and his comments and encouragement throughout this work.

We would like to express our heartfelt appreciation to Ms. Devi, Assistant Professor at Farook College Kozhikode, for helping us throughout our field activities. Thank you for all of your assistance.

Finally, we would like to express our gratitude to our family members for their assistance and support during the field trips.

CONTENT

POTHOLE SEDIMENT CHARACTERIZATION WITH AN IMPLICATION ON FERRIMAGNETIC MINERALS IN PART OF CHALAKUDY RIVER, A TRIBUTORY OF PERIYAR RIVER, KERALA

Project report submitted to Christ College (Autonomous), University of Calicut in partial fulfilment of requirements for the award of degree in

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IN

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UNDER THE GUIDANCE OF

Dr. RESMY K.J

Asst. Professor, Department of Geology and Environmental Science

CERTIFICATE

I hereby declare that the work, which is being present in this dissertation, entitled "POTHOLE SEDIMENT CHARACTERIZATION WITH AN IMPLICATION ON FERRIMAGNETIC MINERALS IN PART OF CHALAKUDY RIVER, A TRIBUTORY OF PERIYAR RIVER, KERALA" by MS. LAKSHMIPRIYA S MENON (CCAUSGL004) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of Dr. Resmy K.J , Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

(AKSHAY K S)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

Signature of project in charge

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DECLARATION

I hereby declare that the dissertation work "POTHOLE SEDIMENT CHARACTERIZATION WITH AN IMPLICATION ON FERRIMAGNETIC MINERALS IN PART OF CHALAKUDY RIVER, A TRIBUTORY OF PERIYAR RIVER, KERALA", THRISSUR, KERALA" is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

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ACKNOWLEDGEMENT

Following the successful completion of this project, I would like to express my heartfelt appreciation to the following individuals, without whom the work would not have been possible.

First of all, I would like to thank God Almighty for all the blessings.

I would like to express my sincere gratitude to Dr. Resmy K.J, Assisstant Professor, Department of Geology and Environmental Science, Christ College (Autonomous), Irinjalakuda, for her dynamic effort in guiding and instructing me for the completion of this work successfully. Without her, the successful completion of this study without have been possible.

I would like to express my heartfelt gratitude to Dr. Linto Alappat, Head of the Department of Geology and Environmental Science, Christ College (Autonomous), Irinjalakuda, as well as other teaching and non-teaching staffs for their valuable suggestions and help. I express my sincere thanks to Mr. Ayyappadas C.S, Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work.

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I would like to express my heartfelt appreciation to Mr. Renjith M K, Range Forest Officer, Division of Social Forestry, Thrissur, Anoop Sir, Mr. Kannan for helping us throughout the field work. Thank you for all of your assistance.

Last but not the least, I express thanks to my family, classmates and friends for being with me, especially for their assistance and support during the field trips.

AKSHAY K S

ABSTRACT

Pothole sediment samples were collected from the young to early mature stages of Chalakudy River and analyzed the granulometry as well as the ferrimagnetic mineral content. From the granulometric studies, greater affinity of sediments towards sand fraction could be noticed. In all samples, the ferrimagnetic minerals were found to be highest in sand fraction with a maximum value of 21% and minimum 2%. However, ferrimagnetic minerals constitutes a small fraction of total heavy minerals, (THM) its content in the pothole samples were really substantial, and can be expected a higher amount of THM in all of the samples.

Pothole formations might be resulted due to the higher energy fluvial action, on the gneissic bed rock, as the area receives plenty of annual rainfall. The less resistant mineral's alternative layers of gneissic rock might have caused for the triggering of the pothole formation. Humid tropic condition in the area also might have contributed for the formation of potholes in the area. All the potholes in the river was not found to be trapping the sediments, and this may be related due to the factors like, aging of the potholes, morphological characters like depth, diameter of the opening etc, and the distribution of pothole in the river cross section. For a better vision on the sediment trap as well as the formation of potholes in the area, through field study need to be done.

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BACHELOR OF SCIENCE

IN

GEOLOGY

By

AMAL C R

Reg No: CCAUSGL012

(2020-2023)

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE

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UNDER THE JOINT SUPERVISION OF

Dr. LINTO ALAPPAT

&

Ms. SHAIMA M.M

CERTIFICATE

I hereby declare that the work, which is being present in this project, entitled "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" by Mr. Amal C R (Reg No: CCAUSGL012) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the joint supervision of **Dr. Linto Alappat**, Assistant Professor and Head, Dept. of Geology and Environmental sciences and **Ms Shaima M.M**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

AMAL C R

It is certified that the above statement made by the candidate is true to the best of my knowledge.

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External Examiners:

DECLARATION

I hereby declare that the dissertation work "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

IRINJALAKUDA — Amal C R

DATE: — Reg No: CCAUSGL012

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Amal C R

ABSTRACT

Sea-level along the coast of Kerala have not been constant, it oscillated throughout the Quaternary and the present-day features of the coast are resulted from the transgression and regression events of Late Quaternary. The core sediments from Valarpadam Island analysed in the present study using sub-surface stratigraphy, textural analysis and palaeontological evidences implied the presence of varied depositional environments in the Island including intertidal, littoral and supratidal conditions. Fossil shell of marine occurrences (Pirenella cingulata, Timoclea cochinensis, Mereteix aurora) indicate the depositional conditions of marginal marine to marine conditions prevailed in the area in the quaternary period due to marine transgression and later sea receded, and the area is now inhabited to inland islands. Presence of peat layers, fossil shells and leaf impressions in the strata gives indication on the geomorphic history of the region that was initiated by transgression and followed by a regressive phase and showed that the shoreline initially migrated towards the east and was later shifted towards the west in the later stage of deposition.

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A project report submitted to university of Calicut in partial fulfilment of requirements for the award of

BACHELOR OF DEGREE

In

GEOLOGY

By

ANAMIKA A (Reg No. CCATSGL013)

(2020-2023)

Under the guidance of

Mrs. Sweeshma P Dev

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE
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CERTIFICATE

This is to certify that the Dissertation entitled **Textural characterisation of beach sediments of Azhikode at the mouth of River Periyar"** is a bonafide record of work done by MS. ANAMIKA A (Reg No. CCATSGL013), B.Sc. Geology Christ College (Autonomous), Irinjalakuda, under my guidance in partial fulfillment of requirements for the Bachelor of Science Degree in Geology during the year 2020 -2023.

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Assistant Professor,

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Place: Irinjalakuda

Date:2/05/2023

External Examiners;

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2 …….

3 ……

DECLARATION

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IRINJALAKUDA Reg no

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ACKNOWLEDGEMENT

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First and foremost, we would like to thank God Almighty for allowing us to complete this project on time and for the favourable circumstances that have resulted.

We would like to express our heartfelt gratitude to Miss. Sweeshma P V, Assistant Professor, Department of Geology, Christ College, Irinjalakuda, for her guidance and for providing necessary advice, for her patience in bearing our ideas, and for all the efforts she made to see this project through to completion. This study would not be possible without her tremendous help and guidance.

We would like to express our gratitude to Dr Linto Alappat, Head of the Department of Geology, Christ College Irinjalakuda, as well as all other teaching and non-teaching department personnel, for the suggestions.

We are also grateful to Rev. Dr Jolly Andrews CMI, Principal of Christ College Irinjalakuda, for providing all available resources for this project and his comments and encouragement throughout this work.

We would like to express our heartfelt appreciation to Ms. Devi, Assistant Professor at Farook College Kozhikode, for helping us throughout our field activities. Thank you for all of your assistance.

Finally, we would like to express our gratitude to our family members for their assistance and support during the field trips.

CONTENT

ASSESMENT OF GROUND WATER POTENTIAL ZONES USING GEOGRAPHIC INFORMATION SYSTEM IN KODUNGALLUR TALUK, THRISSUR, KERALA

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CERTIFICATE

I hereby declare that the work, which is being present in this dissertation, entitled "**ASSESMENT OF GROUND WATER POTENTIAL ZONES USING GEOGRAPHIC INFORMATION SYSTEM IN KODUNGALLUR TALUK, THRISSUR, KERALA**" by Ms. ANUSREE KAKKOTTIL (CCAUSGL014) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of **Mr. Tharun R**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

(ANUSREE KAKKOTTIL)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

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External Examiners:

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IRINJALAKUDA ANUSREE KAKKOTTIL

DATE: Reg No: CCAUSGL014

ACKNOWLEDGEMENT

This report is a certified documentation of Assessment of groundwater potential zones of Kodungallur- Taluk Thrissur, Kerala This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

First and foremost, I would record my deep sense of gratitude and indebtedness to my guide Mr. Tharun R. Assistant Professor, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for designing the framework of the project and providing constant support and supervision throughout the entire course of study.

I am deeply thankful to Dr. Linto Alappat, HOD, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for his support and guidance throughout the academic year.

I express my sincere thanks to Dr. Swetha T.V., Ms. Shaima M.M, Dr. Resmy K.J, Ms. Sweeshma P.D, Assistant Professors, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, and Mr. Ayyappadas C. S. Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work. I am thankful to all the other faculties of Dept. of Geology and Environmental Science, Christ College, for their helping hands at times of need.

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ANUSREE KAKKOTTIL

ABSTRACT

Ground water is an important resource contributing in annual supply. Now a days ground water is decreasing which increases the demand of water. The objective of this paper is to review the techniques along with methodologies applied to identify the ground water potential zones in Kodungallur Thaluk using GIS. The methods involve for mapping ground water zones and controlling them are drainage density, lithology, slope, geomorphology, and elevation. The source for these mapping techniques is derived from satellite imaginaries and additional data sources that include Geological Survey of India (GSI) and carto DEM. These maps were converted to raster format in Arc Map 10.8. These thematic maps were combined by weighted overly analysis by assigning weightage to different thematic maps in order to yield a ground water prospect map. Most of the areas falls in the High groundwater potential zones and lithology and drainage density were proved the dominant parameter.

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UNDER THE JOINT SUPERVISION OF

Dr. LINTO ALAPPAT

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Ms. SHAIMA M.M

CERTIFICATE

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ASHITHA K M

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External Examiners:

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IRINJALAKUDA — ASHITHA K M

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By

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CERTIFICATE

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(GELGANI GEORGE)

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IRINJALAKUDA Gelgani George

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Gelgani George

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(2020-2023)

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA, KERALA, 680125

(Affiliated to University of Calicut and re-accredited by NAAC with A++ grade)

Under the guidance of

Dr. SWETHA T V

CERTIFICATE

This is to certify that the project work entitled – **"Assessment of Physical and chemical Quality Parameters of the Groundwater system in the Residential confluence area of Irinjalakuda Municipal town, Thrissur district, Kerala, India."** by **Mr. JEEVA K S** (Reg No. CCAUSGL017) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the guidance of **Dr. SWETHA T V**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this project work has not been submitted for any award of degree.

(JEEVA K S)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

Signature of project in charge

Dr. Swetha T V
Assistant Professor
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Dr. Linto Alappat
Assistant Professor and Head
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Christ College (Autonomous)
Irinjalakuda, Kerala-680125

Place: Irinjalakuda

Date: External Examiners:

DECLARATION

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IRINJALAKUDA — JEEVA K S

DATE: — Reg No: CCAUSGL017

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I am deeply thankful to Dr. Linto Alappat, HOD, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, for his support and guidance throughout the academic year.

I express my sincere thanks to Mr. Tharun R, Dr. Resmy K.J, Dr. Anso Antony, Assistant Professors, Department of Geology and Environmental Science, Christ College (Autonomous) Irinjalakuda, and Mr. Ayyappadas C. S. Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work. I am thankful to all the other faculties of Dept. of Geology and Environmental Science, Christ College, for their helping hands at times of need.

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Last but not least, I thank all those who have directly or indirectly helped me in various stage of this work till its successful completion.

Mr. JEEVA K S

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Project report submitted to Christ College (Autonomous), University of Calicut in partial fulfilment of requirements for the award of degree in

BACHELOR OF SCIENCE

IN

GEOLOGY

By

MANU DAVID K

Reg No: CCAUSGL018

(2020-2023)

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(2020-2023)

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA, KERALA, 680125

(Affiliated to University of Calicut and re-accredited by NAAC with A++ grade)

UNDER THE JOINT SUPERVISION OF

Dr. LINTO ALAPPAT

&

Ms. SHAIMA M.M

CERTIFICATE

I hereby declare that the work, which is being present in this project, entitled "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" by Ms. ATHIRA M S (CCAUSGL001) submitted to the Department of Geology and Environmental Science Christ College (Autonomous), Irinjalakuda in partial fulfilment of the requirement for the award of the Degree of Bachelor of Science in Geology is an authentic record of my own work carried out under the joint supervision of **Dr. Linto Alappat**, Assistant Professor and Head, Dept. of Geology and Environmental sciences and **Ms Shaima M.M**, Assistant Professor, Department of Geology and Environmental Science during the period of 2022-2023. The matter embodied in this dissertation has not been submitted for any award of degree.

MANU DAVID K

It is certified that the above statement made by the candidate is true to the best of my knowledge.

Signature of project in charge

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Dr. Linto Alappat
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Christ College (Autonomous)
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Place: Irinjalakuda

Date:

External Examiners:

DECLARATION

I hereby declare that the dissertation work "**QUATERNARY COASTAL CHANGES IN CENTRAL KERALA; EVIDENCES FROM THE SEDIMENT CORE OF VALLARPADAM ISLAND, ERNAKULAM**" is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

IRINJALAKUDA MANU DAVID K

DATE: Reg No: CCAUSGL018

ACKNOWLEDGEMENT

This report is a certified documentation of Environmental changes at Vallarpadam Island during Quaternary period. This would not have been possible without guidance, encouragement and support of many well-wishers and my colleagues.

First and foremost, I would record my deep sense of gratitude and indebtedness to my guides Dr. Linto Alappat, Assistant Professor and Head, Department of Geology and Environmental Science & Ms. Shaima M M, Assistant professor, Department of Geology and Environmental science, Christ College (Autonomous) Irinjalakuda, for designing the framework of the project and providing constant support and supervision throughout the entire course of study.

I express my sincere thanks to Mr. Ayyappadas C. S. Research Assistant, Christ College (Autonomous) Irinjalakuda, who helped me throughout the completion of this work. I am thankful to all the faculties of Dept. of Geology and Environmental Science, Christ College, for their helping hands at times of need.

I express my sincere gratitude to the authorities of National shrine Basilica of Our Lady of Ransome-Vallarpadam church for giving permission to collect core samples and assistance for my project.

I also take this opportunity to thank all my classmates and friends who directly or indirectly helped me complete this dissertation work. I extend my gratitude to the entire Christ College family for their support, guidance, and love.

I thank the authorities of the Christ College (Autonomous) Irinjalakuda for providing me the laboratory and the necessary environment for successful completion of this project. I also acknowledge with reverence, our warm regards towards our parents and family members for their constant support and prayers in my life.

And above all, I thank with utmost sincerity to God, the Almighty for his divine benevolence and blessing showered on me. Finally, I thank all those who have directly or indirectly helped me in various stage of this work till its successful completion.

MANU DAVID K

ABSTRACT

Sea-level along the coast of Kerala have not been constant, it oscillated throughout the Quaternary and the present-day features of the coast are resulted from the transgression and regression events of Late Quaternary. The core sediments from Valarpadam Island analysed in the present study using sub-surface stratigraphy, textural analysis and palaeontological evidences implied the presence of varied depositional environments in the Island including intertidal, littoral and supratidal conditions. Fossil shell of marine occurrences (Pirenella cingulata, Timoclea cochinensis, Mereteix aurora) indicate the depositional conditions of marginal marine to marine conditions prevailed in the area in the quaternary period due to marine transgression and later sea receded, and the area is now inhabited to inland islands. Presence of peat layers, fossil shells and leaf impressions in the strata gives indication on the geomorphic history of the region that was initiated by transgression and followed by a regressive phase and showed that the shoreline initially migrated towards the east and was later shifted towards the west in the later stage of deposition.

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A project report submitted to university of Calicut in partial fulfilment of requirements for the award of

BACHELOR OF DEGREE

In

GEOLOGY

By

Reg No. CCATSGL024 - **GOKUL P GOPI**

(2020-2023)

Under the guidance of

Mrs. Sweeshma P Dev

DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE
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CERTIFICATE

This is to certify that the Dissertation entitled **Textural characterisation of beach sediments of Azhikode at the mouth of River Periyar"** is a bonafide record of work done by Mr.GOKUL GOPI (Reg No. CCATSGL024), B.Sc. Geology Christ College (Autonomous), Irinjalakuda, under my guidance in partial fulfillment of requirements for the Bachelor of Science Degree in Geology during the year 2020 -2023.

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Assistant Professor,

Dept of Geology and EnviornmentalScience

Place: Irinjalakuda

Date:2/05/2023

External Examiners;

1 ….....

2 …….

3 …….

DECLARATION

I hereby declare that the project work entitled – **Textural characterisation of beach sediments of Azhikode at the mouth of River Periyar** is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found plagiarized, I shall take the full responsibility for it.

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ACKNOWLEDGEMENT

Following the successful completion of this project, we would like to express my heartfelt appreciation to the following individuals, without whom the work would not have been possible.

First and foremost, we would like to thank God Almighty for allowing us to complete this project on time and for the favourable circumstances that have resulted.

We would like to express our heartfelt gratitude to Miss. Sweeshma P V, Assistant Professor, Department of Geology, Christ College, Irinjalakuda, for her guidance and for providing necessary advice, for her patience in bearing our ideas, and for all the efforts she made to see this project through to completion. This study would not be possible without her tremendous help and guidance.

We would like to express our gratitude to Dr Linto Alappat, Head of the Department of Geology, Christ College Irinjalakuda, as well as all other teaching and non-teaching department personnel, for the suggestions.

We are also grateful to Rev. Dr Jolly Andrews CMI, Principal of Christ College Irinjalakuda, for providing all available resources for this project and his comments and encouragement throughout this work.

We would like to express our heartfelt appreciation to Ms. Devi, Assistant Professor at Farook College Kozhikode, for helping us throughout our field activities. Thank you for all of your assistance.

Finally, we would like to express our gratitude to our family members for their assistance and support during the field trips.

CONTENT

ABSTRACT

The sand analysis project conducted at Munakkal beach aimed to study the textural characterisation, physiochemical properties of the sand samples collected from different locations along the beach. The study involved analysing the grain size, distribution, textural characterisation of the sand using various laboratory techniques. The result showed that the sand at Munakkal beach is predominantly composed of Quartz with varying amounts of feldspars, mica and heavy minerals. The grain size distribution varied along the beach, with finer sand particles found in the intertidal zone and coarser sand particles in the subtidal zone.

The study reveals a good correlation between mica grain size, in different sediment units across the sand. Textural properties indicate that sandy bar facies, muddy facies, vegetated bar were present. The preliminary study had also shown evidence of occurrence of flood event in the past.

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(NAVYA K)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

Signature of project in charge

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Date: External Examiners:

DECLARATION

I hereby declare that the project work **"Assessment of Physical and chemical Quality Parameters of the Groundwater system in the Residential confluence area of Irinjalakuda Municipal town, Thrissur district, Kerala, India."** is a work done by me. No part of the report is plagiarized from other resources. All information included from other sources has been duly acknowledged. I maintain that if any part of the project is found to be plagiarized, I shall take the full responsibility for it.

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Ms. NAVYA K

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(2020-2023)

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(ADARSH M V)

It is certified that the above statement made by the candidate is true to the best of my knowledge.

Signature of project in charge

Dr. Swetha T V
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(2020-2023)

Under the guidance of

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DEPARTMENT OF GEOLOGY AND ENVIRONMENTAL SCIENCE
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Assistant Professor,

Dept of Geology and EnviornmentalScience

Place: Irinjalakuda

Date:2/05/2023

External Examiners;

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IRINJALAKUDA Reg no

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