

“A Risk Assessment of Yuri Bridge”

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Research Objectives

Riskassessment

Risk assessment is the process of quantitatively determining potential risks for a bridge prior to construction using historical data.

ReserachObjecyive

- In February, there was an accident in which a bolt fell from the Yuri Bridge.
- I conduct risk assessments using meteorological data to determine what measures are needed to prevent such accidents.



Figure 1 Yuri Bridge

https://yurihonjo-kanko.jp/taxi_%E7%94%B1%EA9%E6%A9%8B/

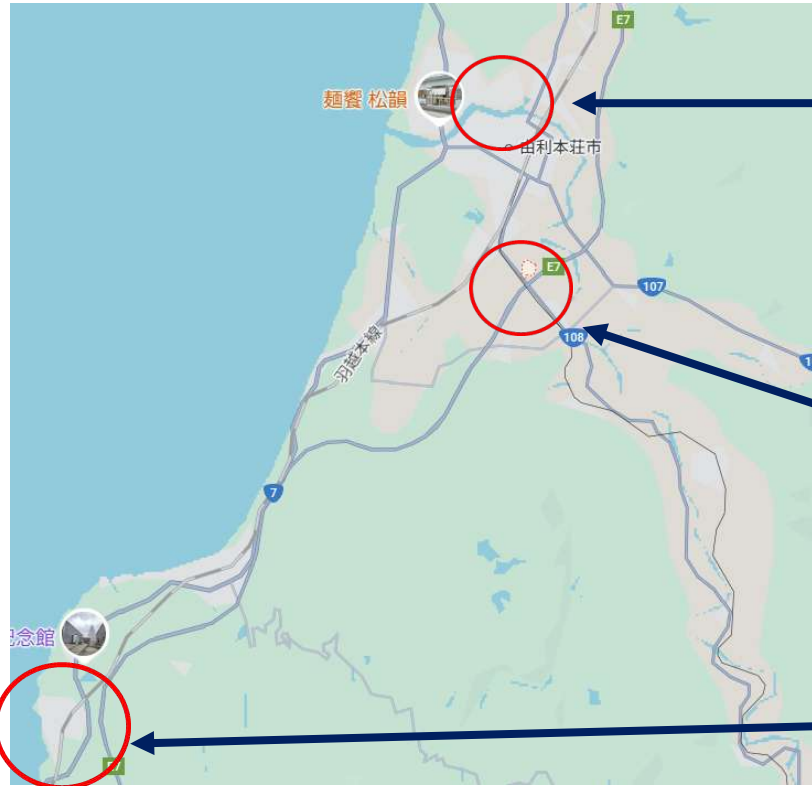
Research methods

- Conduct a risk assessment for Yuri Bridge from a meteorological perspective.
- To conduct the risk assessment, I examined 10minute interval data (January 2024 to~February 2025) on mean wind speed, wind direction, air temperature, and precipitation, and evaluated the year-round conditions of Yuri Bridge.

Used Data : Information from the Japan Meteorological Agency

https://www.data.jma.go.jp/stats/etrn/index.php?prec_no=32&block_no=0199&year=2025&month=01&day=01&view=

Observation points



Yuri
Bridge

Precipitation
and
Temperature
(Yurihonjo
City, Umeta Yozeki
Minami)

Average wind
speed
and wind
direction
(Nikaho City)



https://www.tohokukanko.jp/attractions/detail_1007608.html

- Precipitation and temperature data were obtained from the Japan Meteorological Agency station located approximately 5 kilometers from the Yuri Bridge

- Wind direction and average wind speed data were obtained from the Japan Meteorological Agency station located in Nikaho City, which is near the coastal area (a location about 24 kilometers from Yuri Bridge)。

How to use data

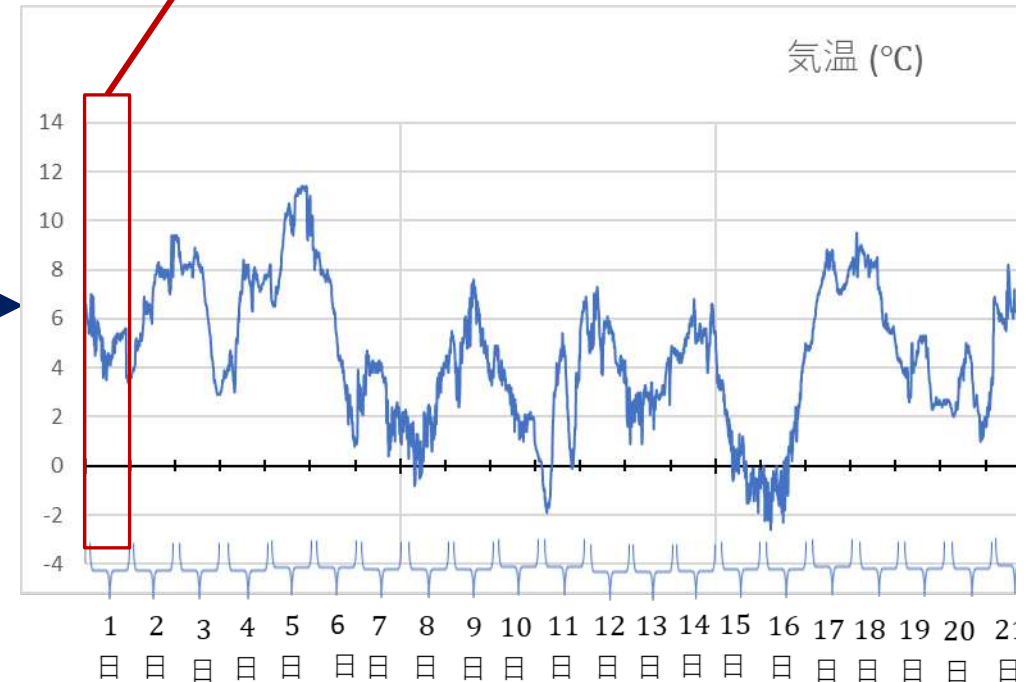
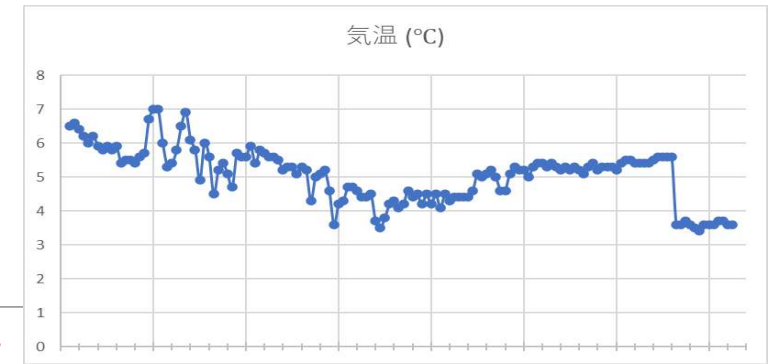
にかほ（秋田県） 2024年1月1日（10分ごとの値）

時分	降水量 (mm)	気温 (℃)	相対湿度 (%)	風向・風速				日照 時間 (min)
				平均		最大瞬間		
				風速(m/s)	風向	風速(m/s)	風向	
00:10	0.0	6.5	81	4.5	北北東	9.2	北	
00:20	0.0	6.6	80	4.7	北	10.4	北北東	
00:30	0.0	6.4	78	4.8	北	10.2	北	
00:40	0.0	6.2	80	5.0	北	10.7	北北東	
00:50	0.0	6.0	82	4.7	北	11.0	北	
01:00	0.0	6.2	80	4.8	北	10.7	北北西	
01:10	0.0	5.9	82	4.8	北	12.2	北北西	
01:20	0.0	5.8	83	4.7	北	10.2	北北東	
01:30	0.0	5.9	82	5.1	北	10.8	北北東	
01:40	0.0	5.8	83	4.4	北	8.6	北北東	
01:50	0.0	5.9	86	5.5	北	11.9	北北西	
02:00	0.5	5.4	90	5.9	北	13.3	北北西	
02:10	0.0	5.5	87	6.0	北	11.0	北北東	
02:20	0.0	5.5	86	5.1	北	10.4	北北東	

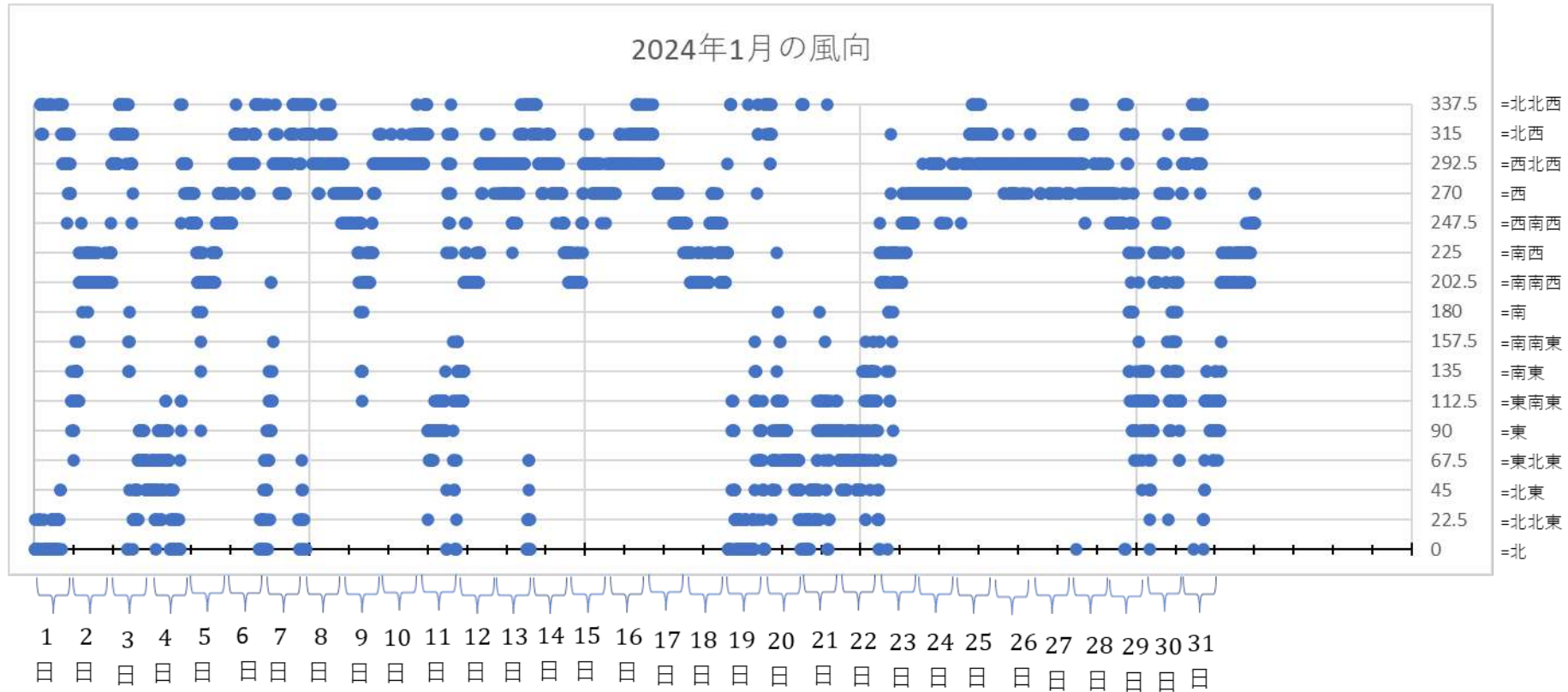
https://www.data.jma.go.jp/stats/etrn/index.php?prec_no=32&block_no=0199&year=2025&month=01&day=01&view=

Using 10-minute interval data, graphs of temperature, precipitation, average wind speed, and wind direction were created. And Each graph was then compared.

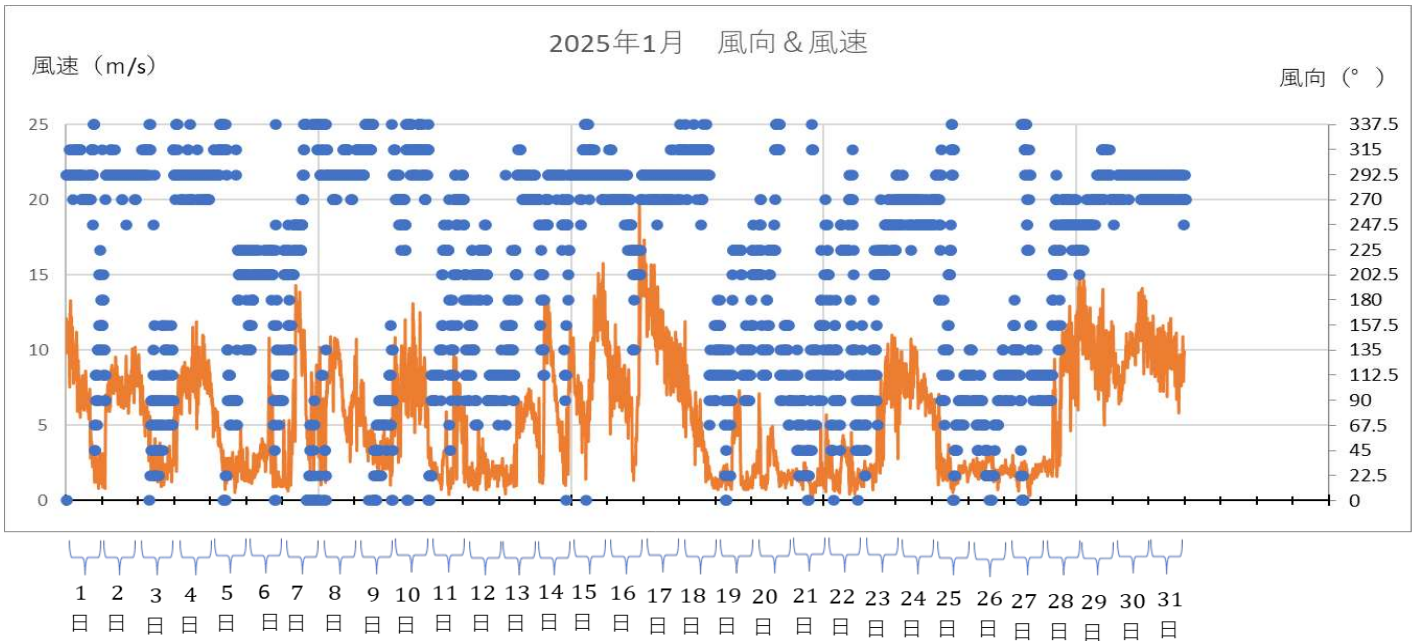
magnification



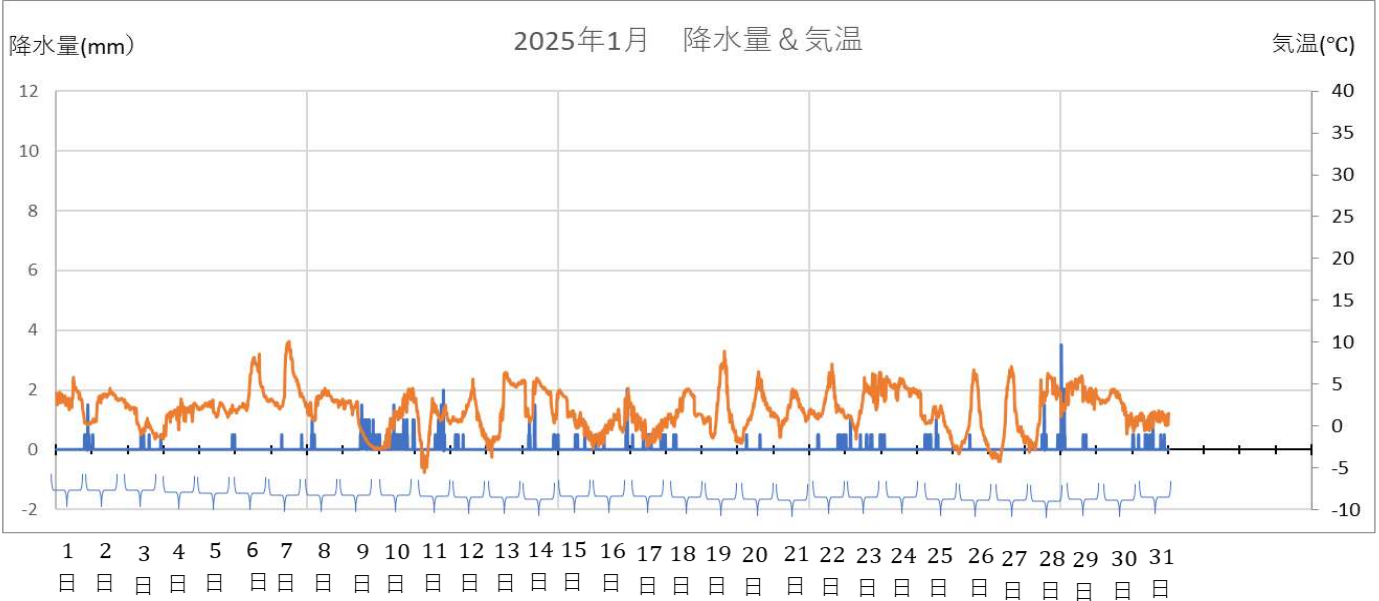
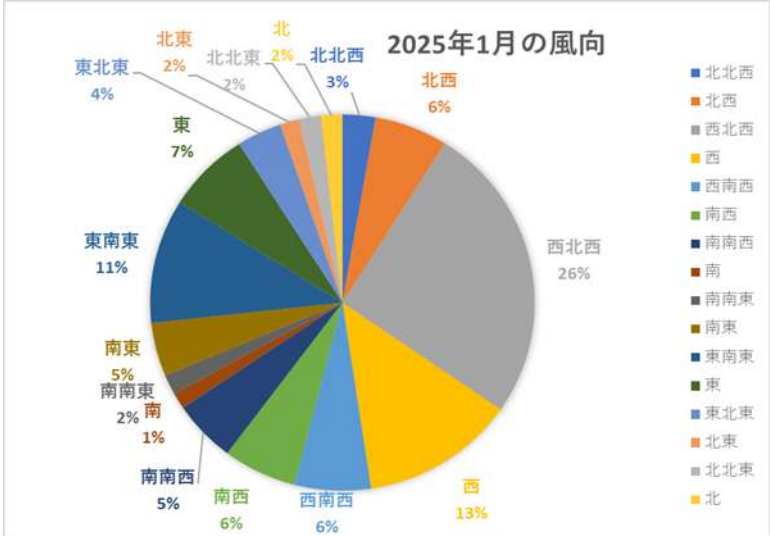
About the graph of wind direction

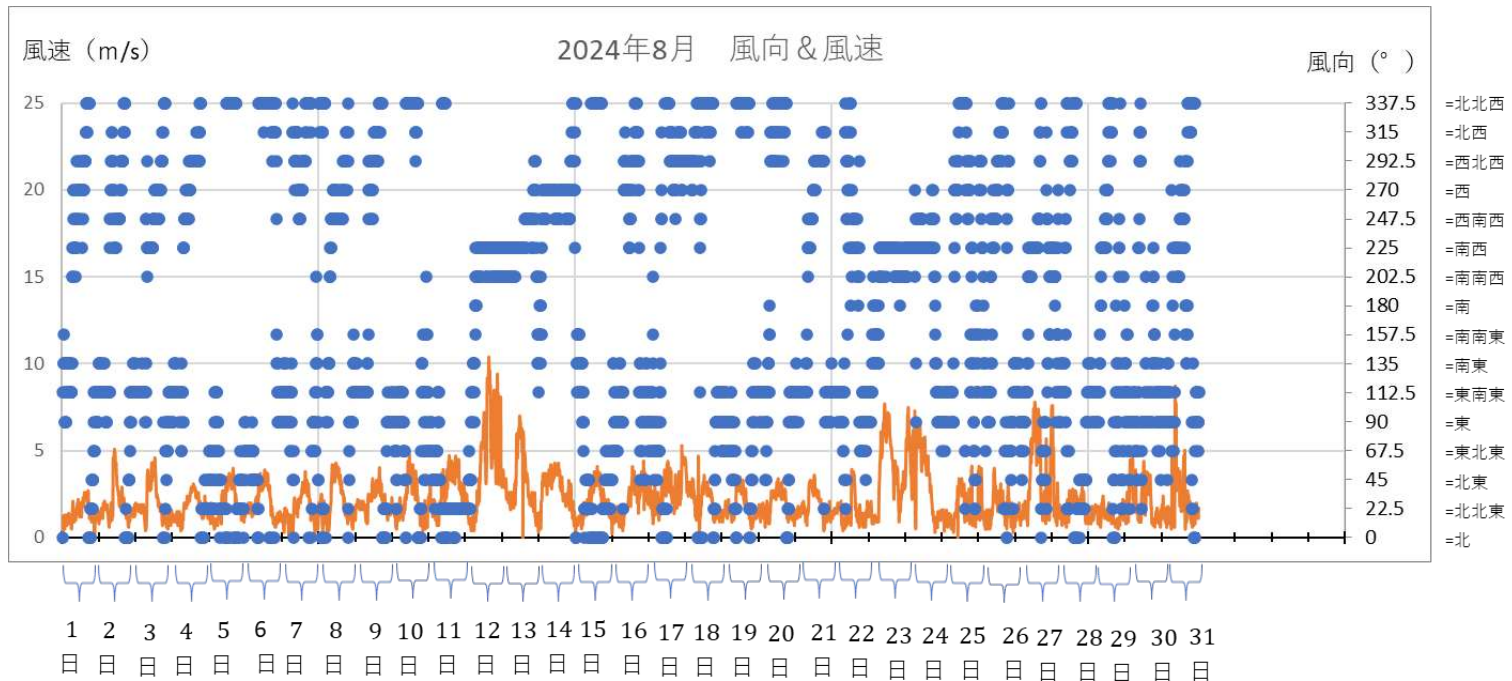


Convert wind directions (north, east, south, west) into angles in degrees, then make a scatter plot to show their relationship.

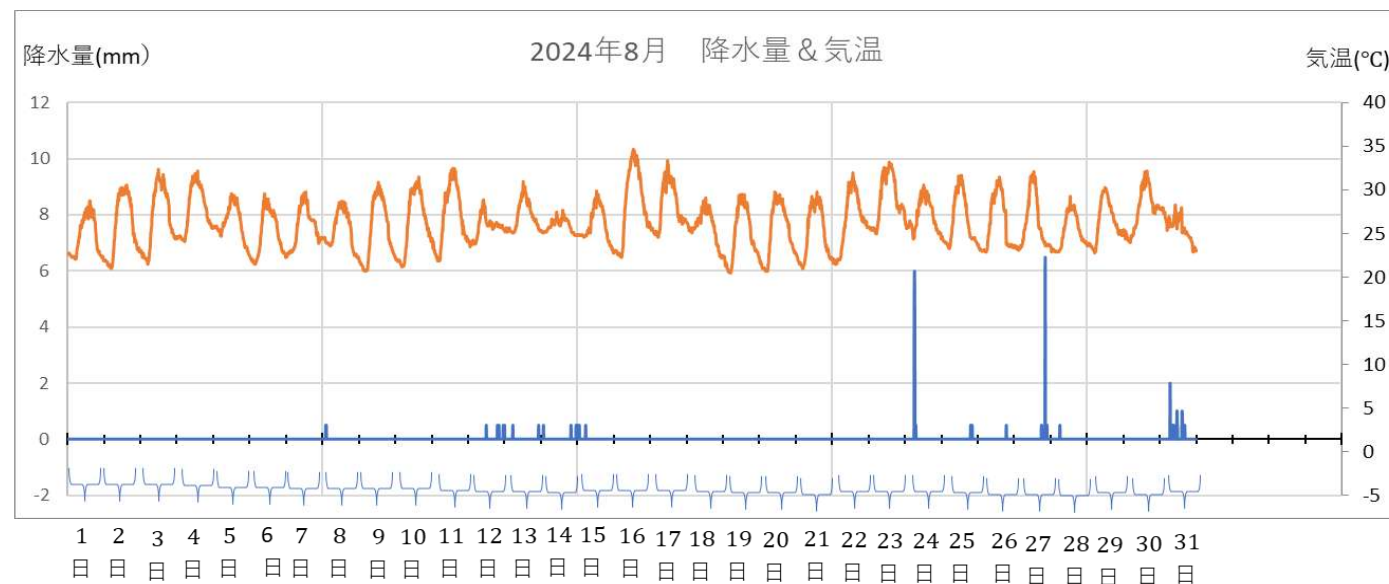
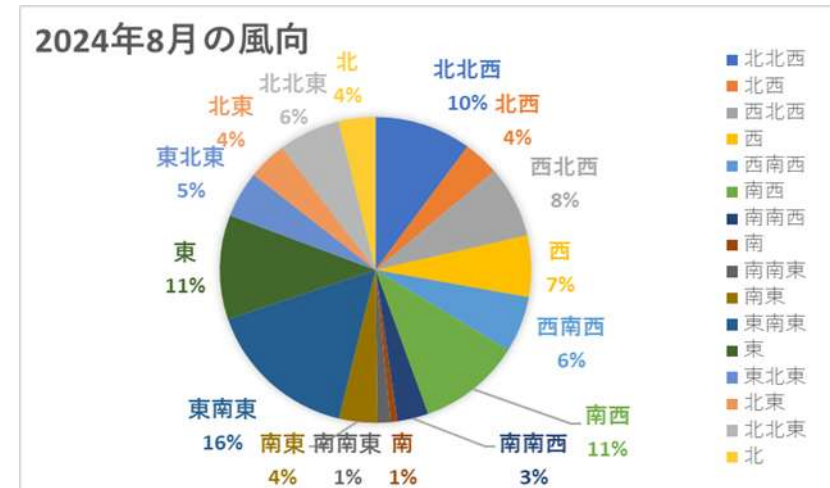


Results from January 2025





Results from August 2025



The findings from the survey

- Throughout the year, winds from the Sea of Japan side are predominant, and as wind speed increases, west and west-northwest winds tend to occur.
- In August, September, and October, wind speeds are relatively low, and winds from the inland side—such as east and east-southeast—are more common.
- When wind speeds are low, wind direction tends to be more variable.

Next Steps

- To create wind roses using the data collected in this study.
- Graph illustrating maximum instantaneous wind speed based on observed data.
- The effects of north-northwest winds on vehicles at the protective barrier height of Yuri Bridge.

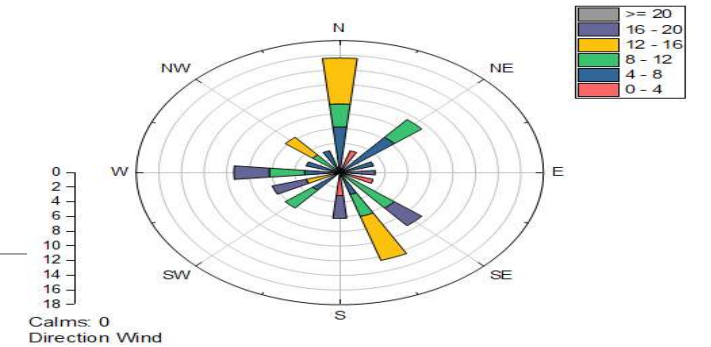


Figure 1 Wind Rose Examples
<https://www.originlab.com/doc/ja/Tutorials/Windrose-Graph>



Figure 2 Yuri Bridge's protective barrier
https://yurihonjo-kanko.jp/taxi_%E7%94%B1%E5%88%A9%E6%A9%8B/

Thank you for
listening
