

# Seismic Energy Forecast for Japan

2025 September 02-19-27 - potential earthquake or  
eruption in Japan

Version: 0

First Revision: 2025-09-09 11:58:18

Last Revision: Rev. 0 - 2025-09-09 11:58

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# 1. Revision History

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Vers ion	Date	Aut hor	Description
0	2025-09-09 11:58:18	MF	Seismic Energy Forecast for Potential Earthquake or Eruption in Japan
	first emission		

## 2. Explanation of Terms and Concepts

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### 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 is to demonstrate the validity of using GPS + TROPO data several weeks before a seismic event.

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

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

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### 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

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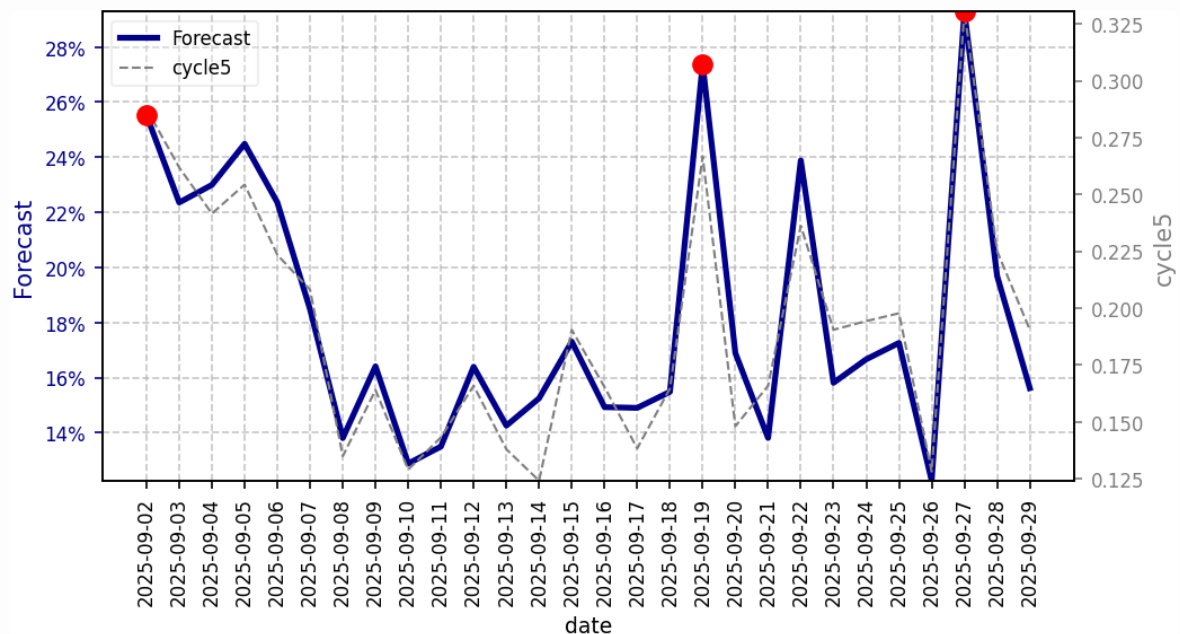
### About Time Slot

*Note: each date point represents **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 M 7.0+ Seismic Energy Forecast (possible earthquake or eruption), res:1 day, UTC (focus: cycle5)



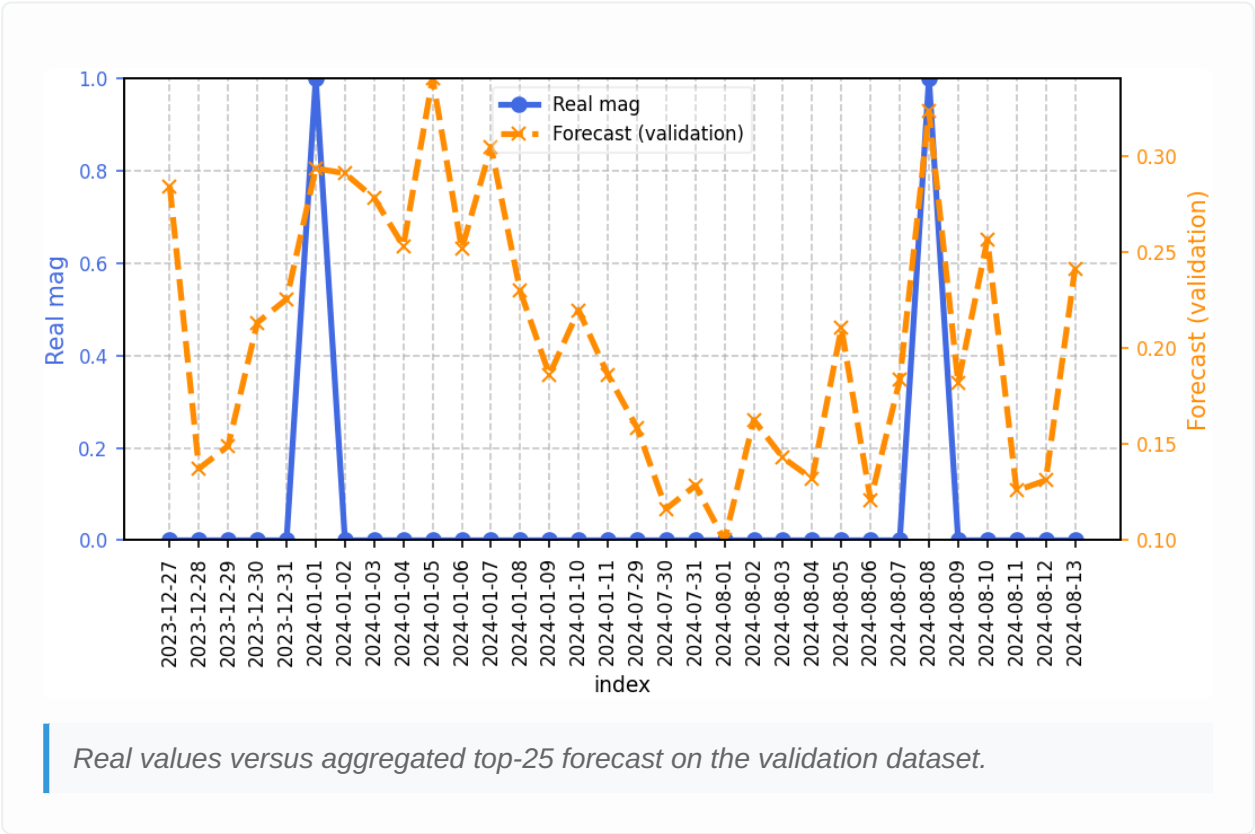
#### ⚠ Higher Risk Detected for Following Dates:

- 1. from 2025-09-27 to 2025-09-28 (UTC) - Risk Value: 0.293
- 2. from 2025-09-19 to 2025-09-20 (UTC) - Risk Value: 0.274
- 3. from 2025-09-02 to 2025-09-03 (UTC) - Risk Value: 0.255

Each date represent the *BEGINNING* of time slot

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

### 3.2 Validation Quality Check



## 4. Features Used For Magnitude

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### Combined Features Analysis Report - trialset20250907-105358

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**Generated:** 2025-09-09T12:14:34.339496 **Cycles Analyzed:** explore, cycle1, cycle2, cycle3, cycle4, cycle5, cycle6

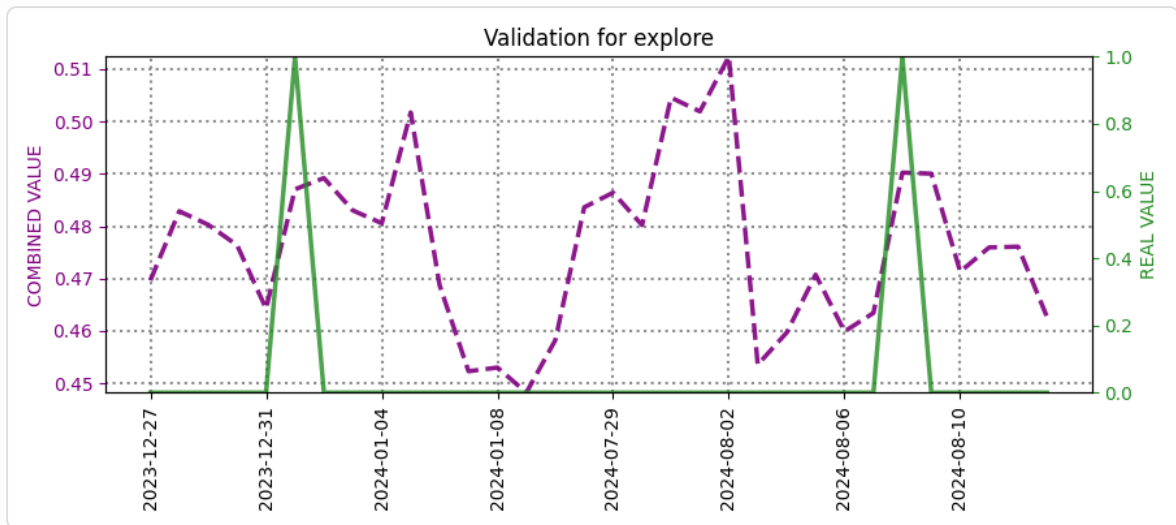
## EXPLORE Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.43	1.08	0.77
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.47	0.59	0.50

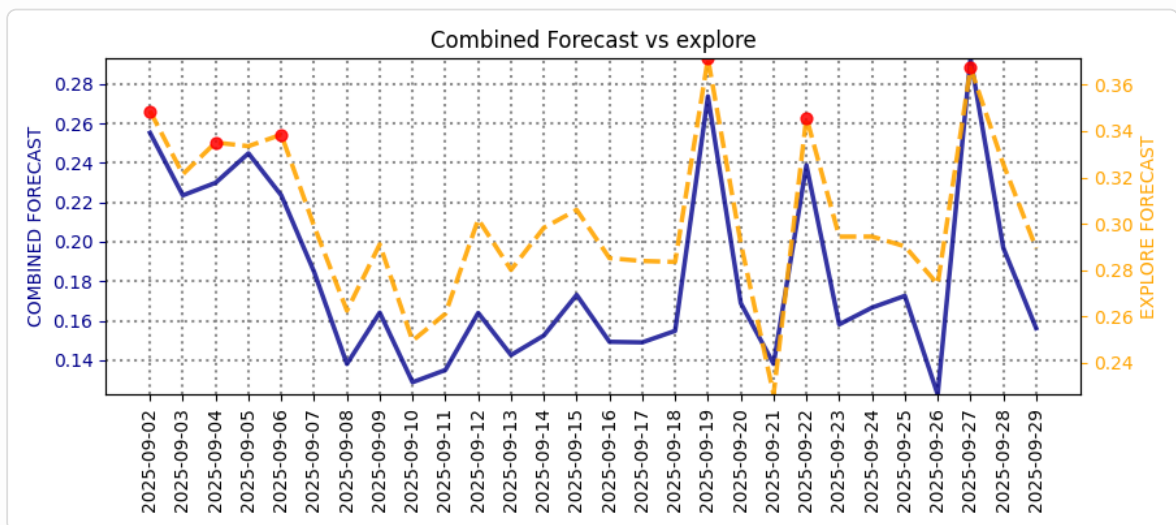
### Validation Analysis

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	41	32
Percentage	22.4%	41.8%	32.7%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 22.4% of all features (22 features)
  - **Tropospheric data** represents 41.8% of all features (41 features)
  - **Position/GPS data** represents 32.7% of all features (32 features)
  - **Target variables** represent 2.0% of all features (2 features)
  - **Dominant category in complete dataset:** Tropo features
-

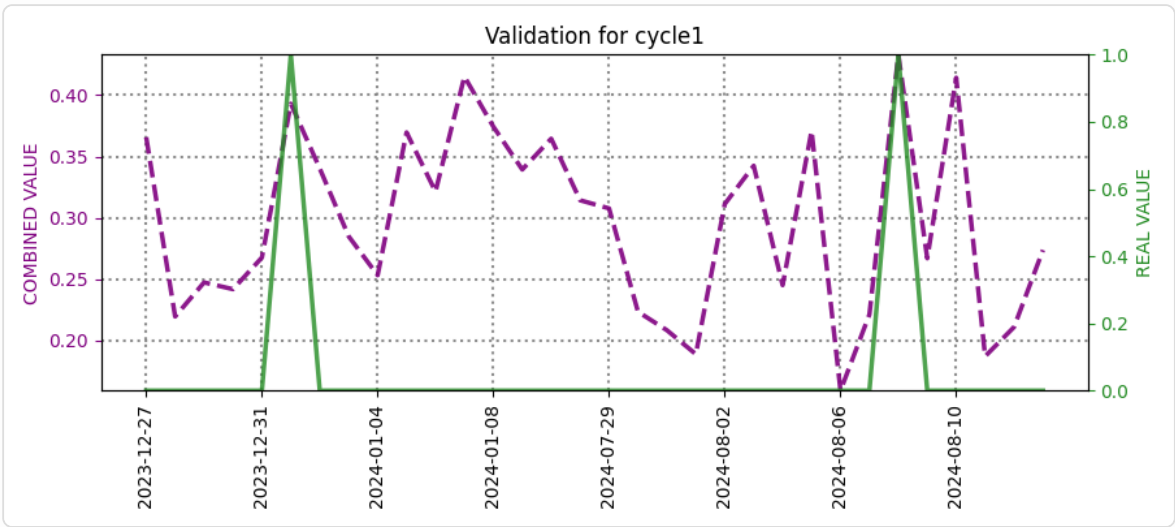
## CYCLE1 Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.41	1.21	0.61
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.49	0.78	0.58

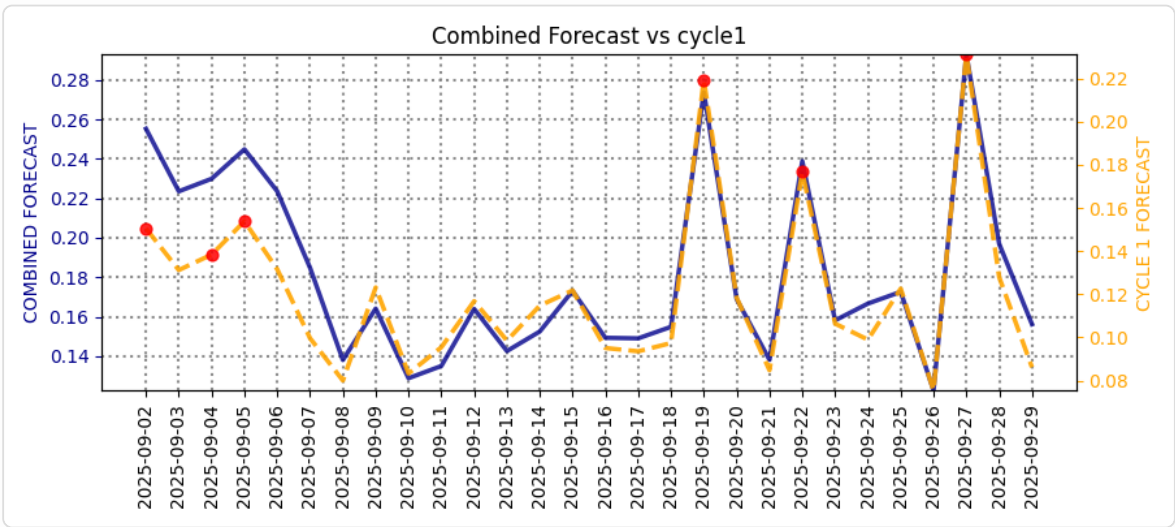
### Validation Analysis

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	10	39	34
Percentage	11.6%	45.3%	39.5%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 11.6% of all features (10 features)
  - **Tropospheric data** represents 45.3% of all features (39 features)
  - **Position/GPS data** represents 39.5% of all features (34 features)
  - **Target variables** represent 2.3% of all features (2 features)
  - **Dominant category in complete dataset:** Tropo features
-

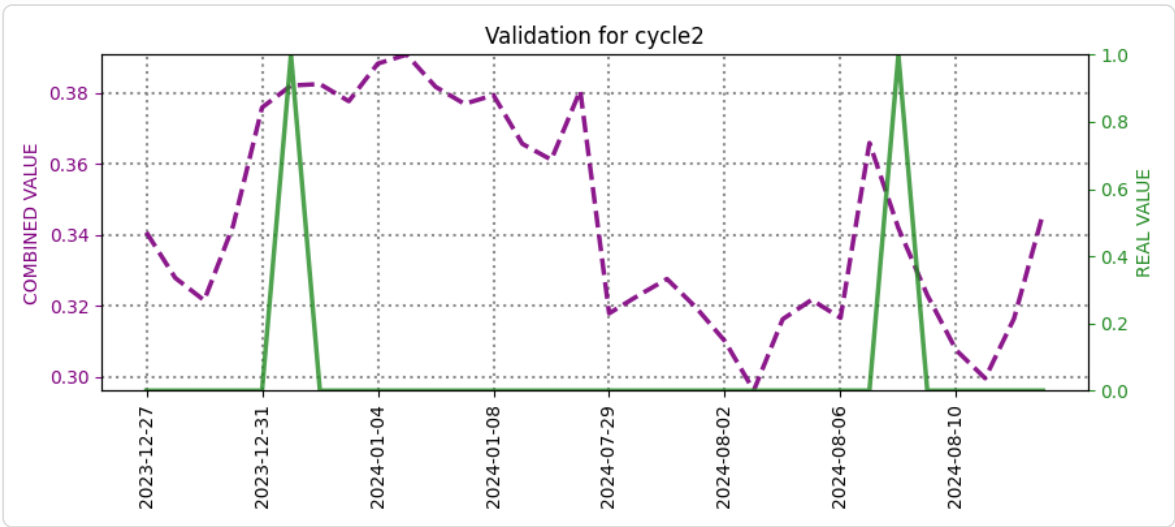
## CYCLE2 Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.35	1.37	0.67
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.48	0.64	0.52

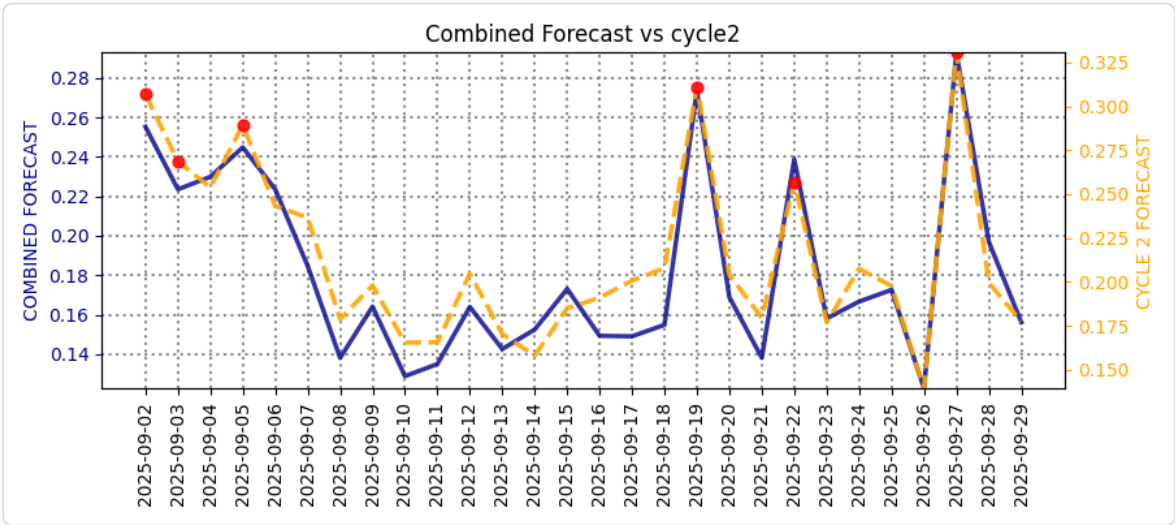
### Validation Analysis

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	47	37
Percentage	18.7%	43.9%	34.6%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 18.7% of all features (20 features)
  - **Tropospheric data** represents 43.9% of all features (47 features)
  - **Position/GPS data** represents 34.6% of all features (37 features)
  - **Target variables** represent 1.9% of all features (2 features)
  - **Dominant category in complete dataset:** Tropo features
-

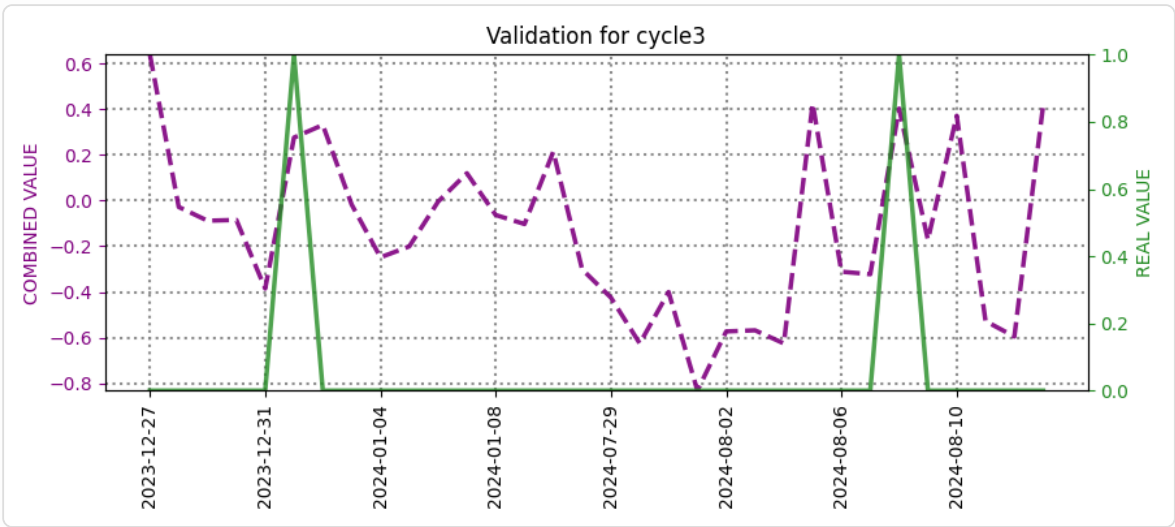
## CYCLE3 Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.47	0.86	0.63
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.49	0.80	0.55

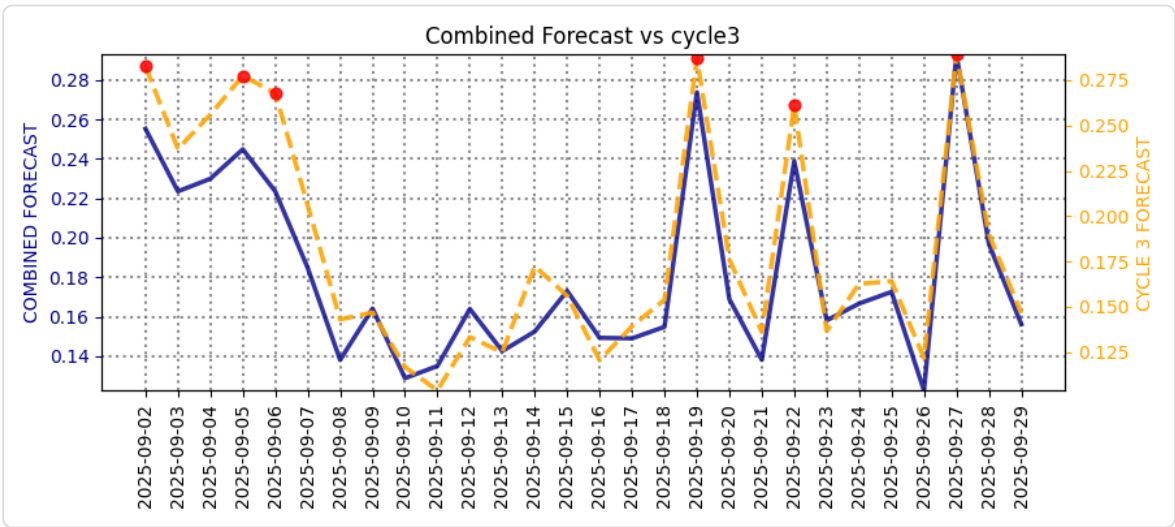
### Validation Analysis

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	45	34
Percentage	13.7%	47.4%	35.8%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 13.7% of all features (13 features)
  - **Tropospheric data** represents 47.4% of all features (45 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
-

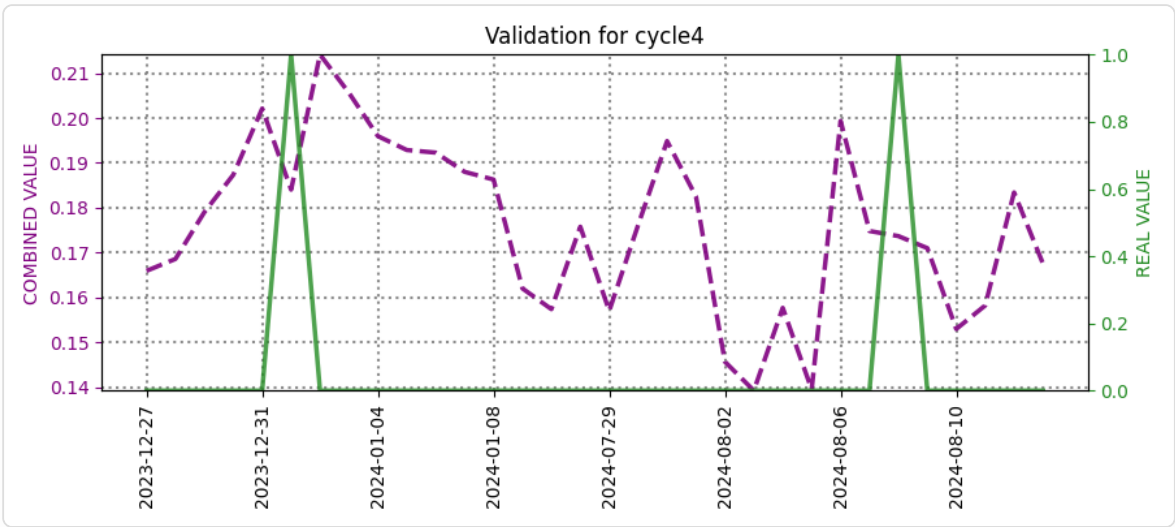
## CYCLE4 Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.42	1.16	0.68
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.47	0.63	0.53

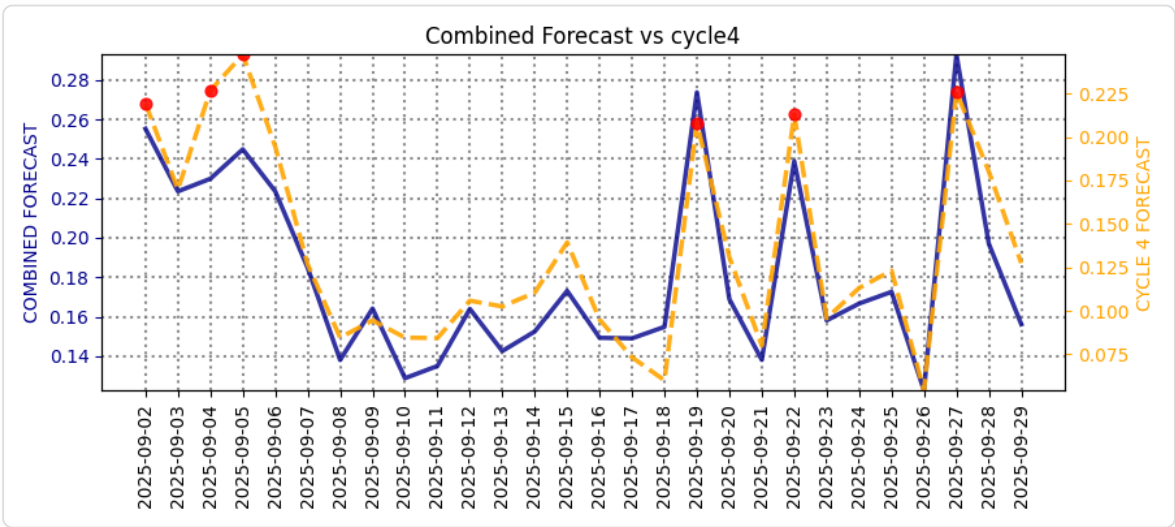
### Validation Analysis

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	40	41
Percentage	22.9%	36.7%	37.6%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 22.9% of all features (25 features)
  - **Tropospheric data** represents 36.7% of all features (40 features)
  - **Position/GPS data** represents 37.6% of all features (41 features)
  - **Target variables** represent 1.8% of all features (2 features)
  - **Dominant category in complete dataset:** Pos features
-

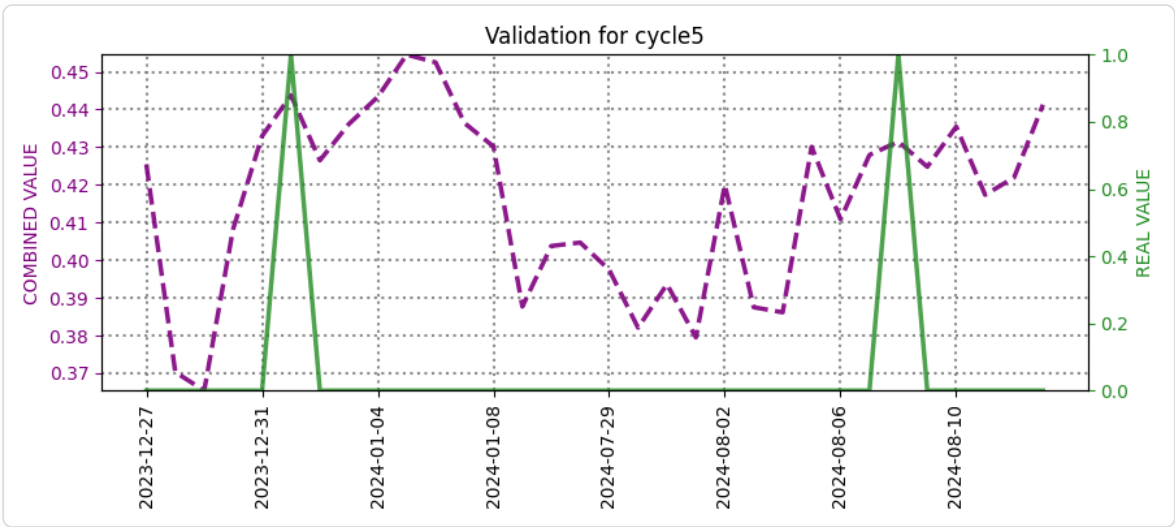
## CYCLE5 Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.30	0.86	0.61
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.46	0.63	0.52

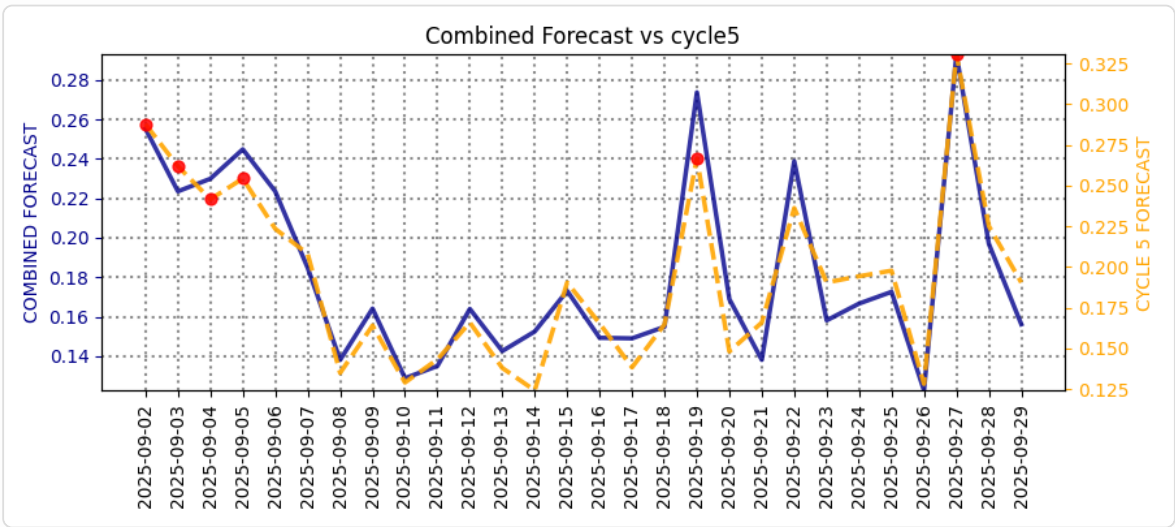
### Validation Analysis

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	21	41	34
Percentage	21.2%	41.4%	34.3%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 21.2% of all features (21 features)
  - **Tropospheric data** represents 41.4% of all features (41 features)
  - **Position/GPS data** represents 34.3% of all features (34 features)
  - **Target variables** represent 2.0% of all features (2 features)
  - **Dominant category in complete dataset:** Tropo features
-

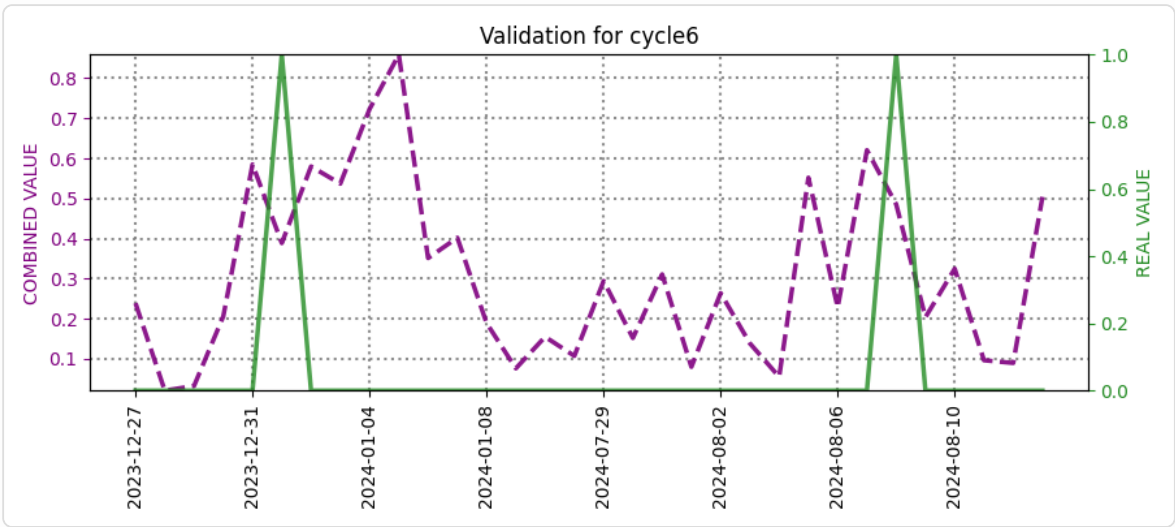
## CYCLE6 Analysis

### Trial Statistics

Metric	Min	Max	Average
Hyperopt Loss (lower is better)	0.35	1.08	0.58
Metric Score (f1:0.5,mae:0.5) (lower is better)	0.49	0.66	0.54

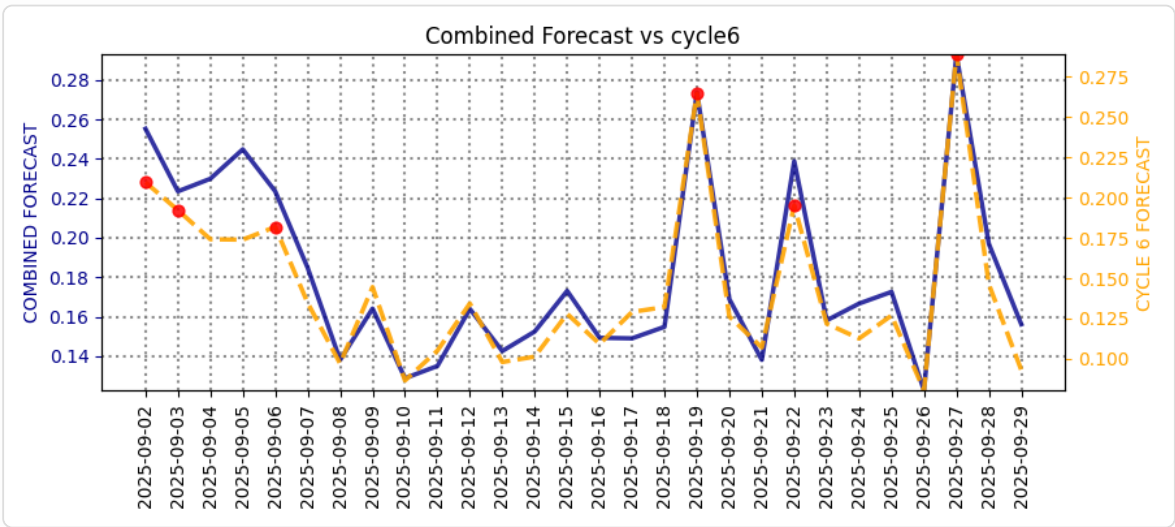
### Validation Analysis

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	8	51	34
Percentage	8.3%	53.1%	35.4%

## Summary Insights

Complete Dataset:

- **Astronomical data** represents 8.3% of all features (8 features)
- **Tropospheric data** represents 53.1% of all features (51 features)
- **Position/GPS data** represents 35.4% of all features (34 features)
- **Target variables** represent 2.1% of all features (2 features)
- **Dominant category in complete dataset:** Tropo features

Cross-Cycle Summary

Cycle	Best Trial	GPS Features	Tropo Features	Astro Features	Hyperopt Loss	Metric Score (f1:0.5,mae:0.5)	Hybrid Score
explore	28	32	41	22	0.43	0.57	0.50
cycle1	27	34	39	10	0.42	0.50	0.46
cycle2	46	37	47	20	0.35	0.49	0.42
cycle3	58	34	45	13	0.47	0.55	0.51
cycle4	67	41	40	25	0.42	0.53	0.48
cycle5	32	34	41	21	0.30	0.46	0.38
cycle6	55	34	51	8	0.35	0.50	0.43

## 5. Astronomical Features Used

### Astronomical Features Used per Cycle - trialset20250907-105358

**Focus cycle:** cycle5

Cycle	Loss	Hybrid	Bodies	Observers	Ephemerides	Operations
explore	0.43	0.50	136199, 199, 2015tg387, 599, 699	geo_35.6895;139.6917;0	delta, delta_rate, el, lunar_presence, velocitypa	max
cycle1	0.42	0.46	199, 499, 502	geo_35.6895;139.6917;0	az, delta, ra_rate	max, min
cycle2	0.35	0.42	10, 101955, 299, 301, 599	geo_35.6895;139.6917;0	az, delta, ra_rate, suntargetpa	max, min
cycle3	0.47	0.51	136199, 299, 301, 499	geo_35.6895;139.6917;0	az, suntargetpa, velocitypa	max, min
cycle4	0.42	0.48	199, 499, 502, 699	geo_35.6895;139.6917;0	az, dec_rate, el, ra_rate, suntargetpa, velocitypa	max, min
cycle5	0.30	0.38	10, 199, 2012vp113, 599, 699	geo_35.6895;139.6917;0	dec_rate, el, lunar_presence, ra_rate, velocitypa	max, min
cycle6	0.35	0.43	2012vp113, 299, 301	geo_35.6895;139.6917;0	az, delta, lunar_presence	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

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### Summary of Findings

Elevated seismic energy suggests potential earthquakes or eruptions in Japan.  
Peak dates: 2025-09-02, 2025-09-19, 2025-09-27 (UTC).

### Conclusions

Increased seismic energy indicates potential earthquakes or eruptions for  
2025-09-02, 2025-09-19, 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.



## 7. Attribution and Disclaimers

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### 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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### 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.