Seismic Energy Forecast for Japan

2025 September 19-22-27 - potential earthquake or eruption in Japan

Version: 0

First Revision: 2025-09-06 08:14:54

Last Revision: Rev. 0 - 2025-09-06 08:14

Index

1. Revision History

Version	Date	Author	Description
0	2025-09-06 08:14:54	MF	Seismic Energy Forecast for Potential Earthquake or Eruption in Japan
	first emission		

2. Explanation of Terms and Concepts

About Features used to produce this forecast

We produced this forecast using the following specific source:

1. astronomical solar system data (same day - 0 shift)
2. seismic sensor GPS data (60 days shift)
3. tropospheric data (60 days shift)

The Purpose it to demonstrate the validity of using GPS + TROPO data several week before a seismic event.

Time series sharpness achievable by astronomical data only can be up to 7 days.

This study demonstrate that using augmented data in past geophysical observations can rise the time line sharpness up to 24 hrs and more.

About Graph system

*Note: **trend** graph*

Forecast graph and tables refer to a base value, against it.

For instance if a value of 37 per latitude is the base line and graph value is 0% it means that the location estimated for that period of time is UNDER 37.

Another example is for magnitude graph, with baseline Mw 7.0, 0% means no risk detected, and 100% means high risk detected

---

About Time Slot

Note: each date point represent **the beginning of the time slot**

For instance if a forecast time point is on 2025-01-01 and the graph resolution is 7 days, it's a forecast for 2025-01-01 until 2025-01-06 (UTC)

3. Features Used For Magnitude

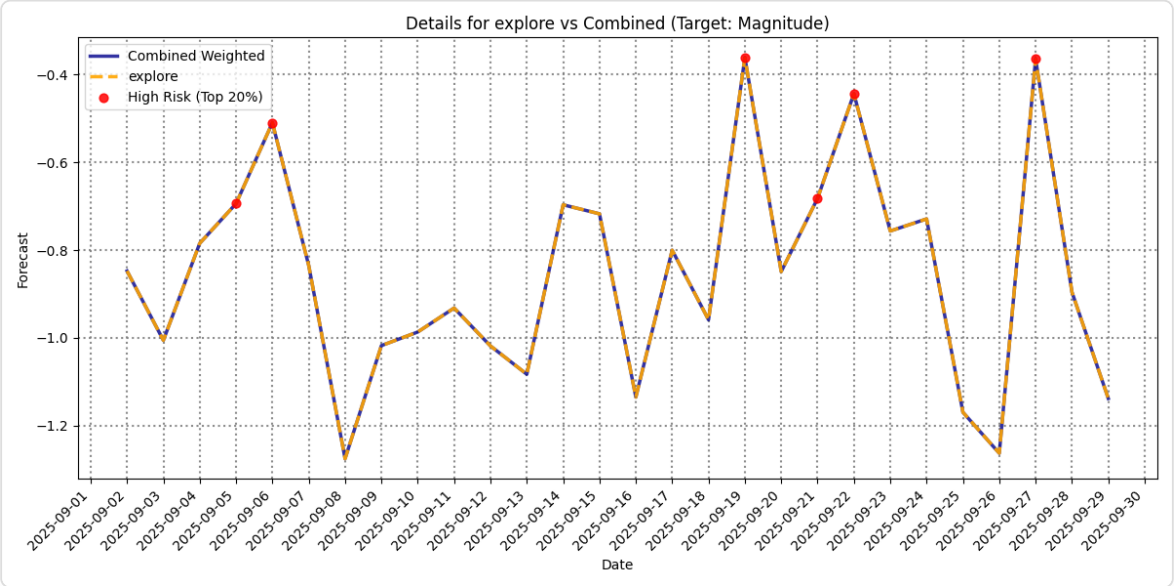
Combined Features Analysis Report - trial*set*20250906-075248

Generated: 2025-09-06T08:15:29.392092 **Cycles Analyzed:** explore

Trials Summary

Cycle	Trial Count	Best Loss	Worst Loss	Total Weight
explore	1	0.441287	0.441287	2.266

EXPLORE Analysis

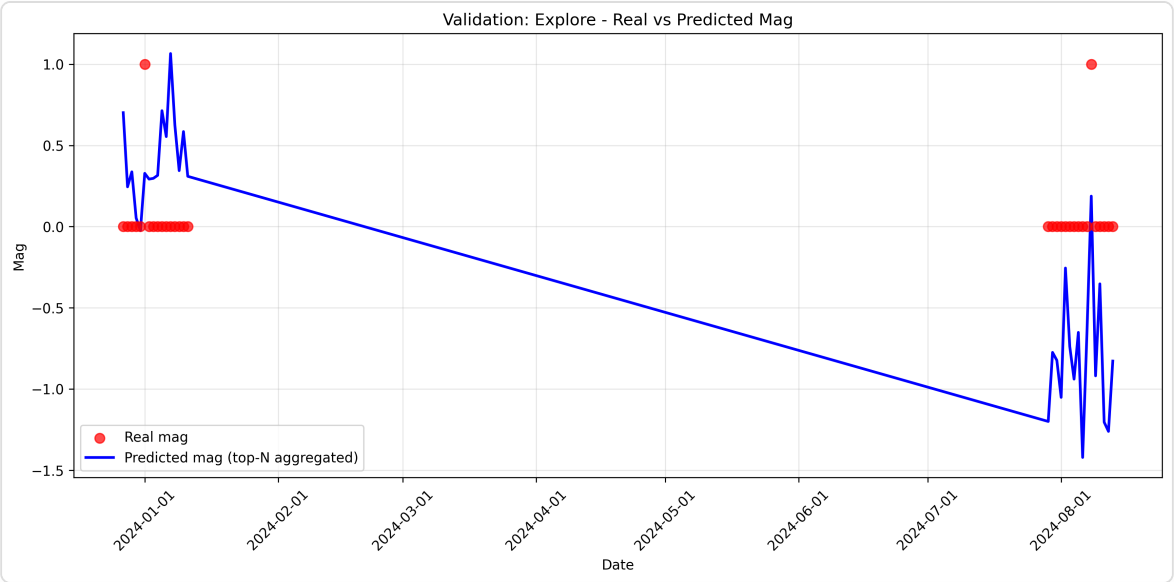


Trial Information

Trial ID	Hyperopt Loss	Weight	GPS Features
74	0.441287	2.266	74

Validation Analysis

The validation plot shows how well the aggregated top-N trials predict actual target values on the validation dataset.



Complete Dataset Overview

Analysis of ALL features present in the source files

Category	Count	Percentage
Astro	18	18.9%
Tropo	40	42.1%
Pos	34	35.8%
Target	2	2.1%
Other	1	1.1%

Filtered Dataset (Used for Analysis)

Features matching keyword 'target' that were actually processed

Category	Count	Percentage
Astro	0	0.0%
Tropo	0	0.0%
Pos	0	0.0%
Target	2	100.0%
Other	0	0.0%

Detailed Features Breakdown (Filtered)

Target Features

Primary target variables for prediction

Count: 2

Features: - `Add_pred_target` - `Add_target`

File-by-File Analysis

Complete Dataset (All Features)

File	Total	Astro	Tropo	Pos	Target	Other
forecast.csv	95	18	40	34	2	1

Filtered Dataset (Used for Analysis)

File	Filtered	Astro	Tropo	Pos	Target	Other
forecast.csv	2	0	0	0	2	0

Summary Insights

Complete Dataset:

- **Astronomical data** represents 18.9% of all features (18 features)
- **Tropospheric data** represents 42.1% of all features (40 features)
- **Position/GPS data** represents 35.8% of all features (34 features)
- **Target variables** represent 2.1% of all features (2 features)
- **Dominant category in complete dataset:** Tropo features

Filtered Dataset (Actually Used):

- **Target variables** represent 100.0% of filtered features (2 features)
- **Dominant category in filtered dataset:** Target features

This report was automatically generated by the median_calculator_target_only.py script.

Cross-Cycle Summary

Cycle	Status	Best Trial	Features
explore	Analyzed	74	74 GPS

This combined report was automatically generated by the generate_trial_report.py script. Features analyzed from best trial forecast.csv files extracted from trial ZIP archives.

4. Cycle Loss Ranking

Cycle Loss Ranking - trial*set*20250906-075248

Selected focus: explore (lowest loss)

Rank	Cycle	Loss	Trial ID	GPS Features
1	explore	0.441287	74	74

Lower loss indicates a better-performing cycle.

5. Astronomical Features Used

Astronomical Features Used per Cycle - trial*set*20250906-075248

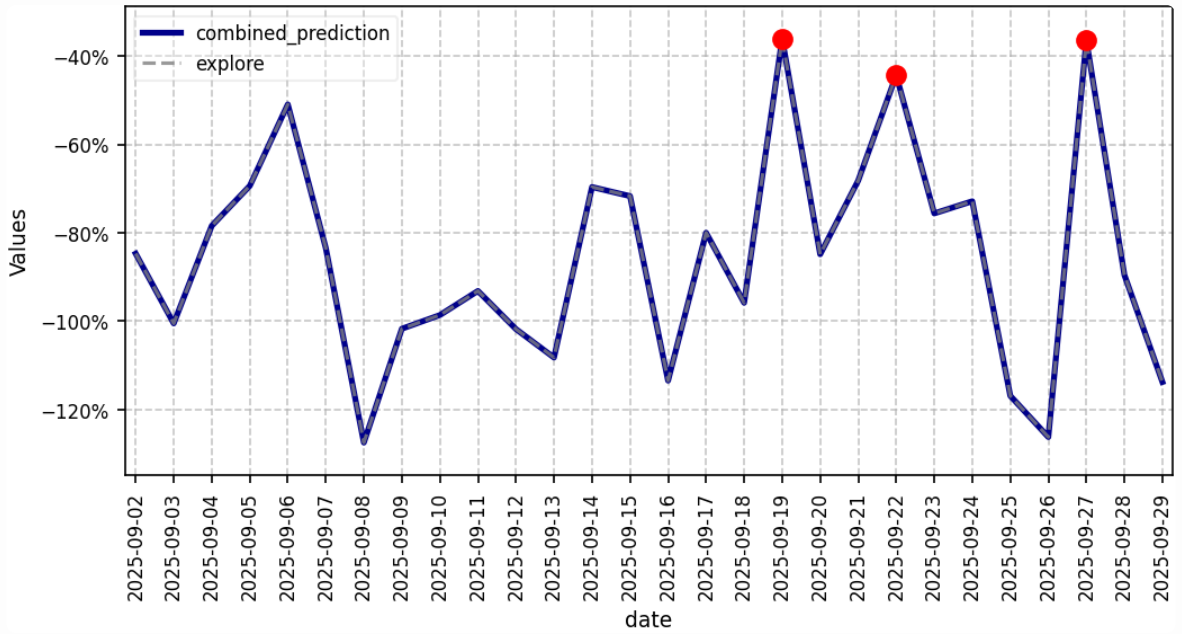
Focus cycle: explore

Cycle	Loss	Bodies	Observers	Ephemerides	Operations
explore	0.441287	199, 2015t-g387, 599, 699	geo_35.6895;139.6917;0	az, dec*rate, lunar*presence, ra_rate, suntargetpa	max, min

Bodies are represented by their NAIF ID (unique identifiers for celestial bodies from NASA/JPL); observers use geo_lat;lon;height schema. Ephemerides are Horizons fields; operations are aggregations like min/max.

6. Forecasts

6.1 M 7.0+ Seismic Energy Forecast (possible earthquake or eruption), res:1 day, UTC (focus: explore)



⚠ Moderate Risk Forecast for Following Dates:

- 1. from 2025-09-19 to 2025-09-20 (UTC) - Risk Value: -0.361
- 2. from 2025-09-27 to 2025-09-28 (UTC) - Risk Value: -0.364
- 3. from 2025-09-22 to 2025-09-23 (UTC) - Risk Value: -0.443

Each date represent the BEGINNING of time slot
This seismic energy forecast indicates moderate seismic risk in Japan.
Excluded cycles with zero forecast: explore_trial_50

7. Summary and Conclusion

Summary of Findings

Moderate seismic energy in Japan in following dates: 2025-09-19, 2025-09-22, 2025-09-27 (UTC).

Conclusions

Moderate seismic activity for 2025-09-19, 2025-09-22, 2025-09-27 in Japan.

Even if the risk appears slight or moderate, preparation is necessary because the epicenter could be near your location. A separate report is required to estimate its position. AI-generated reports may create false alarms or underestimate the risks. Do not use this report to make important decisions. This work is for research purposes only.

8. Attribution and Disclaimers

Data Sources

- Seismic data utilized in this report is sourced from the **USGS Earthquake Catalog** and the **Japan Meteorological Agency (JMA)**.
- Planetary ephemeris data provided by **NASA/JPL Horizons System**.
- All tropo + gps positional data provided by **NASA/JPL**

Disclaimer of Liability

This report is generated for research and informational purposes only. The forecasts presented are based on statistical models and historical data; they are not deterministic predictions. The authors and distributors of this report assume no liability for any actions taken or decisions made based on the information contained herein.

Responsibility Statement

The analysis and conclusions represent the best judgment of our research team based on the available data. This is not an official warning or alert. For official information, please consult your local government and geological survey authorities.