

Seismic Energy Forecast for Japan

2025 October 30, 2025 November 06-27 - potential
earthquake or eruption in Japan

Version: 0

First Revision: 2025-11-04 19:13:05

Last Revision: Rev. 0 - 2025-11-04 19:13

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1. Revision History

| Vers ion | Date | Aut hor | Description |
|-------------|------------------------|------------|--|
| 0 | 2025-11-04 19:13:05 | 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

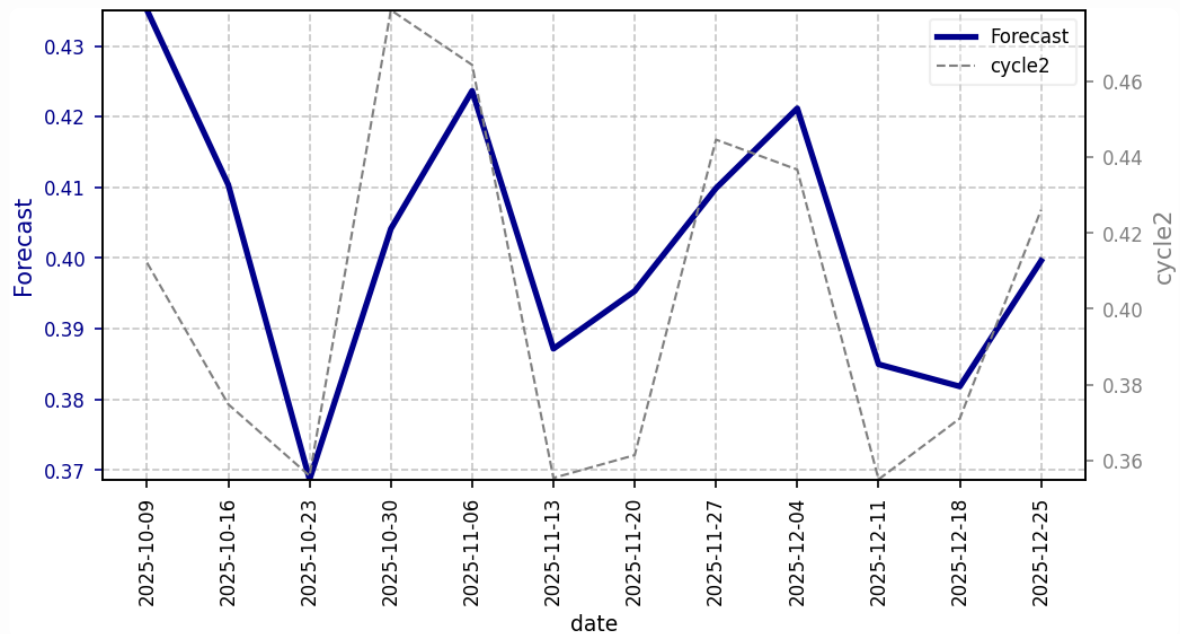
About Time Slot

*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. Forecasts

3.1 Latitude Seismic Energy Forecast, res:1 week, UTC (focus: cycle2)

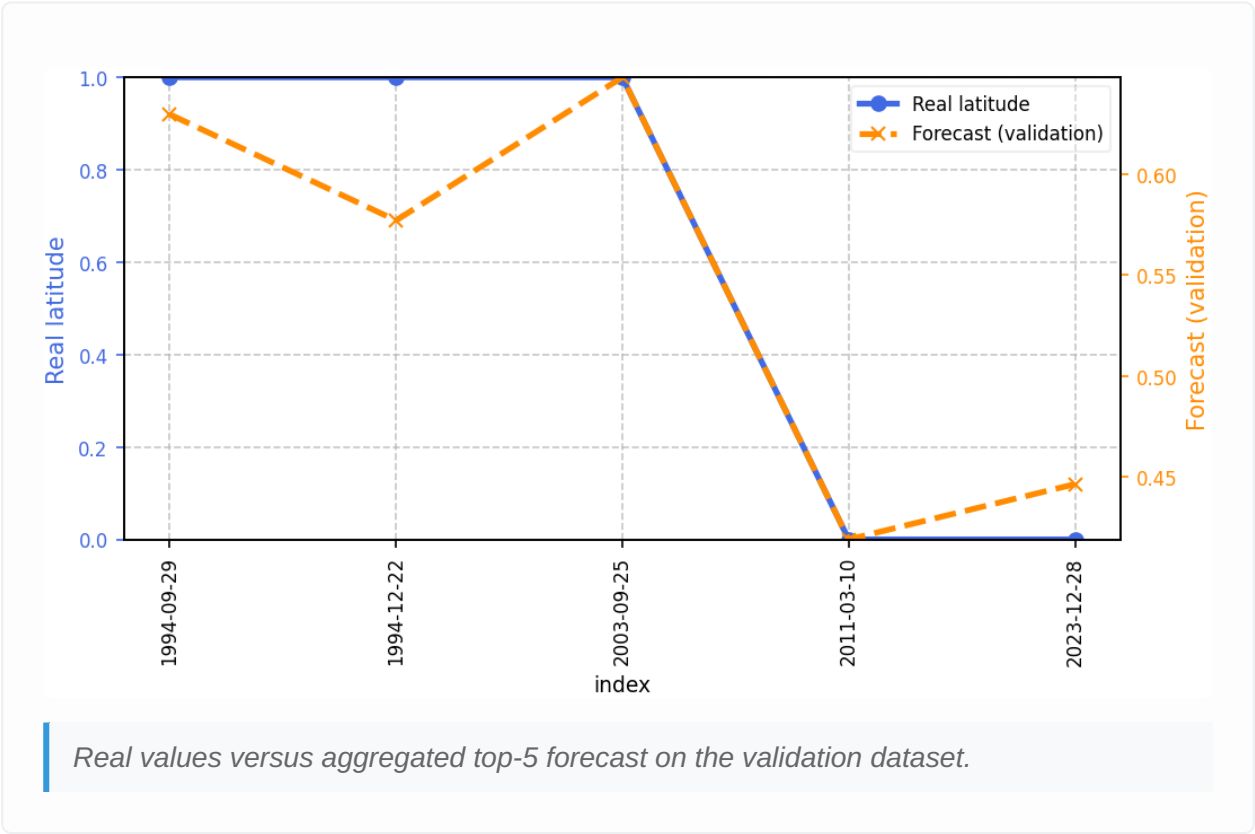


Each date represent the BEGINNING of time slot

This seismic energy forecast highlights potential earthquakes or eruptions in Japan.

Note: Peaks are based on focus cycle cycle2 due to its significantly lower loss and distinct trend compared to the weighted average. This choice was automatically made by the AI and may be reviewed manually.

3.2 Validation Quality Check



4. Features Used For Magnitude

Combined Features Analysis Report - trialsetJAPAN-M75- LAT-39_20251104-075216

Generated: 2025-11-04T19:13:57.913037 **Cycles Analyzed:** explore, cycle1, cycle2, cycle3, cycle4

EXPLORE Analysis

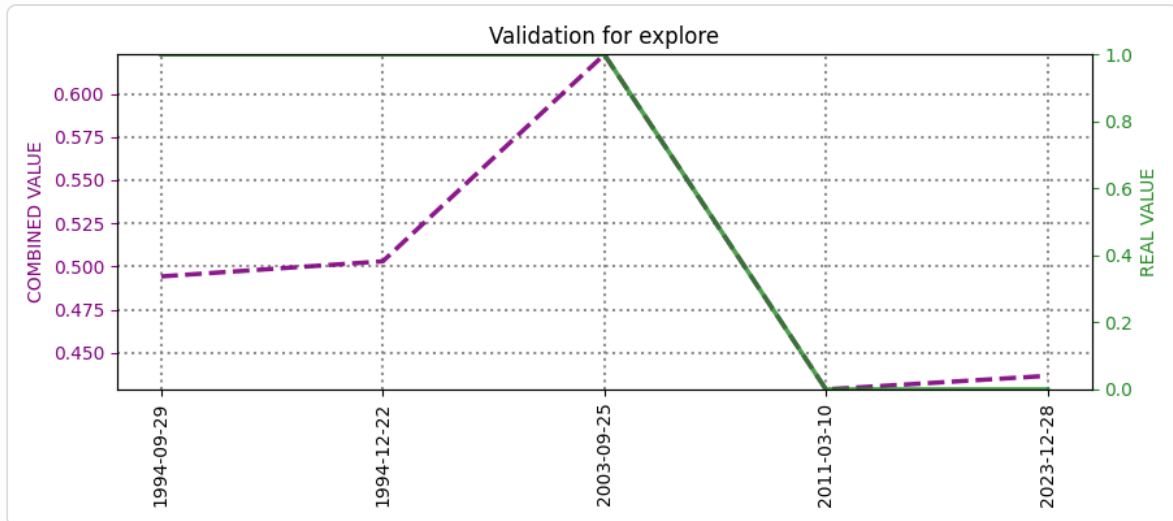
Trial Statistics

| Metric | Min | Max | Average |
|--|------|------|---------|
| Hyperopt Loss (lower is better) | 0.50 | 0.58 | 0.54 |
| Metric Score (accuracy,precision,recall) (lower is better) | 0.00 | 0.00 | 0.00 |

| Contribution Type | Trials |
|-------------------|--------|
| Direct | 5 |
| Inverted | 0 |

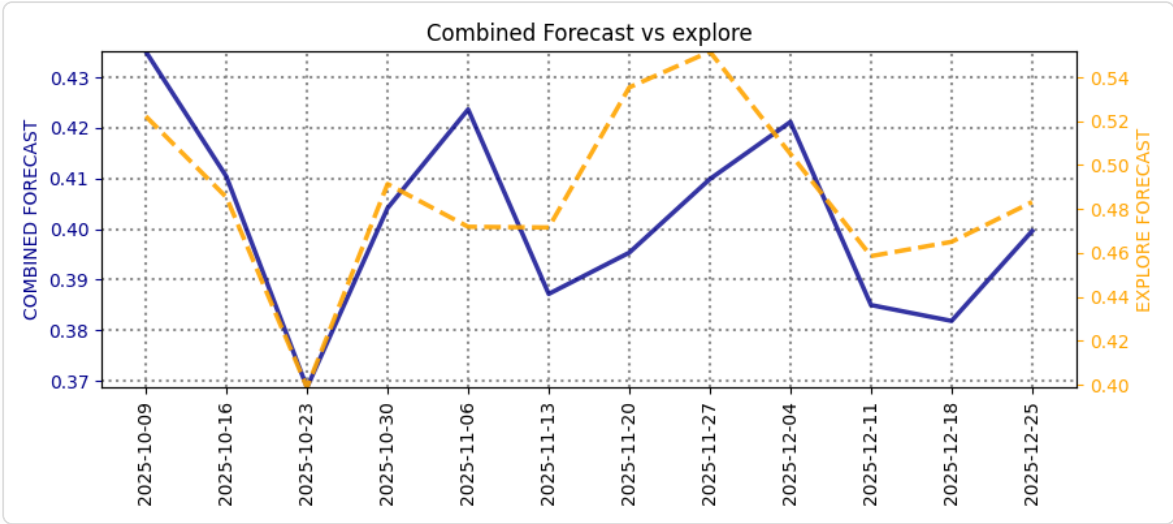
Validation Analysis

Best trial validation for this cycle contrasted with real values.



Forecast Analysis

Best trial forecast for this cycle versus the combined forecast.



Complete Dataset Overview

Analysis of ALL features present in the source files

| | Astro | Tropo | Pos |
|------------|-------|-------|------|
| Count | 25 | 0 | 0 |
| Percentage | 89.3% | 0.0% | 0.0% |

Summary Insights

Complete Dataset:

- **Astronomical data** represents 89.3% of all features (25 features)
 - **Target variables** represent 7.1% of all features (2 features)
 - **Dominant category in complete dataset:** Astro features
-

CYCLE1 Analysis

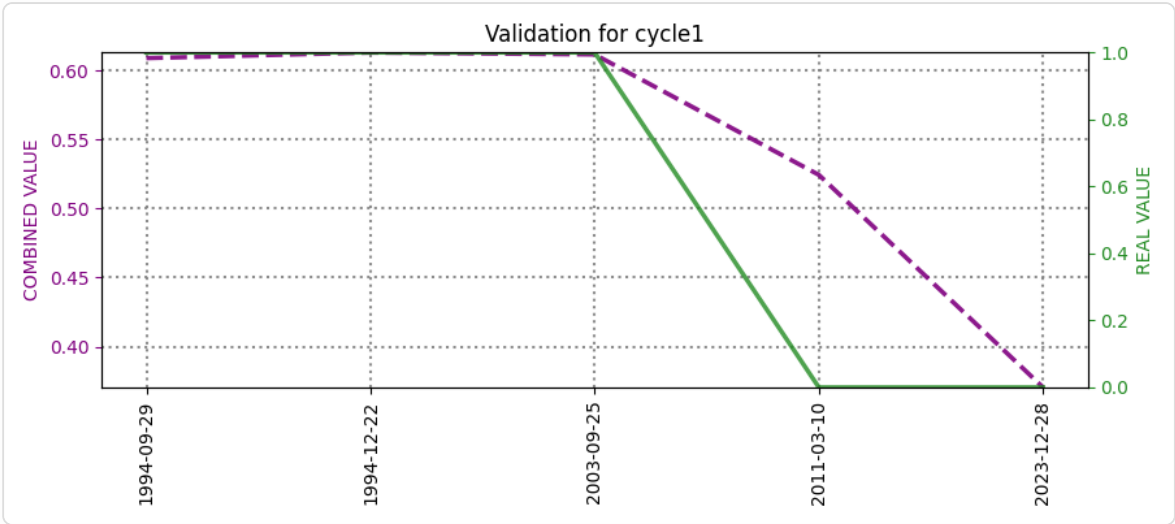
Trial Statistics

| Metric | Min | Max | Average |
|--|------|------|---------|
| Hyperopt Loss (lower is better) | 0.51 | 0.55 | 0.52 |
| Metric Score (accuracy,precision,recall) (lower is better) | 0.00 | 0.00 | 0.00 |

| Contribution Type | Trials |
|-------------------|--------|
| Direct | 5 |
| Inverted | 0 |

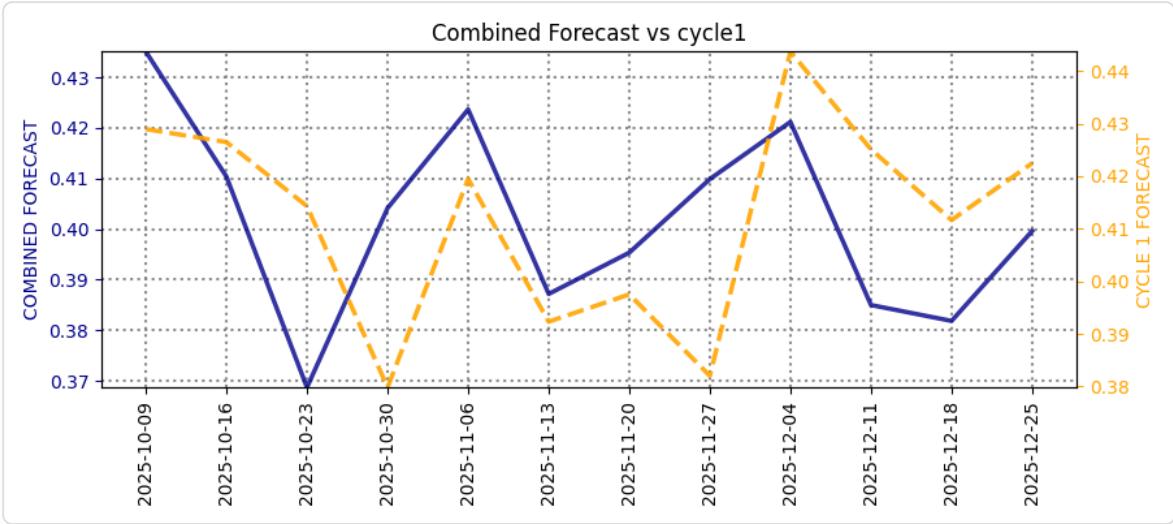
Validation Analysis

Best trial validation for this cycle contrasted with real values.



Forecast Analysis

Best trial forecast for this cycle versus the combined forecast.



Complete Dataset Overview

Analysis of ALL features present in the source files

| | Astro | Tropo | Pos |
|------------|-------|-------|------|
| Count | 13 | 0 | 0 |
| Percentage | 81.2% | 0.0% | 0.0% |

Summary Insights

Complete Dataset:

- **Astronomical data** represents 81.2% of all features (13 features)
 - **Target variables** represent 12.5% of all features (2 features)
 - **Dominant category in complete dataset:** Astro features
-

CYCLE2 Analysis

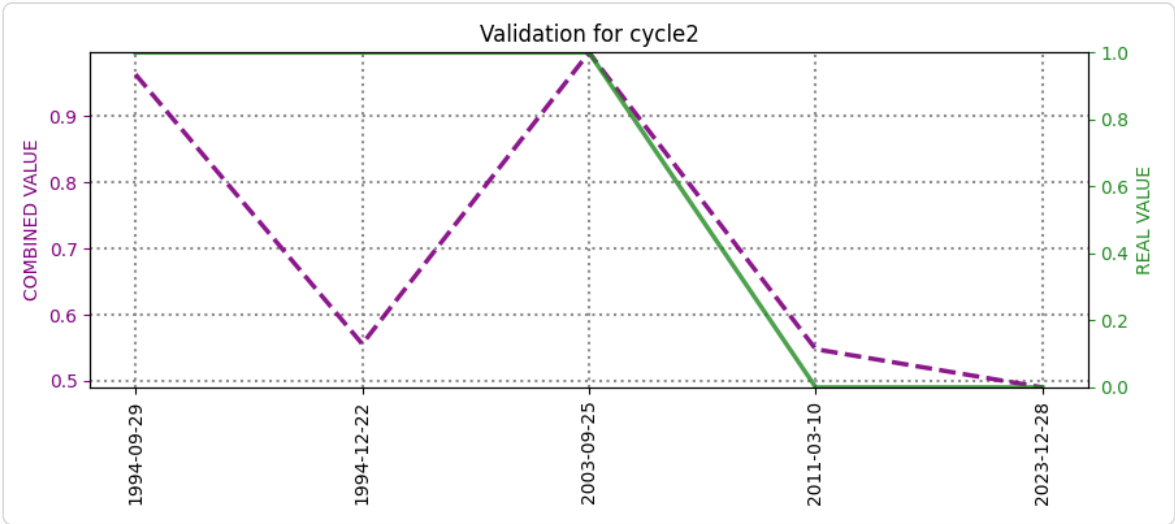
Trial Statistics

| Metric | Min | Max | Average |
|--|------|------|---------|
| Hyperopt Loss (lower is better) | 0.07 | 0.55 | 0.44 |
| Metric Score (accuracy,precision,recall) (lower is better) | 0.00 | 0.00 | 0.00 |

| Contribution Type | Trials |
|-------------------|--------|
| Direct | 5 |
| Inverted | 0 |

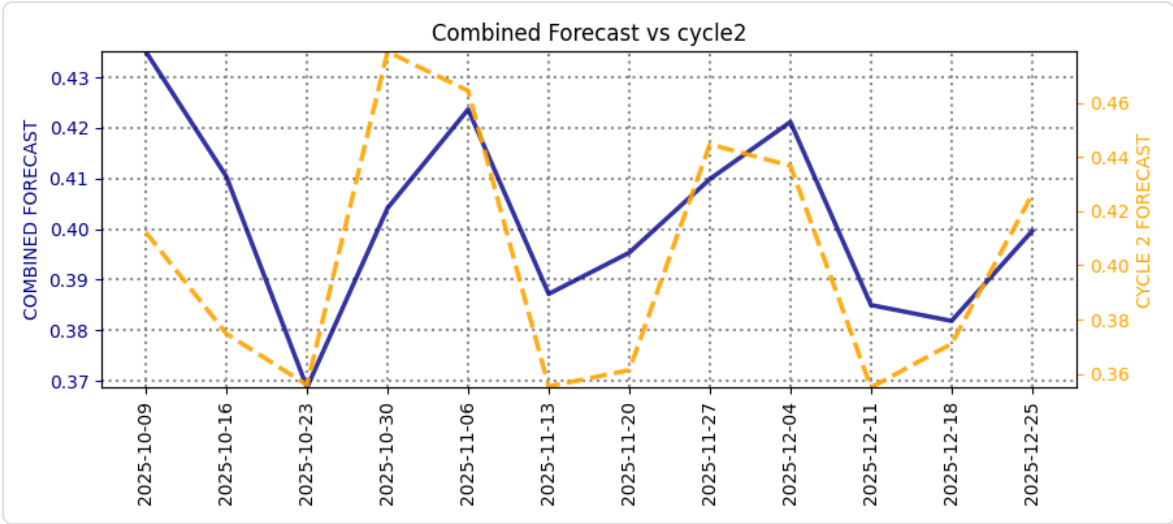
Validation Analysis

Best trial validation for this cycle contrasted with real values.



Forecast Analysis

Best trial forecast for this cycle versus the combined forecast.



Complete Dataset Overview

Analysis of ALL features present in the source files

| | Astro | Tropo | Pos |
|------------|-------|-------|------|
| Count | 22 | 0 | 0 |
| Percentage | 88.0% | 0.0% | 0.0% |

Summary Insights

Complete Dataset:

- **Astronomical data** represents 88.0% of all features (22 features)
 - **Target variables** represent 8.0% of all features (2 features)
 - **Dominant category in complete dataset:** Astro features
-

CYCLE3 Analysis

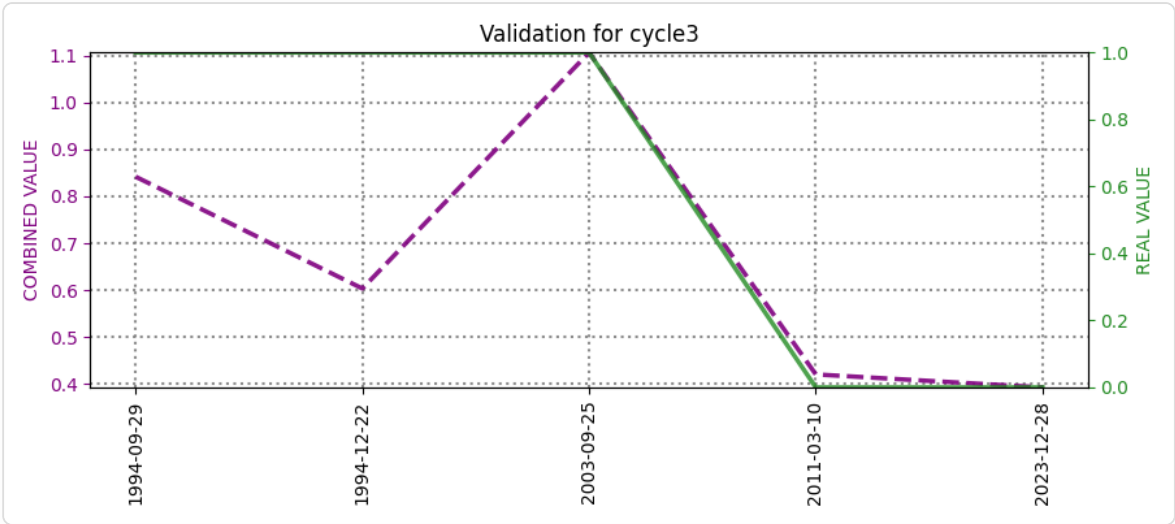
Trial Statistics

| Metric | Min | Max | Average |
|--|------|------|---------|
| Hyperopt Loss (lower is better) | 0.51 | 0.55 | 0.53 |
| Metric Score (accuracy,precision,recall) (lower is better) | 0.00 | 0.00 | 0.00 |

| Contribution Type | Trials |
|-------------------|--------|
| Direct | 5 |
| Inverted | 0 |

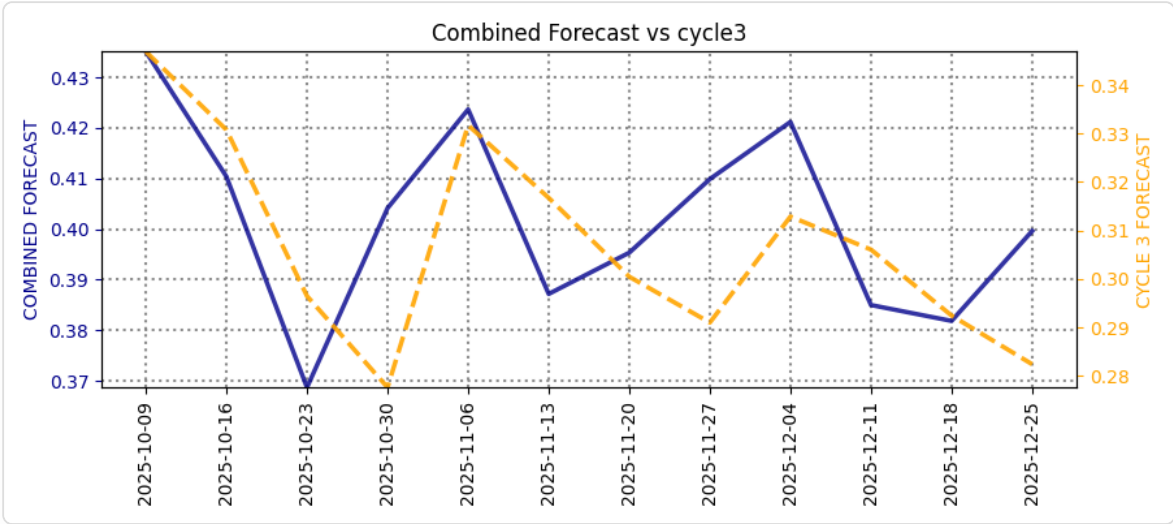
Validation Analysis

Best trial validation for this cycle contrasted with real values.



Forecast Analysis

Best trial forecast for this cycle versus the combined forecast.



Complete Dataset Overview

Analysis of ALL features present in the source files

| | Astro | Tropo | Pos |
|------------|-------|-------|------|
| Count | 17 | 0 | 0 |
| Percentage | 85.0% | 0.0% | 0.0% |

Summary Insights

Complete Dataset:

- **Astronomical data** represents 85.0% of all features (17 features)
 - **Target variables** represent 10.0% of all features (2 features)
 - **Dominant category in complete dataset:** Astro features
-

CYCLE4 Analysis

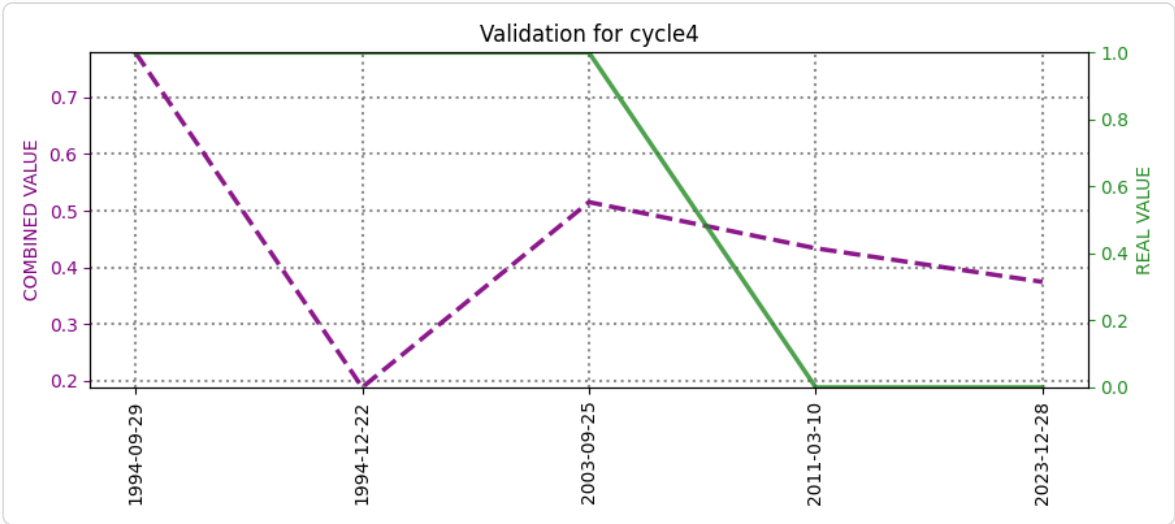
Trial Statistics

| Metric | Min | Max | Average |
|--|------|------|---------|
| Hyperopt Loss (lower is better) | 0.10 | 0.60 | 0.47 |
| Metric Score (accuracy,precision,recall) (lower is better) | 0.00 | 0.18 | 0.10 |

| Contribution Type | Trials |
|-------------------|--------|
| Direct | 5 |
| Inverted | 0 |

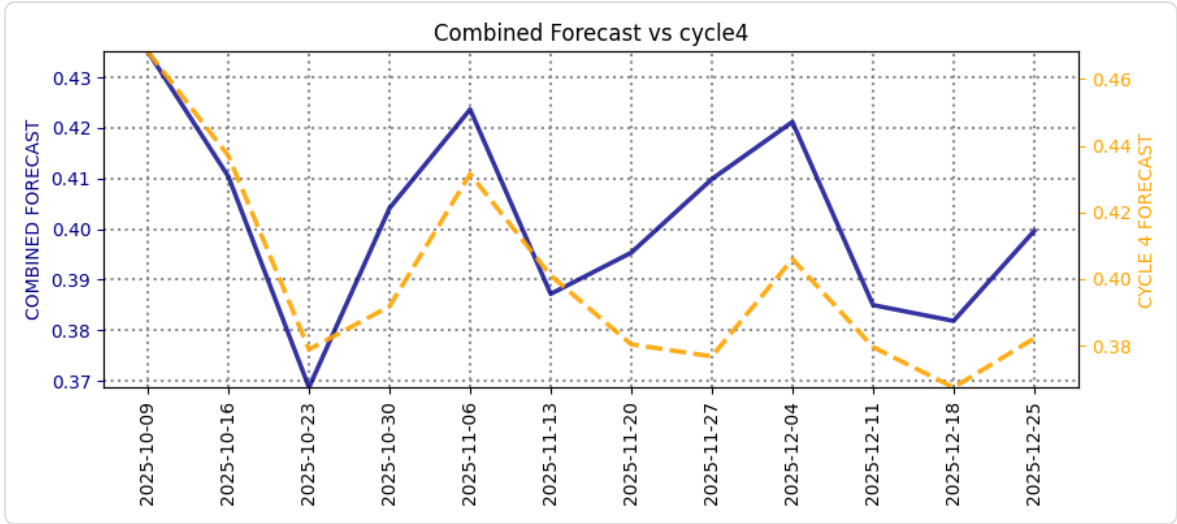
Validation Analysis

Best trial validation for this cycle contrasted with real values.



Forecast Analysis

Best trial forecast for this cycle versus the combined forecast.



Complete Dataset Overview

Analysis of ALL features present in the source files

| | Astro | Tropo | Pos |
|------------|-------|-------|------|
| Count | 20 | 0 | 0 |
| Percentage | 87.0% | 0.0% | 0.0% |

Summary Insights

Complete Dataset:

- **Astronomical data** represents 87.0% of all features (20 features)
- **Target variables** represent 8.7% of all features (2 features)
- **Dominant category in complete dataset:** Astro features

Cross-Cycle Summary

| Cycle | Best Trial | GPS Features | Tropo Features | Astro Features | Hyperopt Loss | Metric Score (accuracy,precision,recall) | Hybrid Score |
|---------------|------------|--------------|----------------|----------------|---------------|--|--------------|
| explore | 135 | N/A | N/A | 25 | 0.50 | 0.00 | 0.25 |
| cycle1 | 122 | N/A | N/A | 13 | 0.51 | 0.00 | 0.25 |
| cycle2 | 127 | N/A | N/A | 22 | 0.07 | 0.00 | 0.04 |
| cycle3 | 199 | N/A | N/A | 17 | 0.51 | 0.00 | 0.26 |
| cycle4 | 12 | N/A | N/A | 20 | 0.10 | 0.15 | 0.12 |

5. Astronomical Features Used

Astronomical Features Used per Cycle - trialsetJAPAN-M75- LAT-39_20251104-075216

Focus cycle: cycle2

| Cycle | Loss | Hybrid | Bodies | Observers | Ephemerides | Operations |
|---------------|-------------|-------------|--|-------------------------------|--|-----------------|
| explore | 0.50 | 0.25 | 10, 101955, 136199, 299, 499 | geo_35.6895;139.6917;0 | az, dec_rate, delta_rate, ra_rate, suntargetpa | max |
| cycle1 | 0.51 | 0.25 | 299, 301, 699 | geo_35.6895;139.6917;0 | delta, delta_rate, el, ra_rate | max, min |
| cycle2 | 0.07 | 0.04 | 101955, 136199, 301, 499, 599 | geo_35.6895;139.6917;0 | dec_rate, delta, delta_rate, lunar_presence, velocitypa | max, min |
| cycle3 | 0.51 | 0.26 | 101955, 136199, 499, 502 | geo_35.6895;139.6917;0 | az, dec_rate, delta, velocitypa | max |
| cycle4 | 0.10 | 0.12 | 10, 136199, 301, 499, 599 | geo_35.6895;139.6917;0 | delta, delta_rate, el, velocitypa | 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. Summary and Conclusion

Summary of Findings

Forecasted latitude relative to threshold 39.0. Below threshold on: 2025-10-09, 2025-10-16, 2025-10-23, 2025-10-30, 2025-11-06, 2025-11-13, 2025-11-20, 2025-11-27, 2025-12-04, 2025-12-11, 2025-12-18, 2025-12-25 (UTC).

Conclusions

Predicted values are below on 2025-10-09, 2025-10-16, 2025-10-23, 2025-10-30, 2025-11-06, 2025-11-13, 2025-11-20, 2025-11-27, 2025-12-04, 2025-12-11, 2025-12-18, 2025-12-25 relative to the threshold.

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.

7. 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**

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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.