



GEOSPATIAL PLATFORM FOR DEPLOYMENT OF WAVE ENERGY CONVERTER USING MACHINE LEARNING



INTRODUCTION

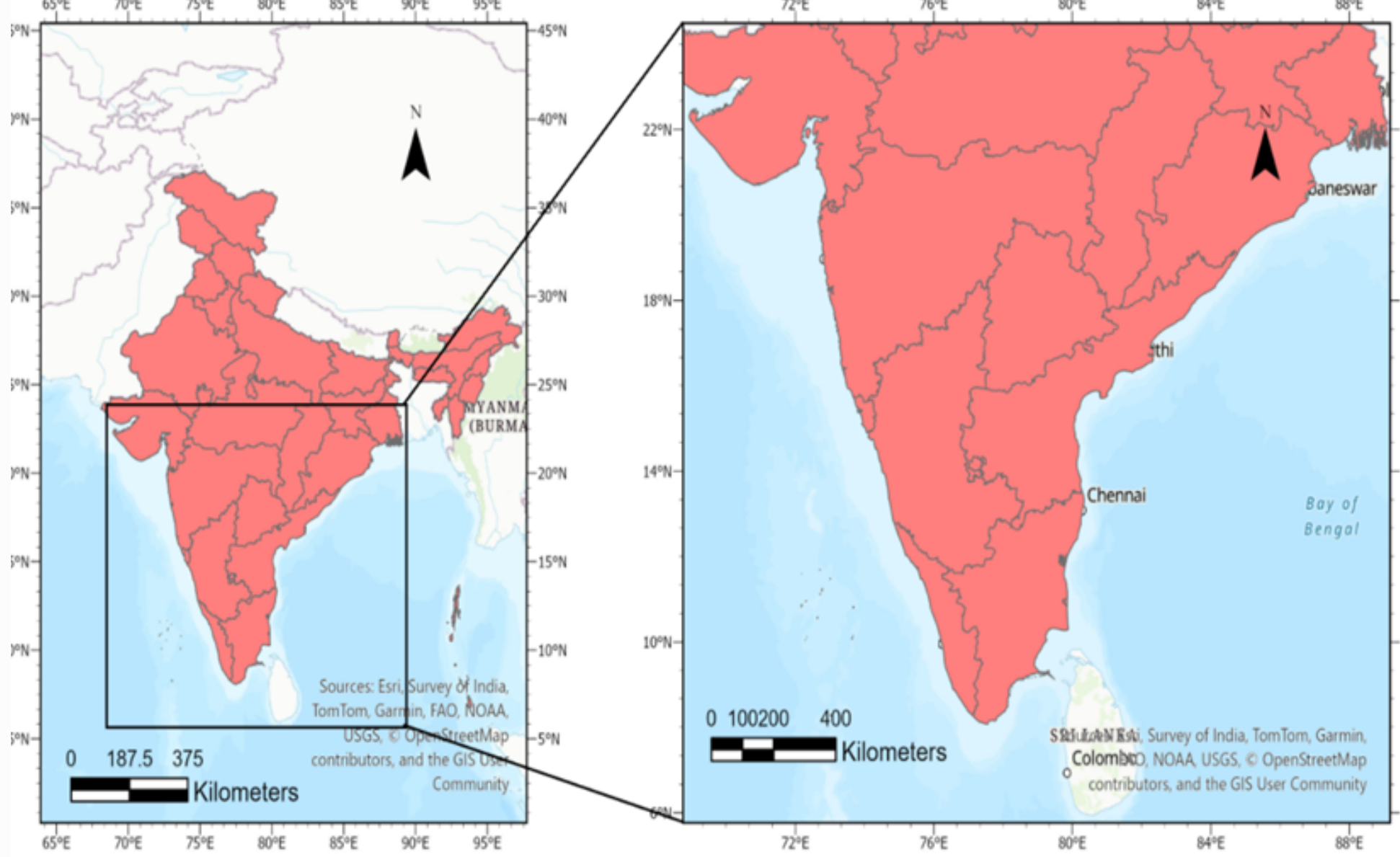
- Ocean wave energy offers a reliable and sustainable power source, contributing to the global shift from fossil fuels to renewables.
- Effective deployment of wave energy requires detailed spatial and temporal analysis to identify optimal sites, considering wave power potential, environmental impact, and infrastructure needs.
- This study provides a geospatial framework using advanced mapping and modeling to support informed decision-making and promote sustainable wave energy development.

OBJECTIVE OF THE STUDY

- To map wave power density using oceanographic data in order to identify regions with the highest energy potential and optimize wave energy generation locations.
- To identify suitable sites for wave energy converters deployment by analysing various spatial and environmental parameters using Weighted Overlay Analysis.
- To develop a machine learning model (Random Forest) for assessing site suitability based on historical and current data.
- To create a geospatial platform for visualizing ocean wave energy potential regions and supporting informed decision-making.

STUDY AREA

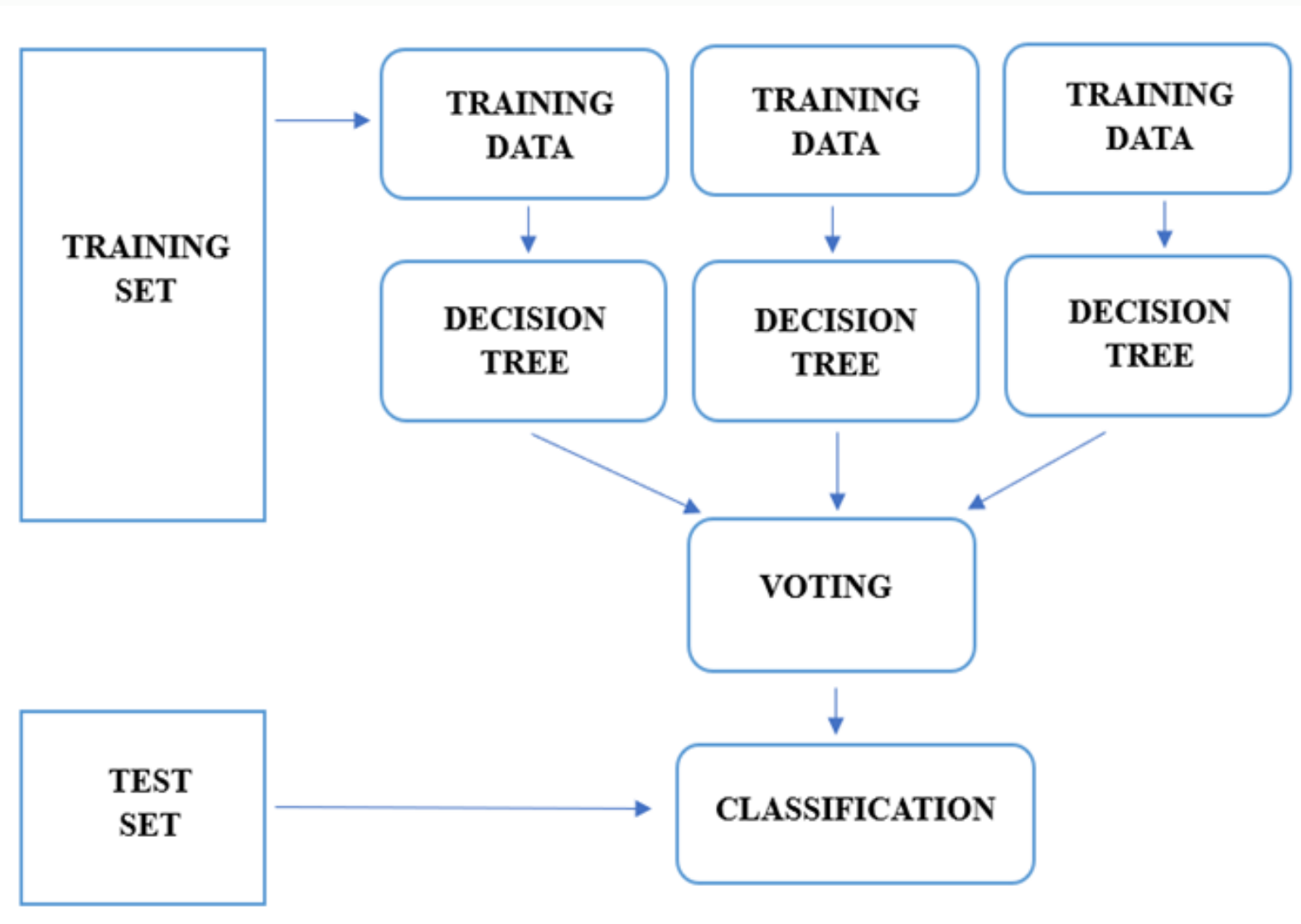
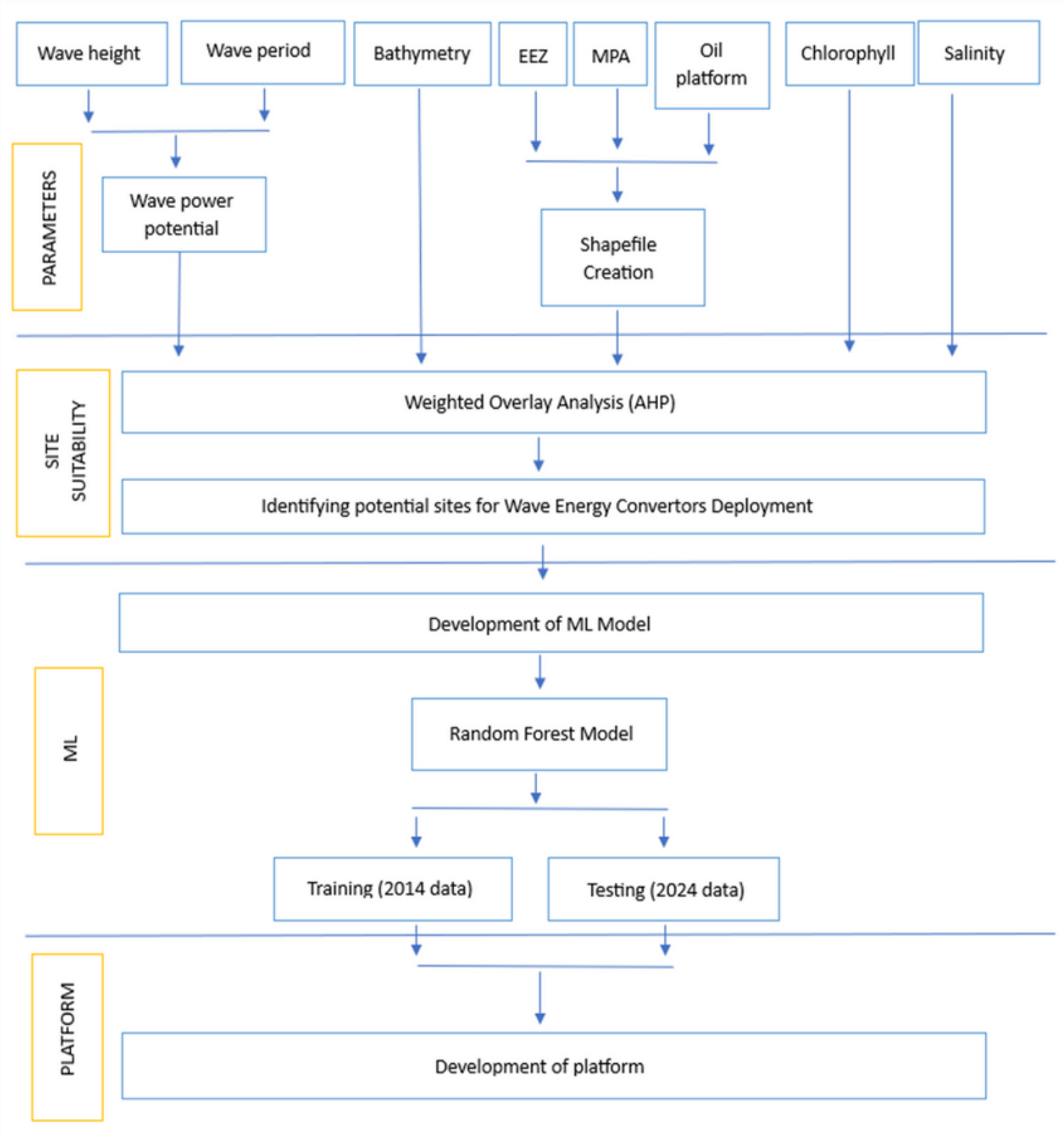
The Oceanic regions around the Indian headland, encompassing the Arabian Sea to the west, the Bay of Bengal to the east, and bordered by the Indian subcontinent to the north, have been chosen as the study area for this research



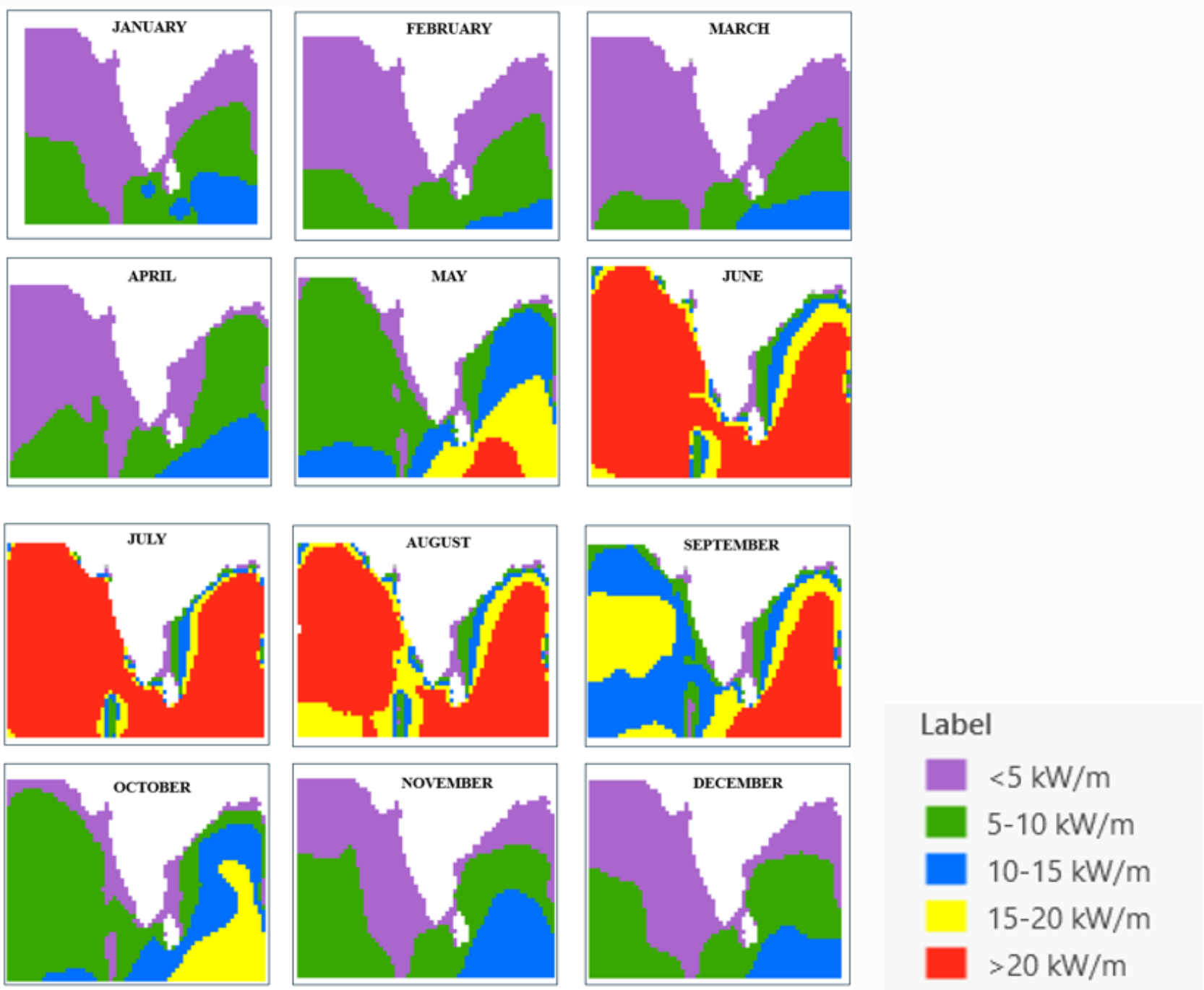
DATA USED

DATA SOURCE	RESOLUTION	VARIABLE
ERA5	$0.25^{\circ} \times 0.25^{\circ}$	Wave height, Wave Period
MODIS	$0.05^{\circ} \times 0.05^{\circ}$	Chlorophyll
PODAAC	$0.25^{\circ} \times 0.25^{\circ}$	Sea Surface Salinity
GEBCO	$0.1^{\circ} \times 0.1^{\circ}$	Bathymetry

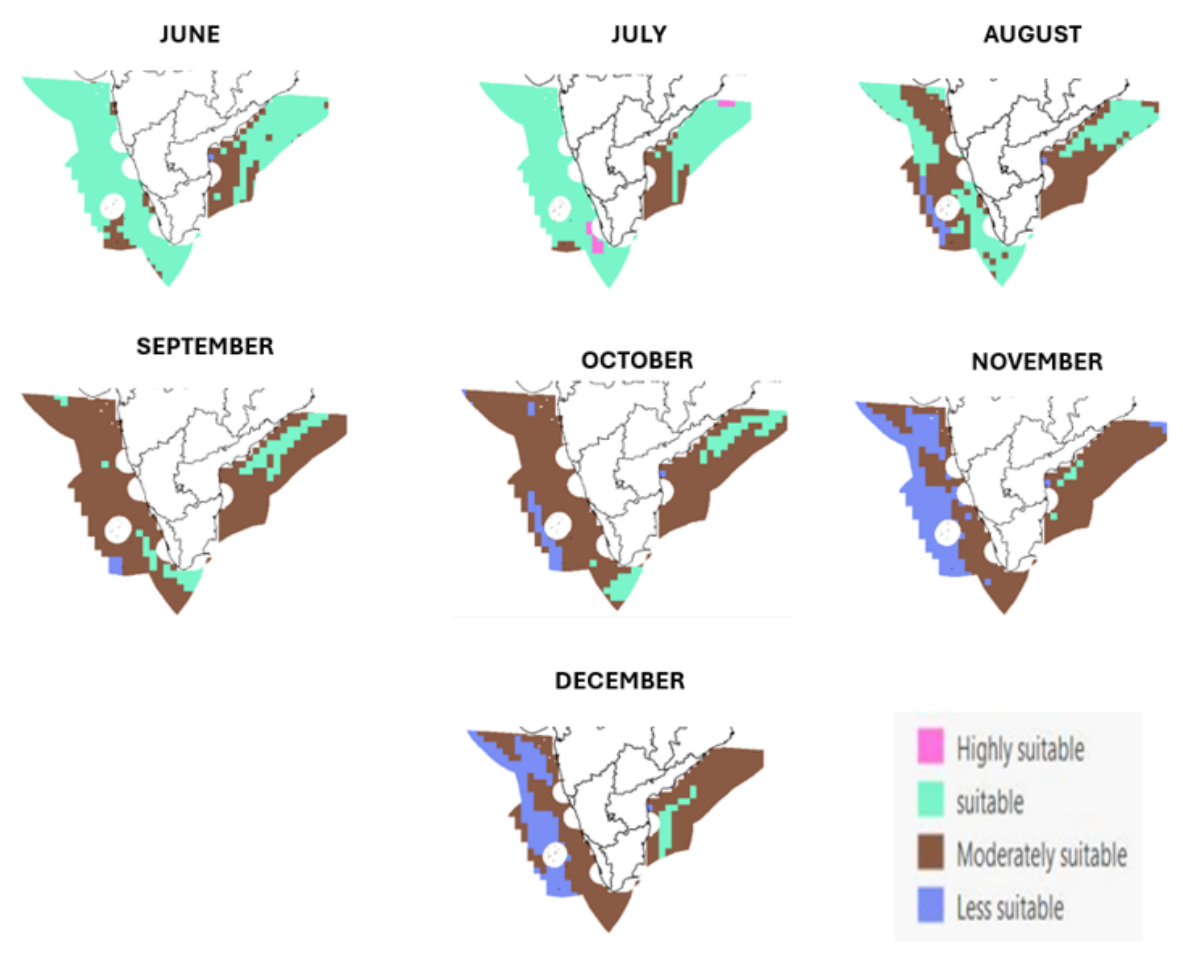
METHODOLOGY



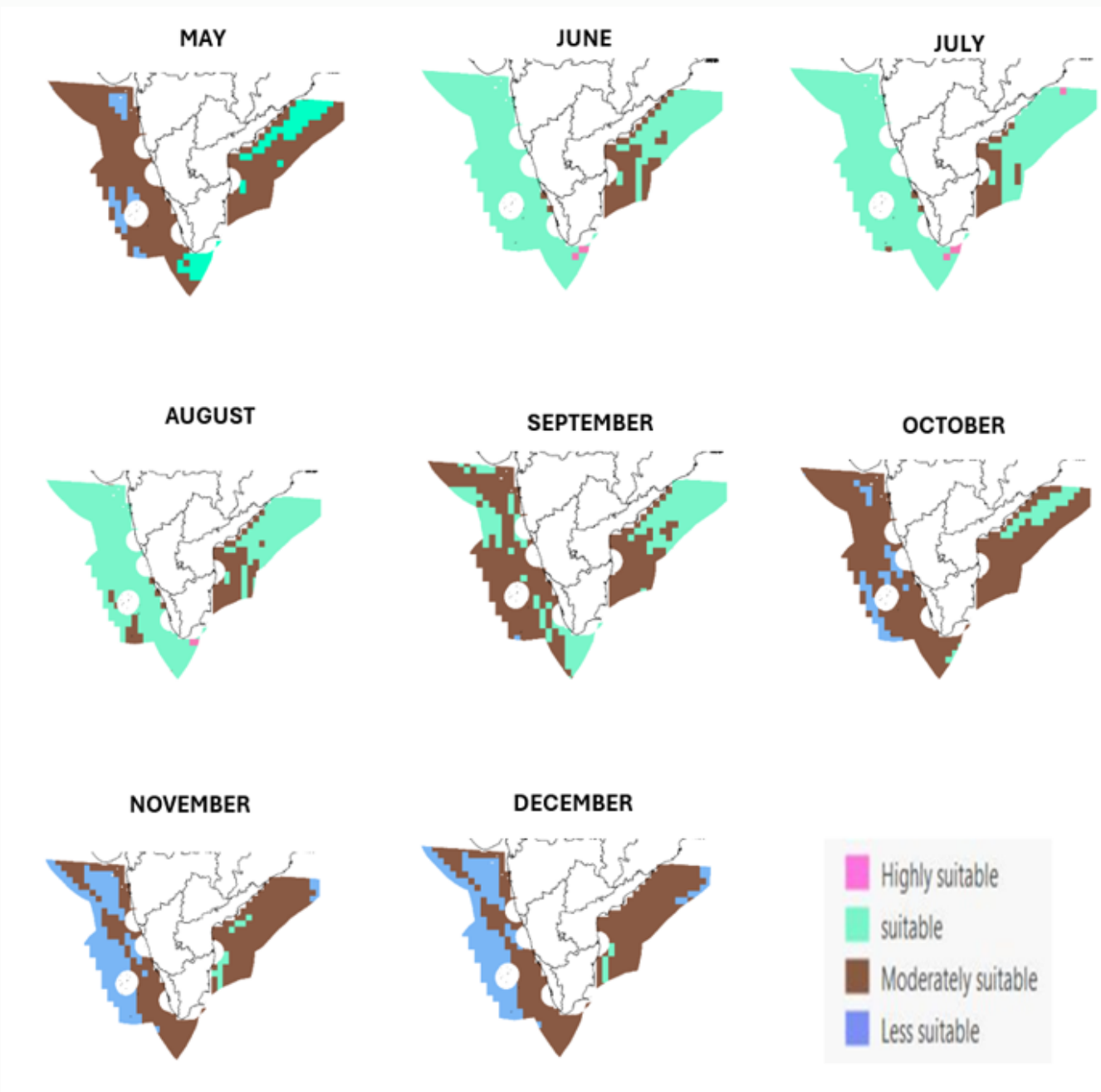
RESULTS



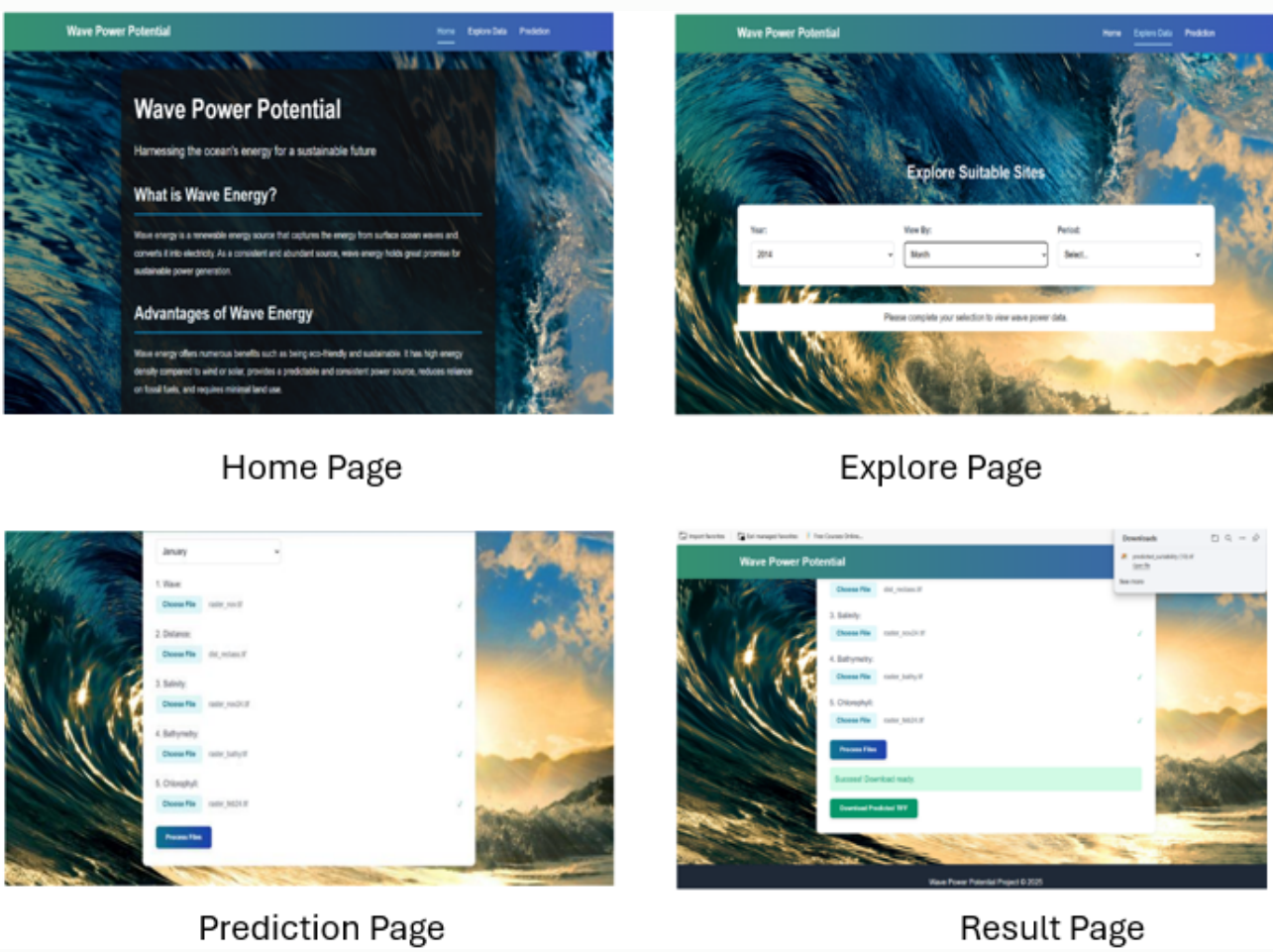
Wave Power Potential



Model Output (2024)



Weighted Overlay Analysis (2014)



Web Application

PROJECT BY:

ROJA R (2021107016)
SANKARANARAYANAN S (2021107019)
SWETHA G (2021107027)

UNDER THE GUIDANCE OF

Dr. C UDHAYAKUMAR, PROFESSOR
INSTITUTE OF REMOTE SENSING.