

# **Spatial Analysis of Tsunami Hazard Based on Numerical Models and Seismicity Data in Pacitan Coastal Areas, Indonesia**

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## Introduction

# Tsunami In Pacitan

Indonesia's coastal landscapes are high vulnerability to geological threats, particularly tsunamis. The southern coast of Java, a heavily populated region, lies at the convergence point of tectonic forces, featuring active subduction zones. Recent events in Banyuwangi and Pangandaran have highlighted the latent seismic risks in this area. Coastal regions like Banten, Pangandaran, and Pacitan are particularly susceptible due to their proximity to subduction zones and seismic gaps. While previous studies have explored tsunami modeling in Pacitan, this research distinguishes itself by incorporating historical seismic data, enabling nuanced modeling of tsunami scenarios.



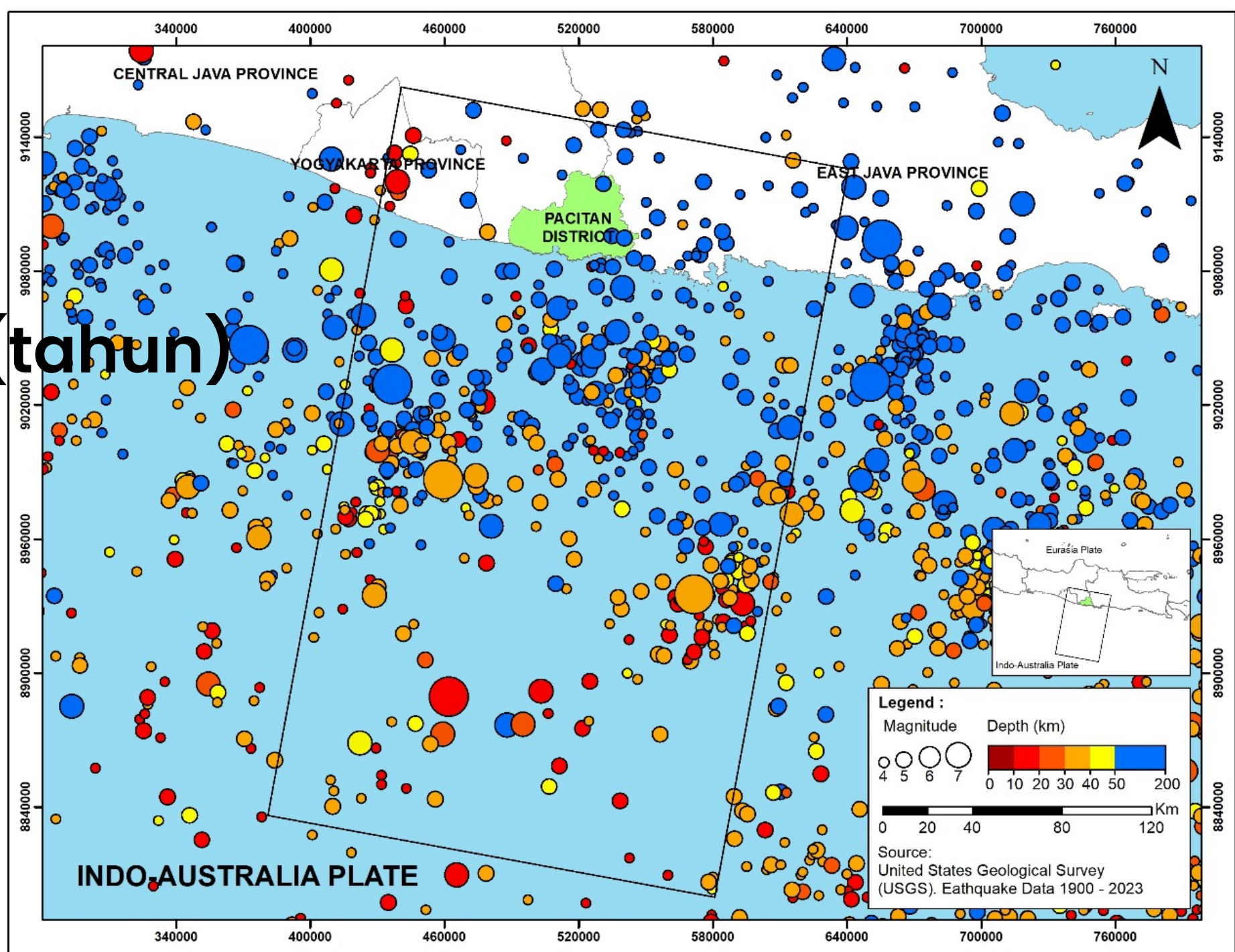
# Aim of Study

This study utilizes numerical tsunami modeling based on the Shallow Water Equations, employing Delft3D-Flow software to predict tsunami wave heights and run-up in the Pacitan Regency. The research also integrates evacuation simulations, evaluating the efficacy of existing evacuation plans. By addressing both aspects simultaneously, this study provides comprehensive insights into disaster management strategies. The findings not only enhance the understanding of tsunami hazards but also offer practical recommendations for policymakers and local authorities. Ultimately, this research aims to fortify the resilience of Java's coastal communities, safeguarding lives and minimizing the impact of potential tsunamis in the vulnerable southern regions.

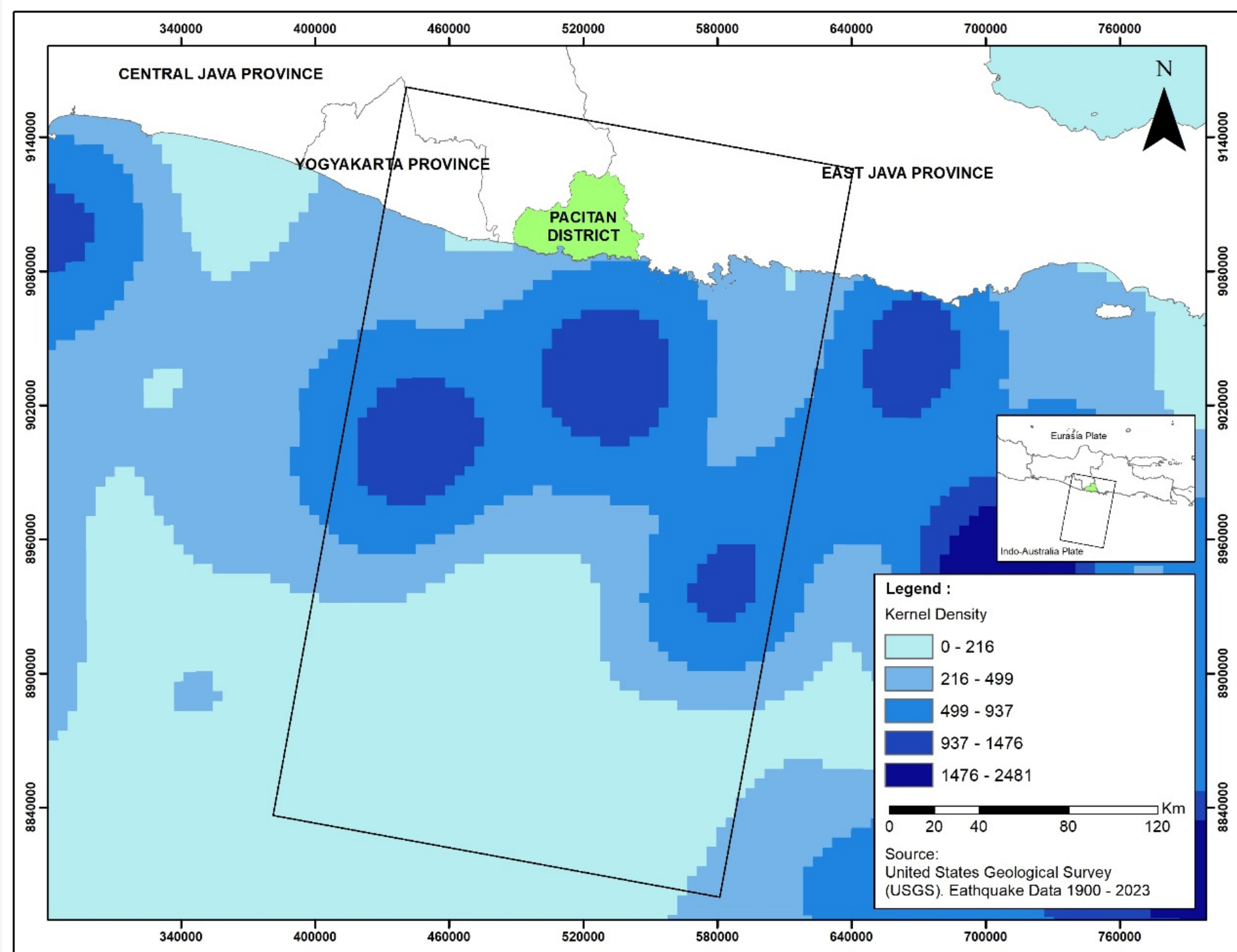




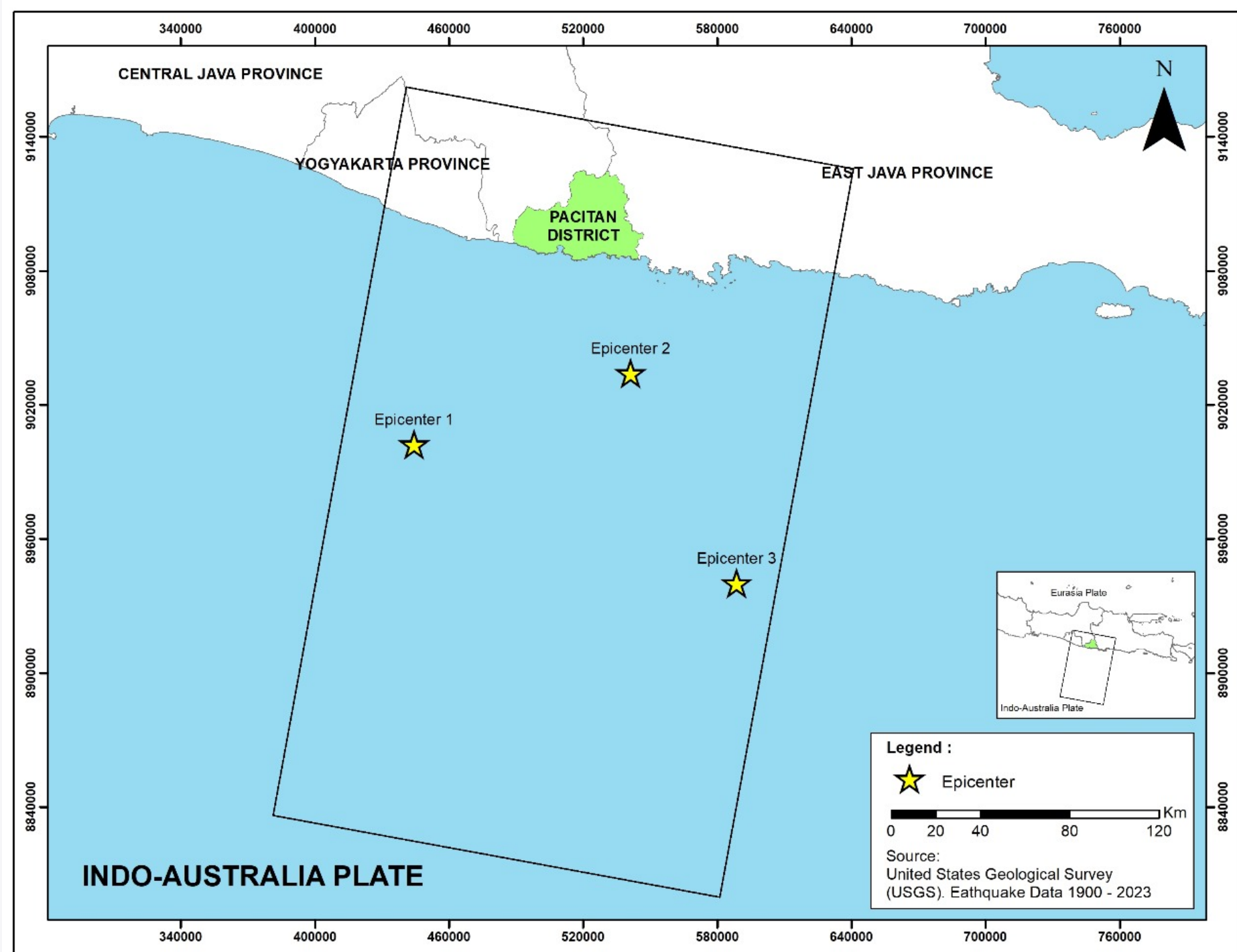
# Seismic Data From 1910 To 2023 (tahun)



# Density Analysis Result



# Selected Location for Epicenter Based on The Density



# Modelling Parameter

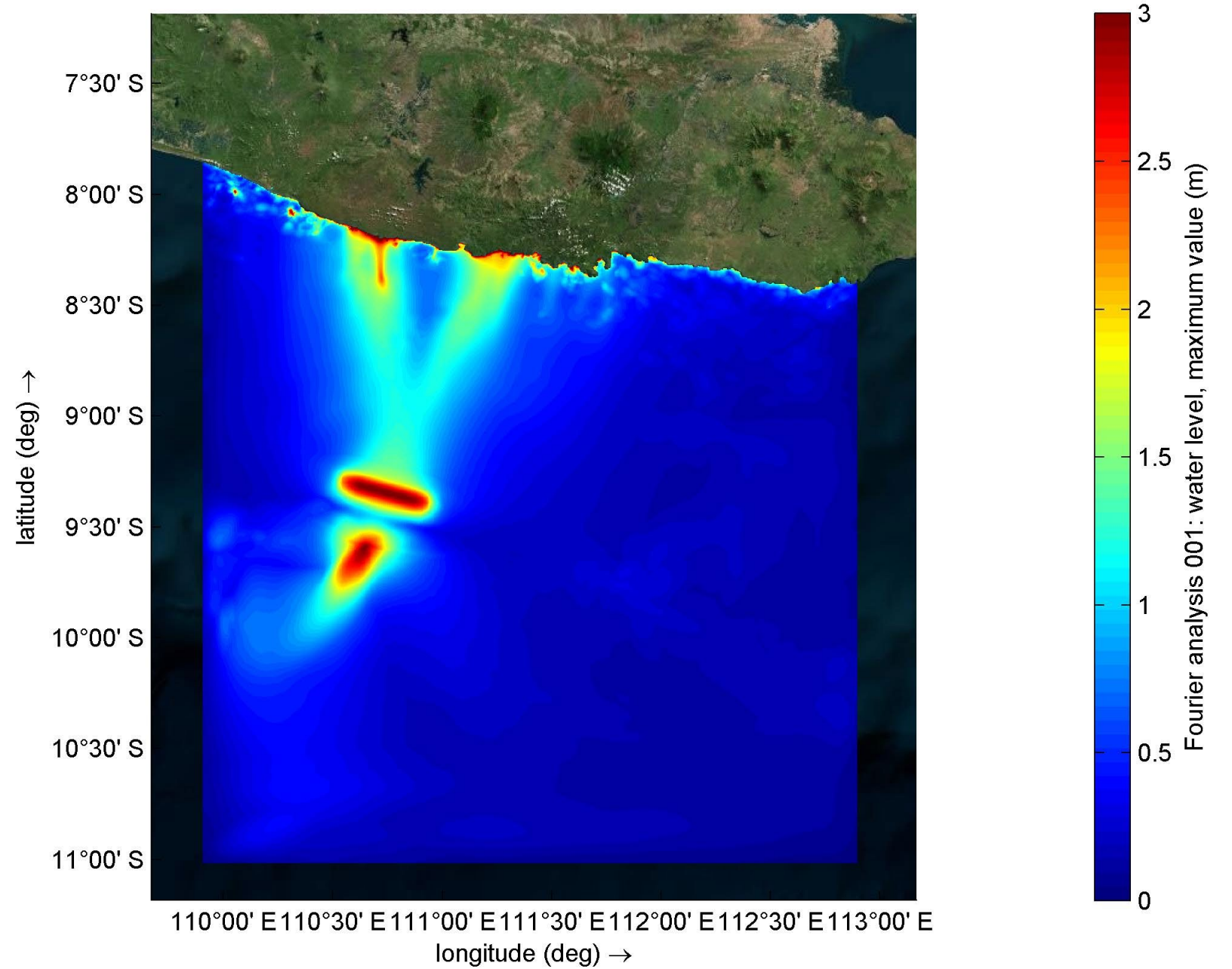
Scenario 1	
Magnitude	: 7,0 Mw
Latitude	: -9.026865°
Longitude	: 110.493893°
Kedalaman	: 10 km
Lebar	: 24 km
Panjang	: 50 km
Strike (°)	: 277
Dip (°)	: 10
Slip/Rake (°)	: 90
Dislokasi/Slip (m)	: 10

Scenario 2	
Magnitude	: 6,0 Mw
Latitude	: -8.738950°
Longitude	: 111.375484°
Kedalaman	: 10 km
Lebar	: 9,5 km
Panjang	: 13 km
Strike (°)	: 272
Dip (°)	: 10
Slip/Rake (°)	: 90
Dislokasi/Slip (m)	: 10

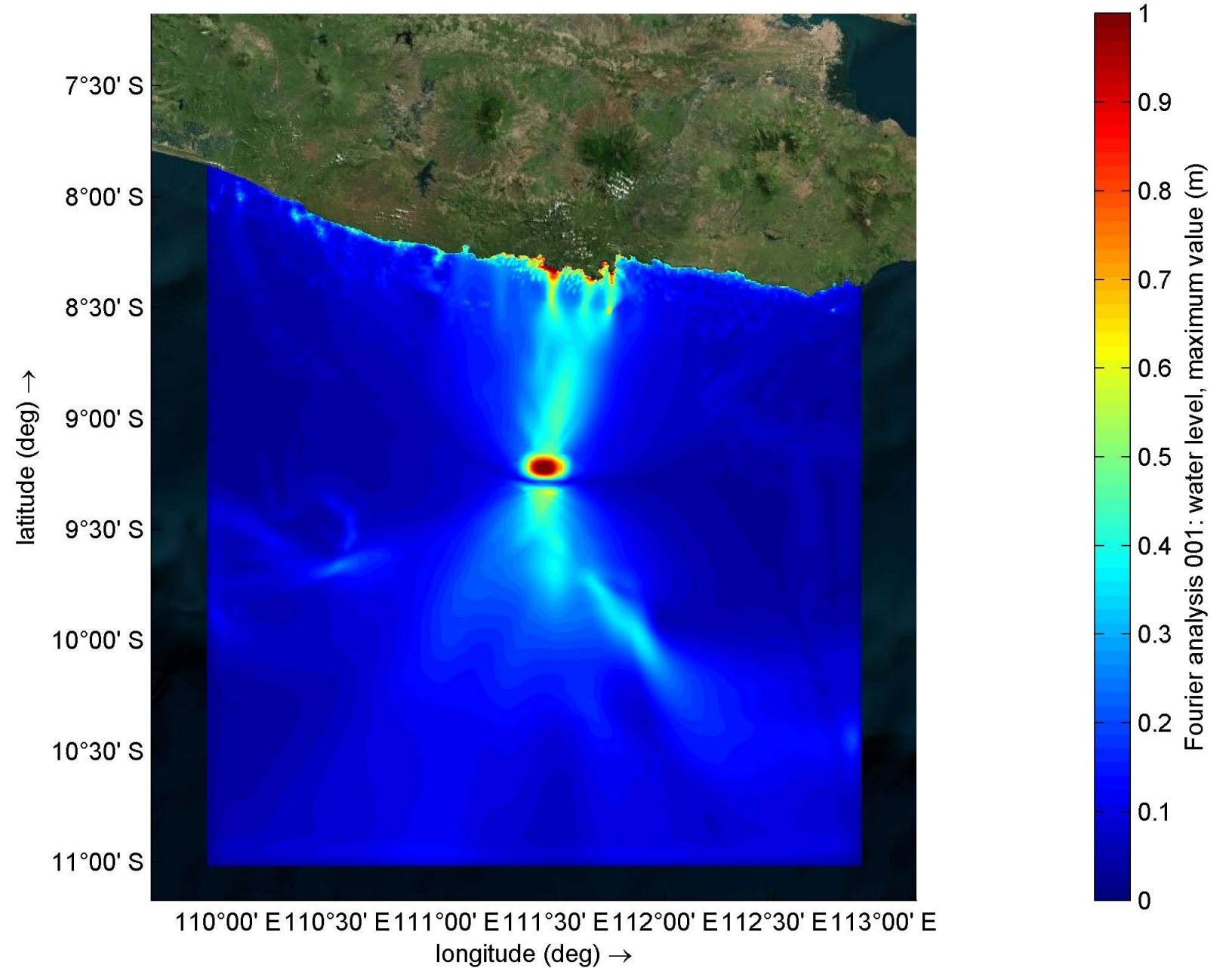
Scenario 3	
Magnitude	: 7,0 Mw
Latitude	: -9.588418°
Longitude	: 111.807951°
Kedalaman	: 10 km
Lebar	: 24 km
Panjang	: 50 km
Strike (°)	: 285
Dip (°)	: 10
Slip/Rake (°)	: 90
Dislokasi/Slip (m)	: 10



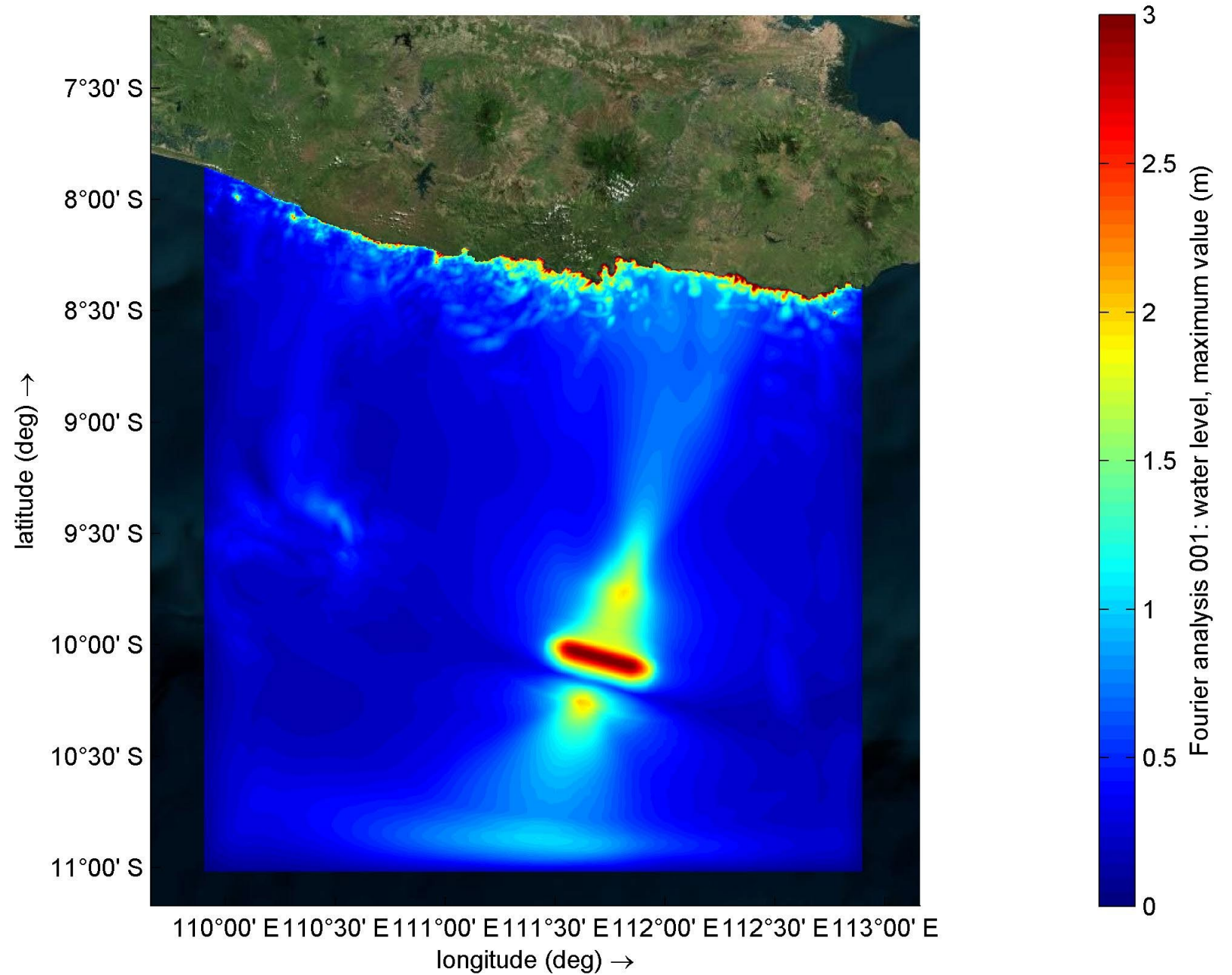
# Tsunami Model Scenario 1



# Tsunami Model Scenario 2



# Tsunami Model Scenario 3



# Modelling Results

## Scenario 1

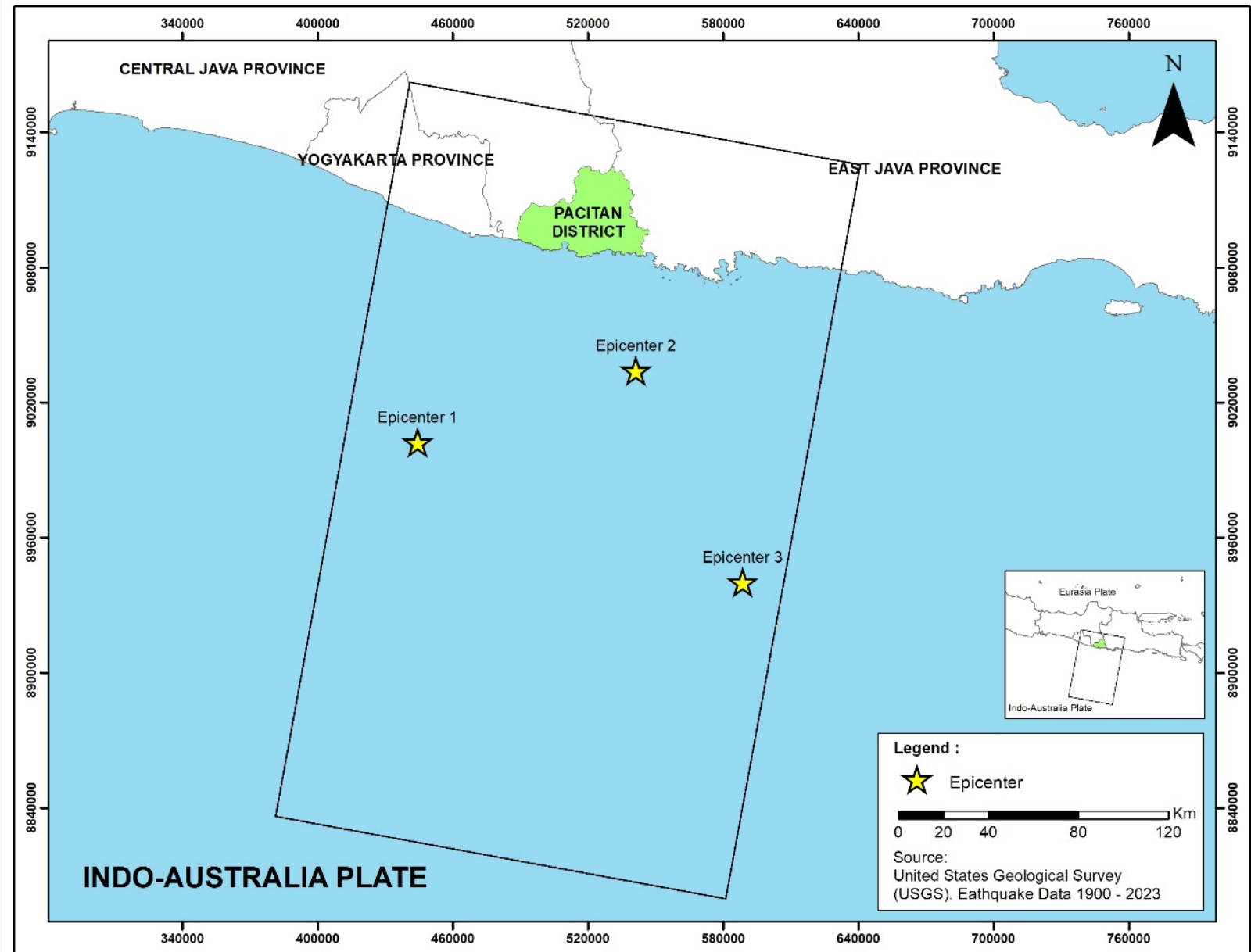
Time to reach Pacitan Beach	: 30 minutes
Distance from epicenter to Pacitan Beach	: 111 km

## Scenario 2

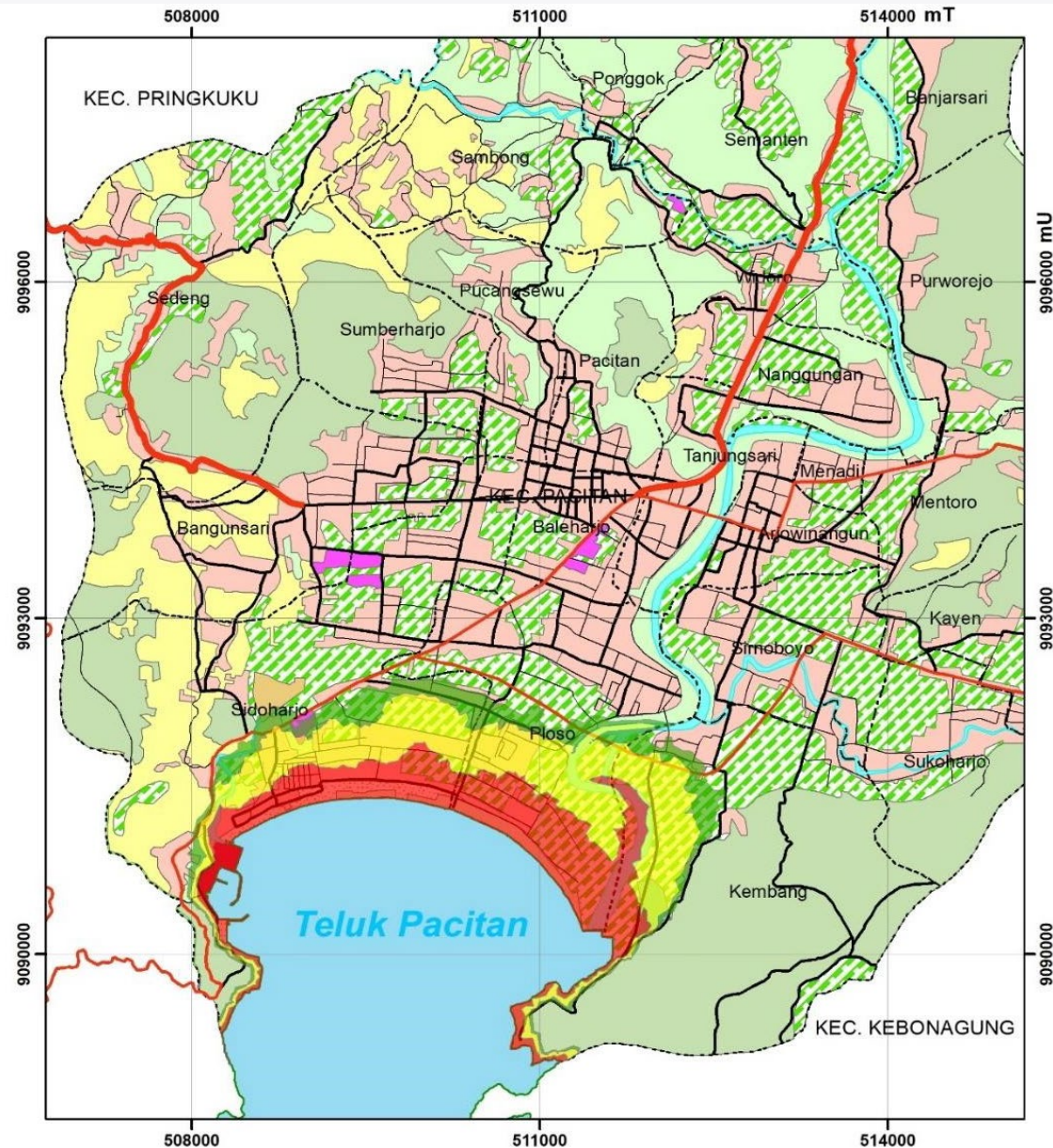
Time to reach Pacitan Beach	: 30 minutes
Distance from epicenter to Pacitan Beach	: 65 km

## Scenario 3

Time to reach Pacitan Beach	: 1 hours 27 minutes
Distance from epicenter to Pacitan Beach	: 171 km



# Inundation Model



## Inundation class



# Conclusion

The results highlighted the significant vulnerability of the Pacitan Sub-District to tsunamis. The findings provided valuable insights for disaster preparedness and mitigation efforts, emphasizing the importance of comprehensive evacuation planning, early warning systems, and community education to minimize the potential impact of future tsunamis in the region.