IMPACT-METRICS

OUR TEAM

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BASIC STATS :

- Total Earthquakes: 1000 (excluding 782 duplicates)
- Magnitude Range: 6.5 to 9.1
- Average Magnitude: 6.94
- Depth Range: 2.7 km to 670.81 km
- Average Depth: 75.17 km
- Events with Tsunami Alerts: 629

NOTABLE EARTHQUAKES

- Highest Magnitude:
  - M 9.1 - 2004 Sumatra - Andaman Islands Earthquake
  - Magnitude - 9.1
- Highest SIG:
  - M 7.8 - Central Turkey
  - SIG - 2910
- Deepest Event:
  - M 7.9 - 45 km S of Levuka, Fiji
  - Depth: 670.81

PREDICTIVE MODEL FOR ESTIMATING CDI AND MMI

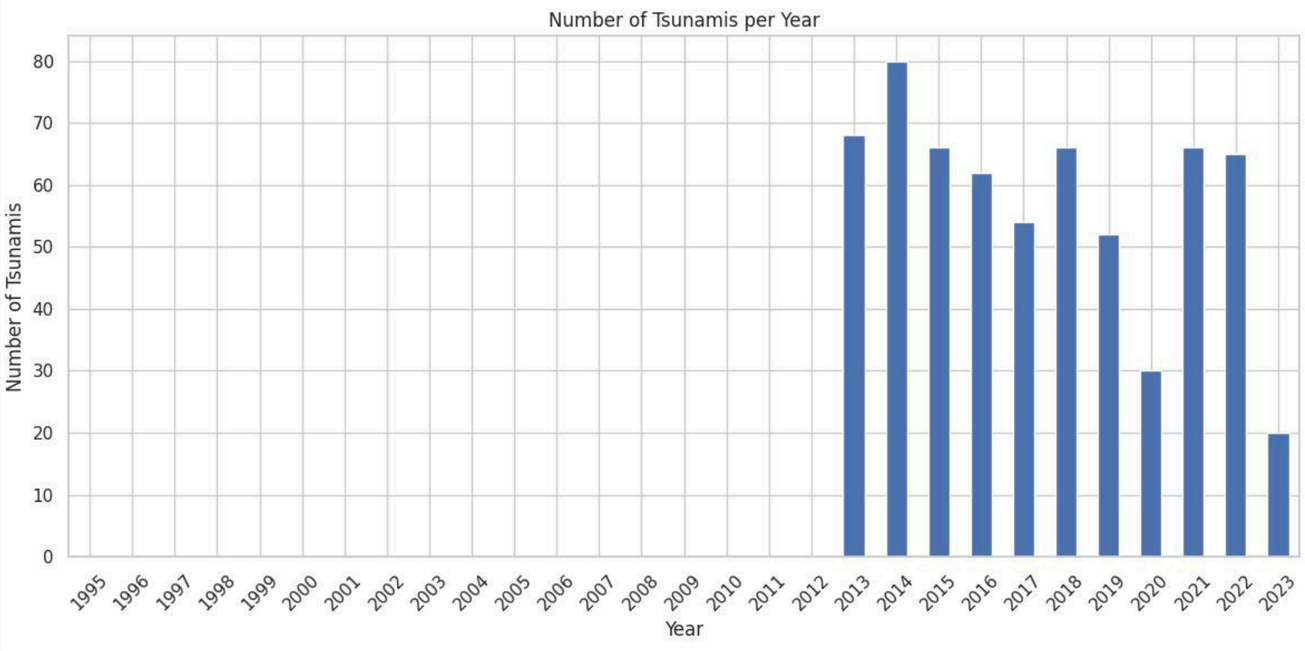
- **Optimal Model** - XGBoost
- Model **Accuracy**:
  - CDI Estimation: 90%
  - MMI Estimation: 87%

ALERT SYSTEM

- Developed a machine learning model utilizing five key features (magnitude, depth, CDI, MMI, and significance) to predict alert levels.
- **Optimal Model**: Random Forest Classifier
- **Accuracy** of the model for classifying Alert: 98%

IMPORTANT INSIGTS

- Tsunami only occured after 2013 due to climate change

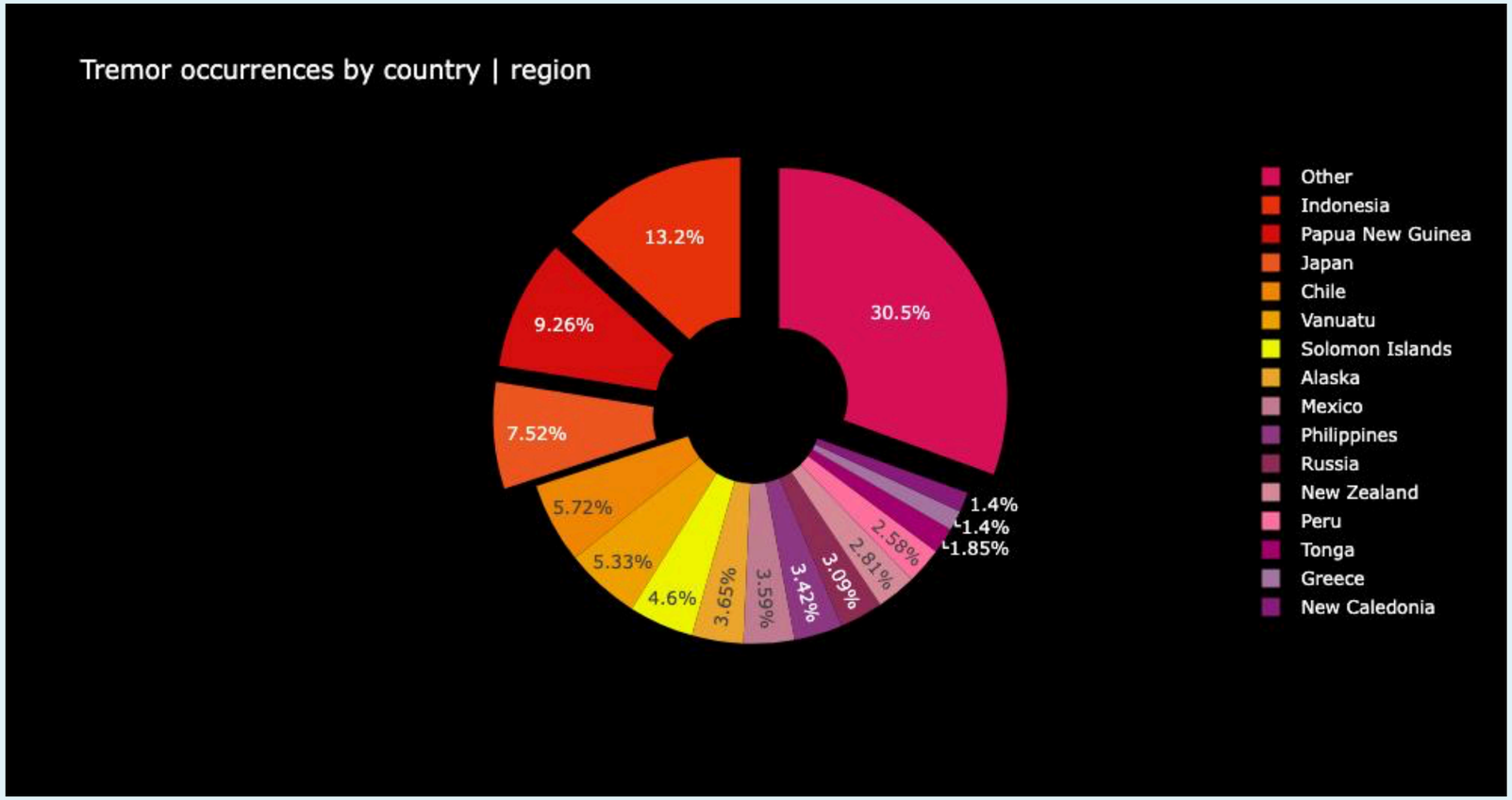


DUE TO :

- Increased Ocean Temperatures
- Melting Polar Ice and Rising Sea Levels
- Enhanced Monitoring Systems

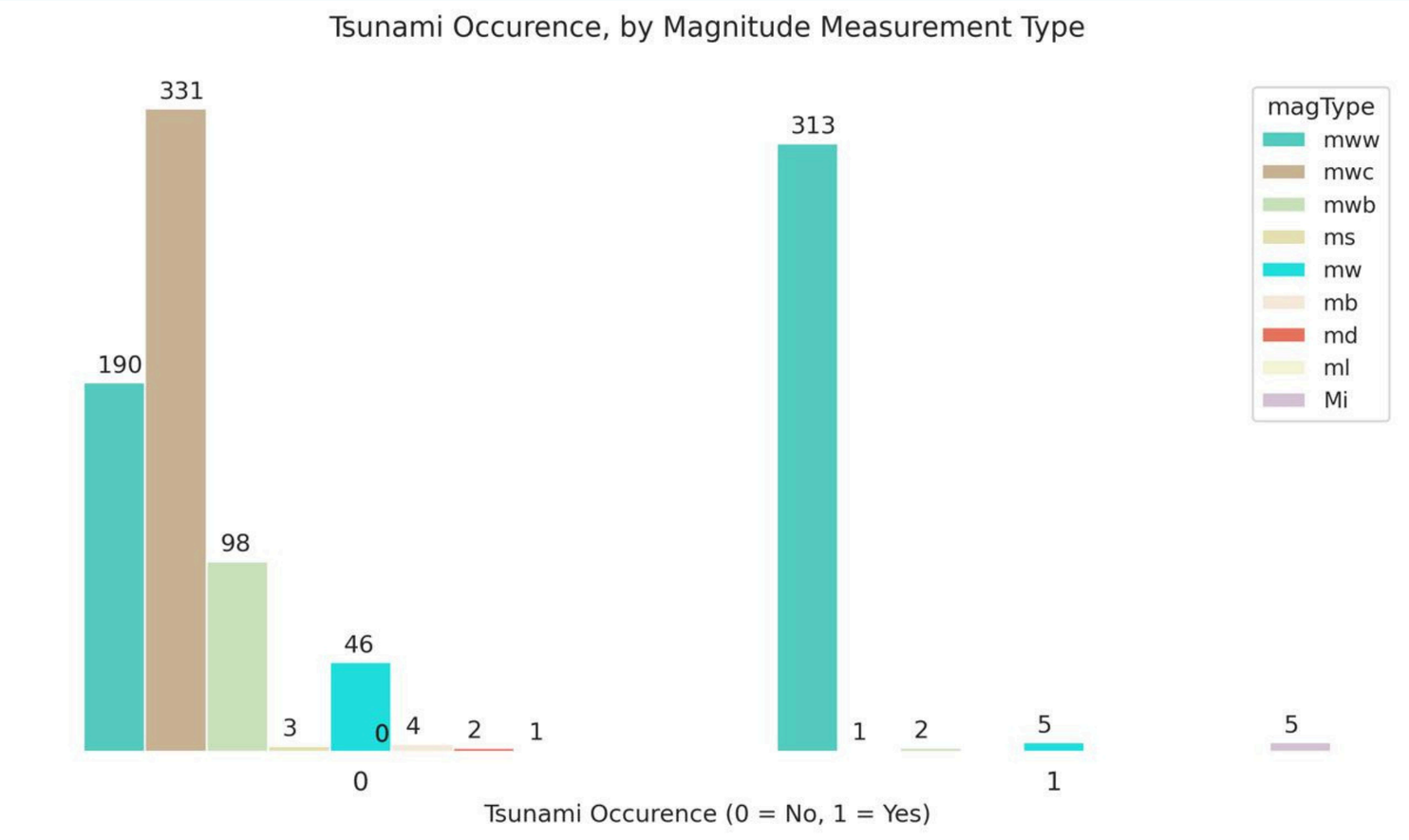
KEY OBSERVATIONS

- Indonesia, Papua new Guinea, Japan alone covers around 30% of total earthquakes

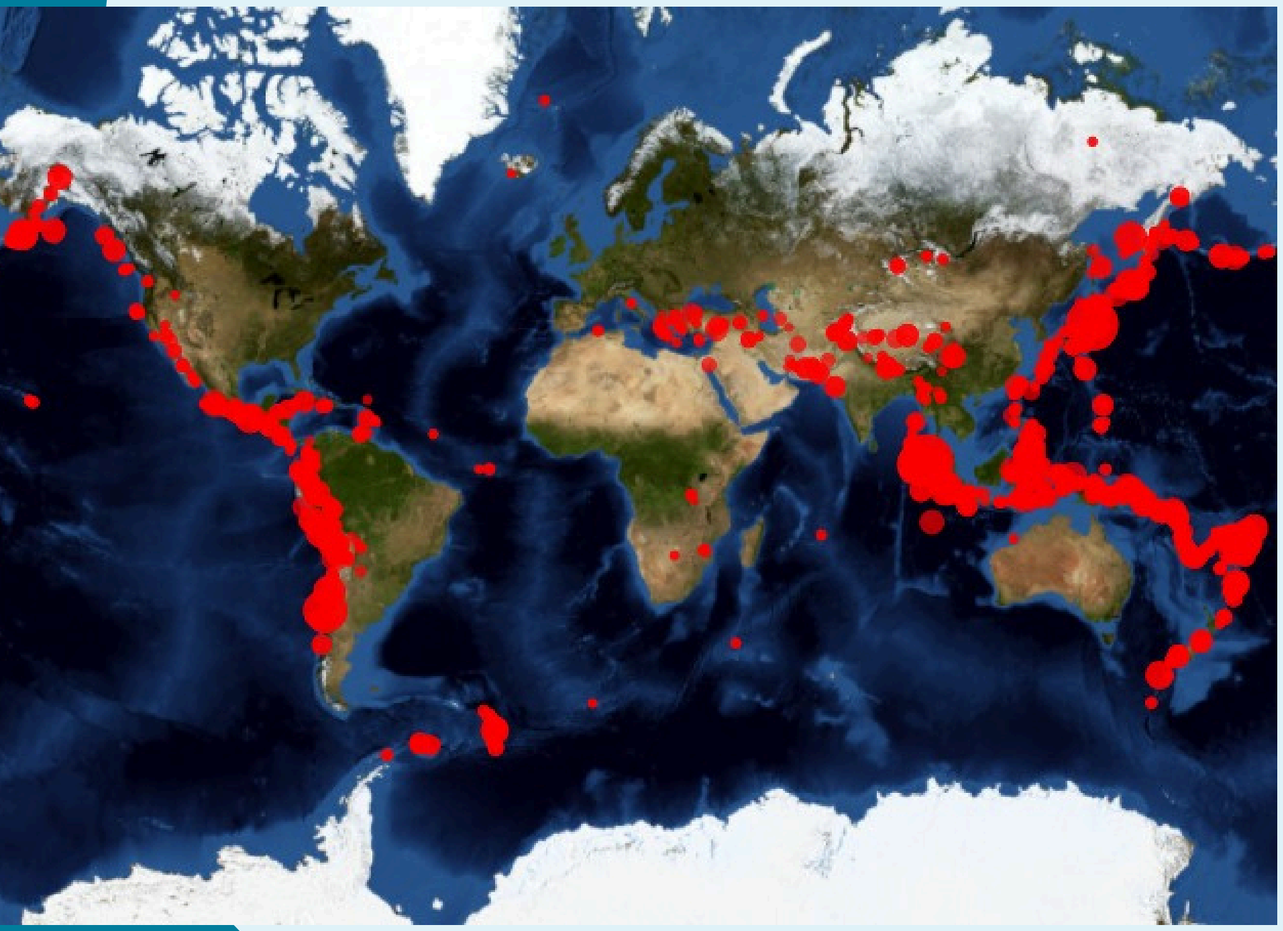


PREFERENCE OF MEASUREMENT TYPE

- For quakes occuring in oceans, mww is the widely used measurement type.
- On the other hand, mwc is the preferred measurement type for quakes occuring on land.



GRAPHICAL REPRESENTATION

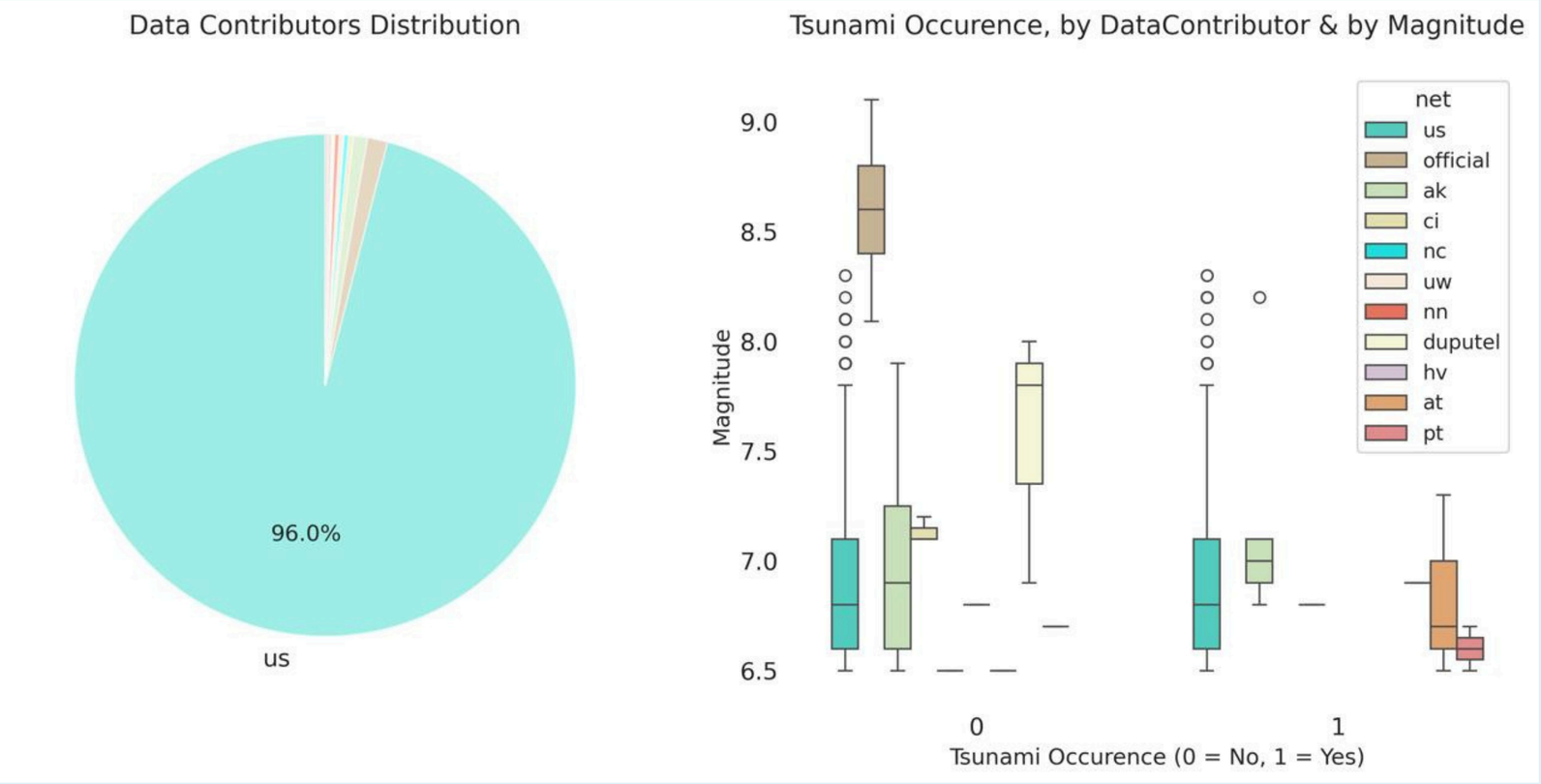


- **Predominance in Coastal Areas**: Earthquakes predominantly occur near coastal zones due to tectonic interactions, such as subduction and transform boundaries.
- **Limited Activity in Open Oceans**: Earthquake occurrences are relatively sparse in the open ocean, with exceptions near mid-ocean ridges and fracture zones.
- **Impact on Land and Populations**: Coastal and adjacent land areas face significant seismic risks, with potential secondary effects like tsunamis impacting human settlements.
- This pattern underscores the link between earthquake occurrences and tectonic processes, particularly at plate margins.

The majority of seismic activity is concentrated around the Pacific "**Ring of Fire**," a zone renowned for its intense geological activity.

DATA CONTRIBUTIONS

- The US is the major contributor of the earthquake data (95.8%)
- It appears that for high magnitude quakes, official and duputel are the primary data contributors.



CONCLUSION

- We successfully integrated Machine Learning algorithms into disaster prediction systems to analyze the potential impact of earthquakes and tsunamis.
- We applied the CDI and MMI scales to predict disaster intensities and better understand their effects on communities.
- By using predictive models, we developed a system capable of providing timely alerts, helping to minimize damage and save lives during natural disasters.

THANK YOU