



NCM

المركز الوطني للأرصاد
National Center of Meteorology



Indian Ocean
Tsunami Information
Centre

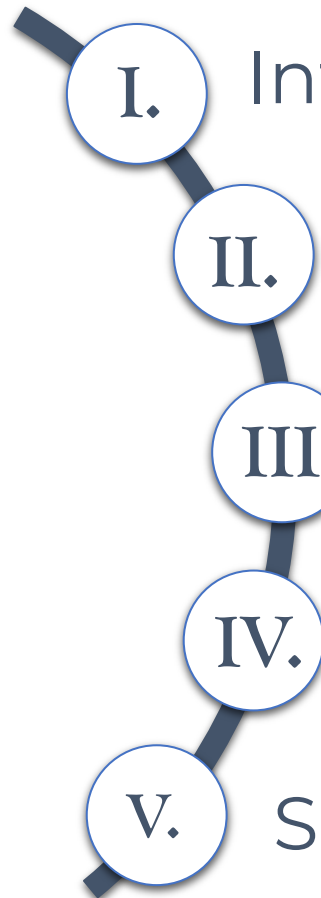


Regional Workshop on Tsunami Inundation Modelling in the Northwest Indian Ocean (Oman 2024)

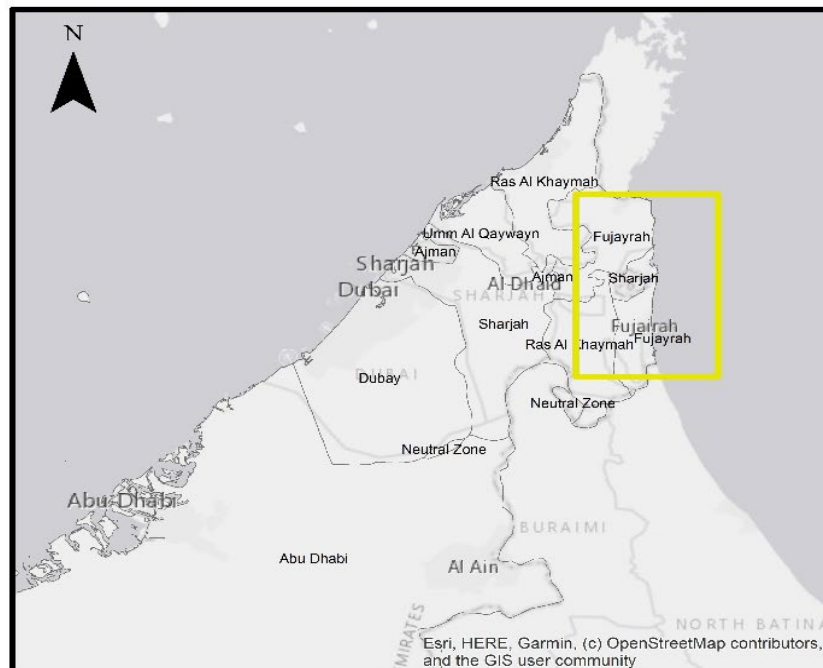
By
Badr Alameri

United Arab Emirates

Outline

- 
- I. Introduction
 - II. Pilot Region & Data availability
 - III. Scenarios
 - IV. Results
 - V. Summary

Introduction

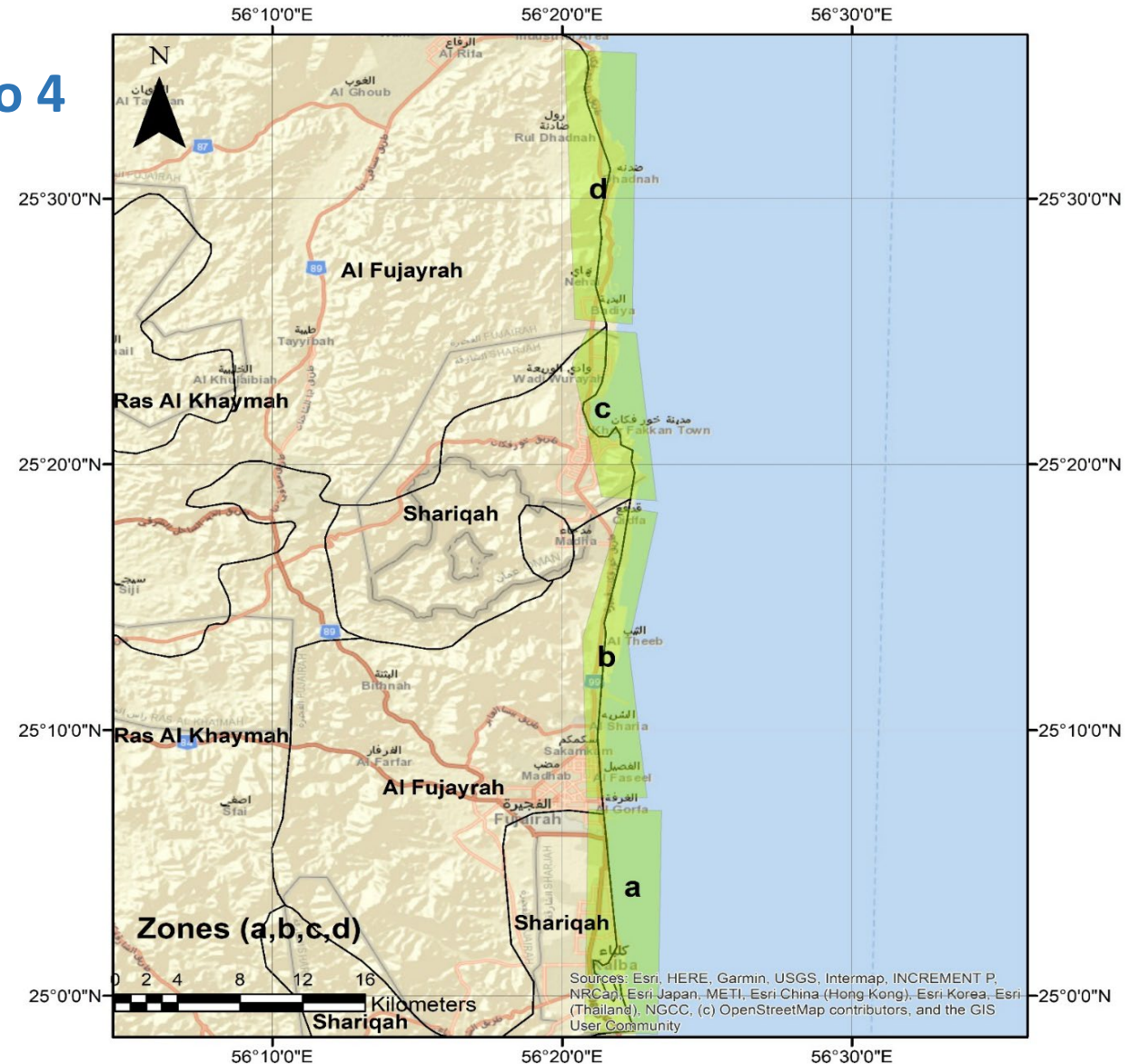


Pilot Region: Fujairah

In this work we divided the study area to 4 zones:

- Zone (a) comprises Kalba city.
- Zone (b) encloses Al Fujairah city.
- Zone (c) involves Khor Fakkan city.
- zone (d) includes Dibba Al- Fujairah city.

Study area (Fujairah's coastline) Zone b



Data Availability

Data	Bathymetry	DEM
Availability	YES	YES
Resolution	15 arcsecond	5m and 15m
Resolution in pilot area	15 arcsecond	5m and 15m

Note: In progress to get bathymetry data in higher resolution.

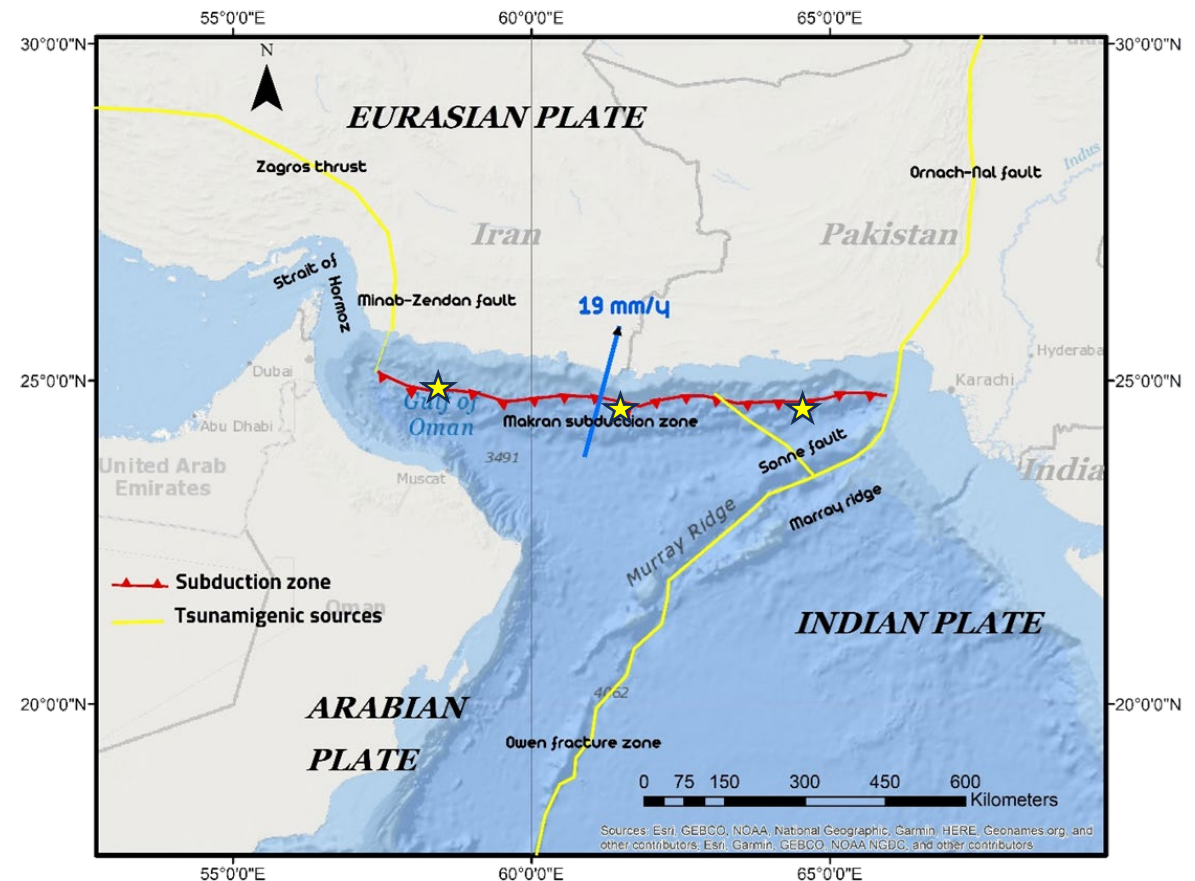
	Availability in pilot area	comments
Digital land use information, development information, zoning map	YES	Residential & Industrial buildings, Transportation, Utilities...etc

	Scenarios	Worst case scenario	Probabilistic hazard information
Availability	YES	YES	YES

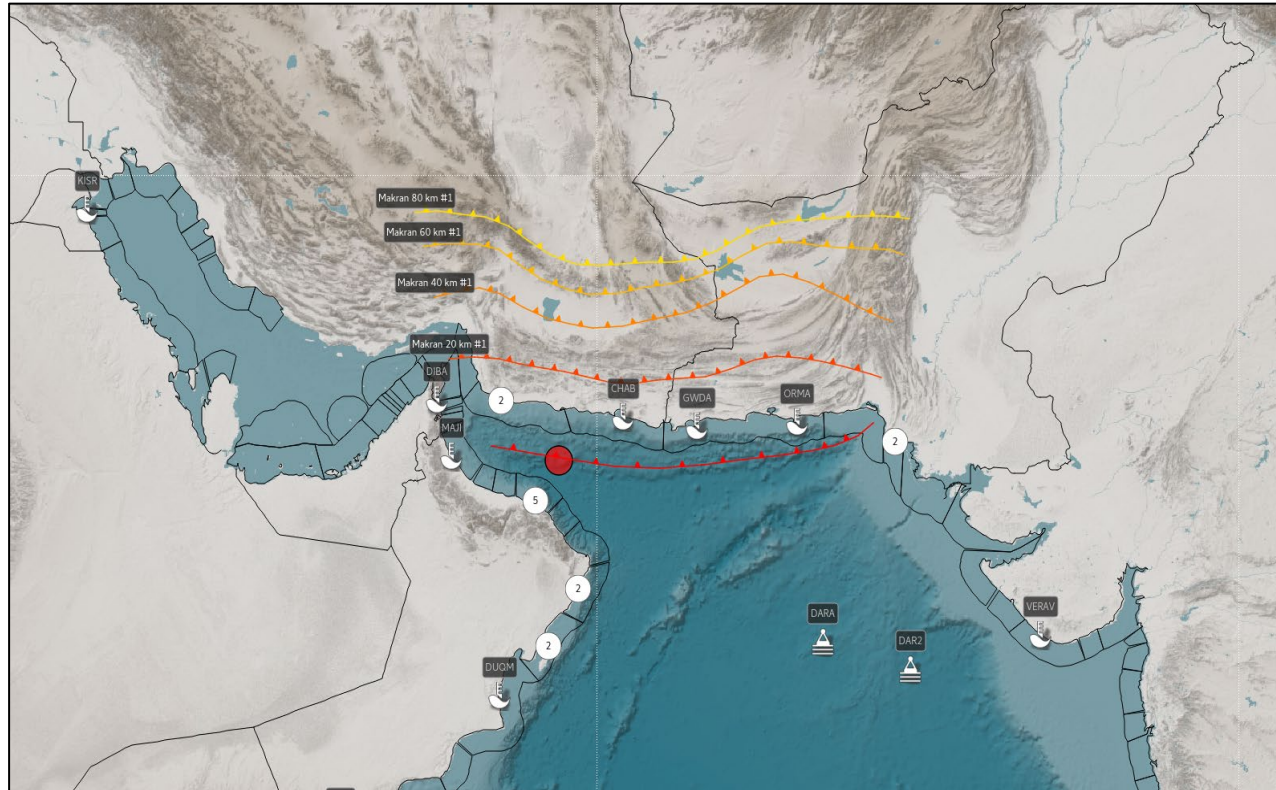
Makran Subduction Zone Scenarios

This study employ the deterministic approach based on the recorded event of 1945. We examined three submarine tsunamigenic earthquake scenarios generated from movements in the Makran subduction zone to estimate the effect of tsunami travel time, wave height, flow depth, and inundation on Al Fujairah coast.

- i) Mw 8.2 tsunamigenic earthquake scenario, generating from the MSZ West fault.
- ii) Mw 9.2 tsunamigenic earthquake scenario, generating from the complete fault of the Makran Subduction Zone.
- iii) Mw 8.8 tsunamigenic earthquake scenario, generating from the MSZ East fault.

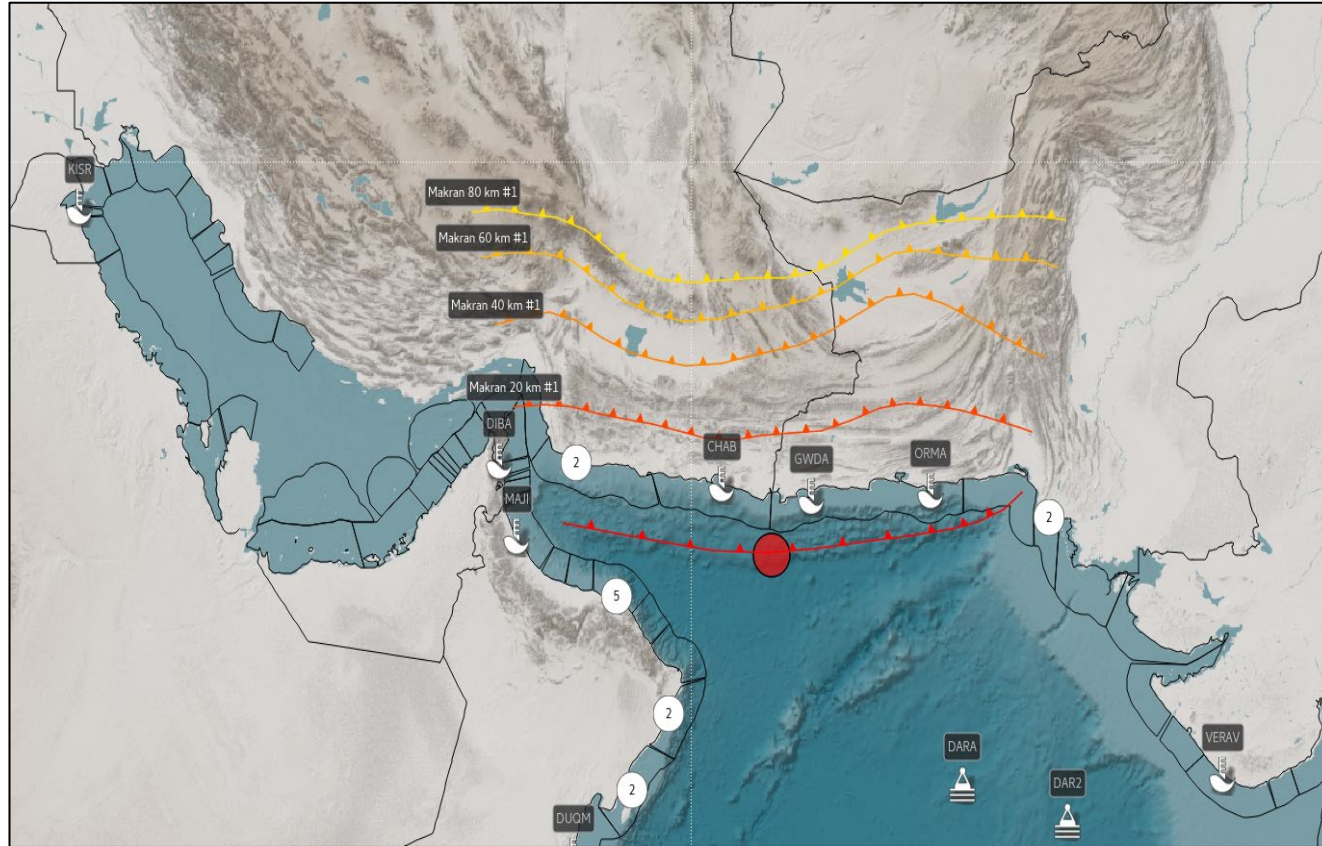


MSZW Scenario



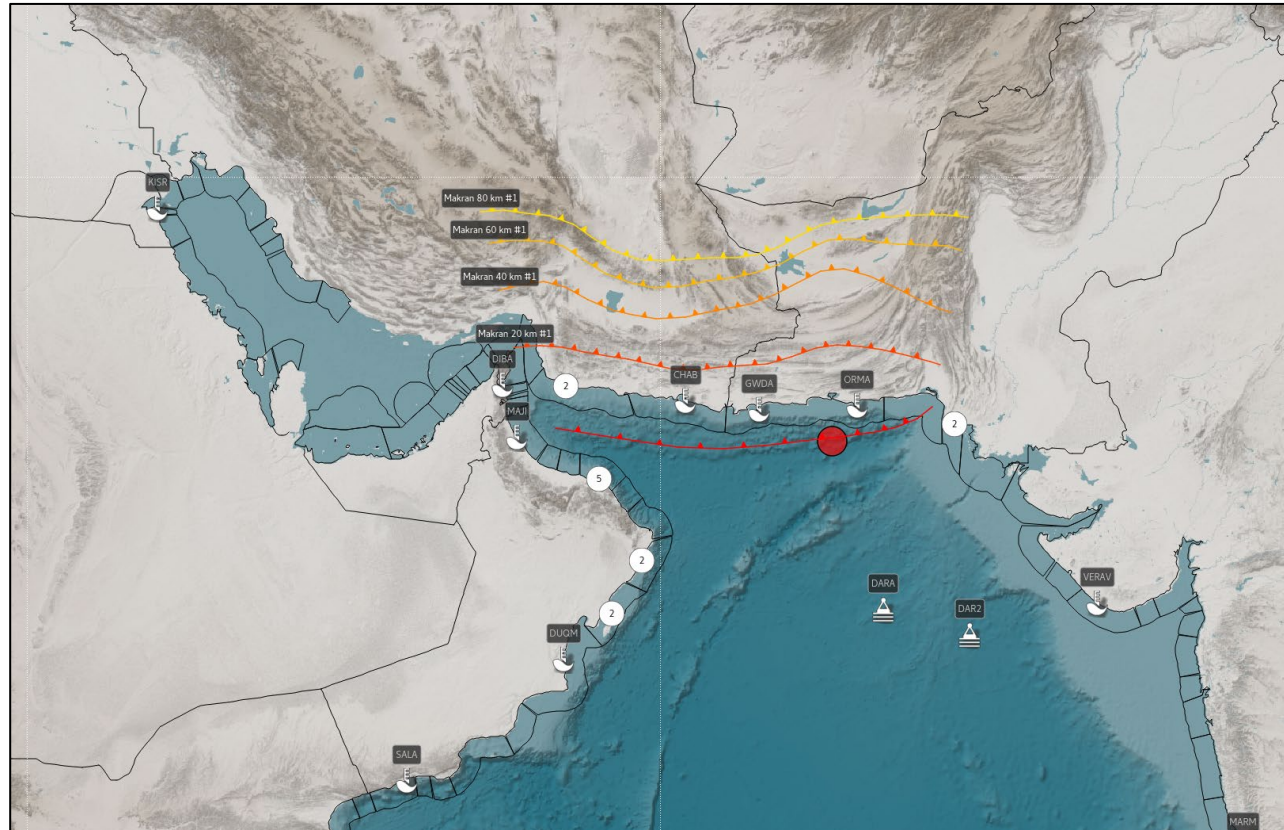
Scenario	MSZW
Mw	8.2
Average Travel time	31 min
Max run-up (m)	1.7 m
Max flow depth (m)	1.64 m

MSZWE Scenario



Scenario	MSZWE
Mw	9.2
Average Travel time	42 min
Max run-up (m)	2.55 m
Max flow depth (m)	2.21 m

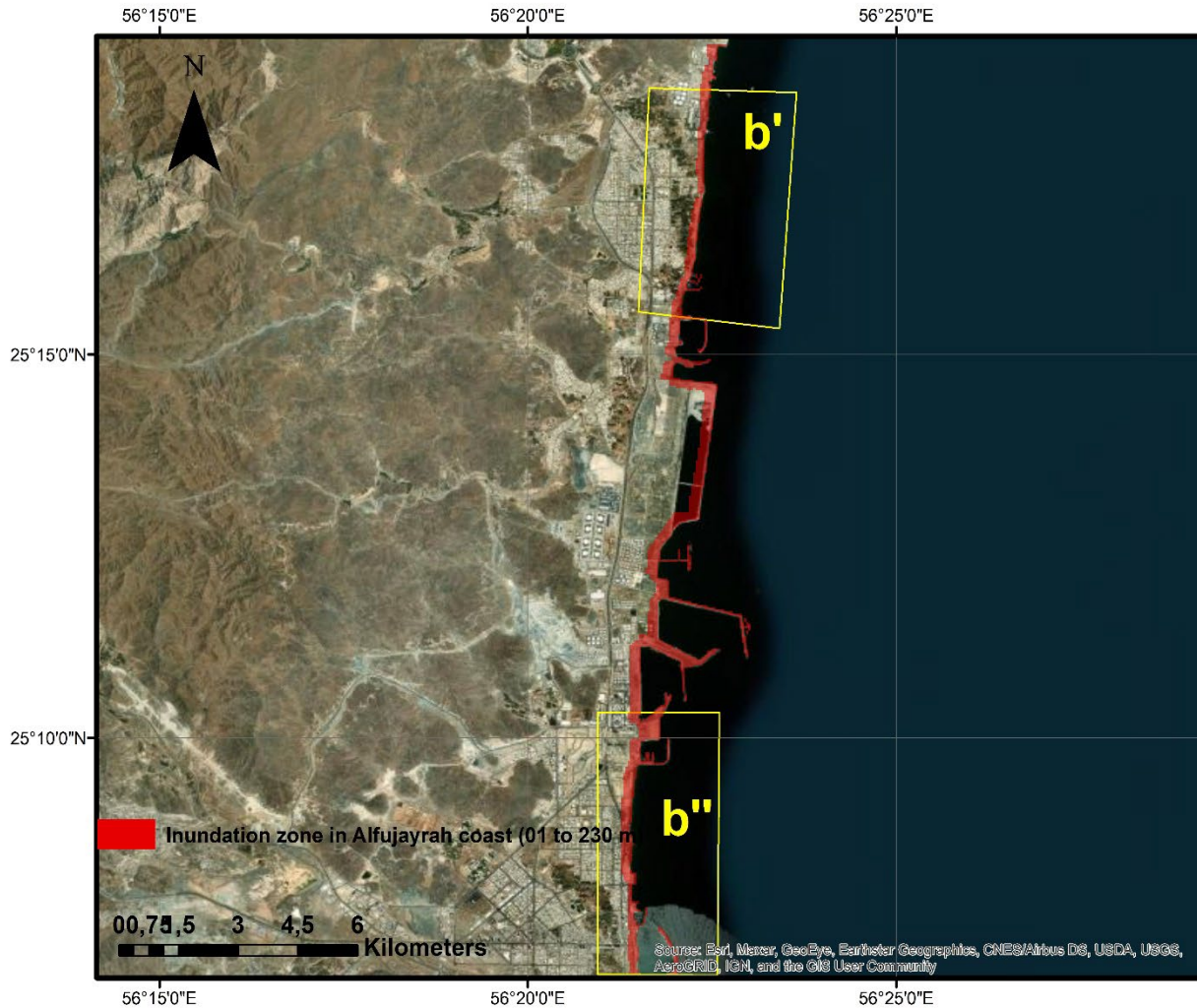
MSZE Scenario



Scenario	MSZE
Mw	8.8
Average Travel time	54 min
Max run-up (m)	1.3 m
Max flow depth (m)	1.05 m

Pilot Region Inundation

MSZWE Scenario



m)



Al Righailat

Pilot Area

Al Righailat

DEM 5m

Bathymetry 15 arcs

MATLAB / ARC GIS

Scenario	MSZWE
Mw	9.2
Travel time	42 min
Maximum run-up (m)	2.55 m
Maximum flow depth (m)	2.21 m
Maximum inundation (m)	153 m



Results & summary

The main findings of this study are:

- The Mw 9.2 earthquake in the MSZ fault scenario causes a travel time of **42 minutes**, a maximum run-up height of **2.55 m**, a maximum flow depth of **2.2 m**, and a maximum inundation distance of **153 m**.
- The Mw 8.2 earthquake from the western MSZ scenario generates **lower impact** on Al Fujairah coast, with tsunami travel time of **31 min**, a maximum run-up height of **1.7m**, a maximum flow depth of **1.64 m**, and a maximum inundation distance of **105 m**.
- The MW 8.8 earthquake from the Eastern MSZ scenario produces **towest** tsunami impact on Al Fujairah coasts, with a travel time of **54 minutes**, a maximum run-up height of **1.3 m**, a max flow depth of **1.05 m**, and a maximum inundation distance of **71 m**.

Scenario	MSZW	MSZWE	MSZE
Mw	8.2	9.2	8.8
Travel time	31 min	42 min	54 min
Maximum run-up (m)	1.7 m	2.55 m	1.3 m
Maximum flow depth (m)	1.64 m	2.21 m	1.05 m
Maximum inundation (m)	105 m	153 m	71 m

Inundation Group

Inundation Modeling Group

Seismologists

GIS experts

MATLAB experts

Software

TOAST

Mirone

ComMIT

Arc GIS

MatLab

Thank You
شكراً

 ncmsmedia

 ncms_media

 officialuaeweather

 UAE Weather Channel

www.ncm.ae