

Summit Wind Trends and Recorded Instrumentation Values 5.0

Maya Hartley

Analysis of trends from 1941-2023

Where the focus need to be when analyzing winds:

1. Constant changes in summit wind field:

a. As structures are demolished/ constructed, the dynamics atop the summit become altered.

2. Anemometer location changes:

a. The difference between the 1981-pres data and the 1941-1980 data is highly dependent on the height of the anemometers/ their possible obstructions

3. Homogenization difficulties

- a. There is no control to compare the different data sets to
- Further dividing data sets so there are separate sets for each change in summit infrastructure is near impossible, as there is a lack of data on construction records
- 4. Standards of directional wind measurement were different prior to 1968

Changes on the Summit



Average number of big wind events per year from 1933 - end of 1940 was **57.6**

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Big Wind Events have here been determined as events in which an hour's sustained wind speed remained over 100 mph



1935

Changes on the Summit



From 1941-1980, the average number of big wind events was **6.9** per year.

Approximately 50% of winds
were out of the west, and
22% out of the northwest



Other Discrepancies: Anemometer Location Changes

Red Star: 1941-1980 **Yellow Star**: 1980-pres

1941-1980: **~6292'**

1980-present: 6317'

1/10 mile physical distance



Sherman Adams building completed construction on 08/01/1980

Other Discrepancies: Wind Direction Categorization

1. Prior to 1968, wind direction was categorized into 1 of 16 directions.



- The last recorded wind direction not using the cardinal directions was on 10/02/1967
 - a. after this date, all wind directions were categorized by 45 degree intervals in order to coincide with NWS standards.

What do these changes mean for the future of data analysis?

- 1. Proper homogenization of wind data is currently impossible
 - a. Many summit infrastructure inconsistencies
 - i. a severe lack of data on exact dates of constructions/demolitions

a. Each set would need to be scaled

- i. taking into account changing summit infrastructure and anemometer location, height, and position.
- a. Lack of a control set
- a. All data points before 1968 must be adjusted to fit into the 8 cardinal directions

Despite the inconsistencies, what can we determine from the data we do have?



Average # of annual big wind events: 6.8684

Average # of annual big wind events: 16.5813

Note: The Pitot-11, which went gold in 2011, had consistent flooding issues due to improper flushing of the tube.

Despite the inconsistencies, what can we determine from the data we do have?





In Conclusion

-The wind field, and thus, the winds we measure, has changed drastically since the observatory's beginning.

-The movement of anemometers results in us measuring different winds

-MWOBS changed wind direction standards

-We appear to be seeing a decline in Big Wind Events

-We are seeing a significant shift in wind direction





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[Photo by Harold Orne MOUNT WASHINGTON OBSERVATORY

in the dense mixed woods just beyond, cup-like flowers of the golden-yellow slopes of the cone was the Greenland Sandwort, Arenaria groenland-





Thank you!

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