Skyward Canvas Above Boulder Creek: Clouds Second

Dhairya K Agnihotry

Introduction

This report explores the atmospheric conditions surrounding the appearance of cirrocumulus clouds on October 31, 2024. The clouds were observed at noon near Folsom Street and Boulder Creek, captured using high-resolution photography that meticulously documents their distinctive small, rounded puffs indicative of ice crystal formation at high altitudes. This visual documentation is paired with meteorological data extracted from a Skew-T Log-P diagram recorded earlier that day at Grand Junction. The integration of these two data sources provides a nuanced understanding of the environmental factors that contribute to the development of such cloud formations. By examining both the detailed photographic evidence and the atmospheric conditions depicted in the Skew-T diagram, this report aims to enhance the understanding of cirrocumulus cloud dynamics, offering insights into the stable atmospheric conditions that were prevalent during their formation.

Methodology

Photographic Equipment and Settings:

- Camera: Samsung Galaxy S23 Ultra, utilizing its 200 MP wide-angle lens to capture detailed and expansive cloudscapes.
- Settings: Automatic and pro modes were employed to fine-tune exposure and focus, with AI enhancements to clarify and detail the cloud structures.
- Positioning: The camera was oriented northward to optimize the capture of natural lighting and enhance the visual contrast of the cloud formations.

Meteorological Data Source:

- Skew-T Log-P Diagram: Sourced from the University of Wyoming, providing a detailed profile of atmospheric conditions over Grand Junction, relevant to the location of the cloud observation.

Observations and Findings

The photograph presents a vivid display of cirrocumulus clouds, noted for their extensive, small, rounded puffs. These clouds often indicate moisture at higher altitudes and can be associated with fair but cold weather. Characteristically, cirrocumulus clouds form in rows or sheets and do not cast shadows on each other, giving them a textured appearance that is beautifully captured in the image. Their presence suggests dynamic atmospheric conditions where moist air has been lifted to a level where rapid cooling occurs, leading to the formation of these thin, ice-crystal clouds that subtly signal changes in the weather patterns.

Analysis

Skew-T Log-P Diagram Analysis:

- LCL (Lifting Condensation Level): Not applicable as cirrocumulus clouds form much higher than the typical LCL range.
- Temperature and Dew Point: The diagram indicates significant cooling with altitude, with a notable separation between temperature and dew point, suggesting dry conditions conducive to this cloud type.

- Instability Indicators: CAPE is recorded at a minimal level, consistent with stable atmospheric conditions typical for the formation of cirrocumulus clouds.

Conclusion

The cirrocumulus clouds observed correlate well with the atmospheric conditions detailed in the Skew-T diagram for the day. This alignment confirms that the cloud formation was influenced by specific atmospheric stability and moisture content at higher elevations. The photographic documentation, paired with meteorological analysis, provides a robust framework for understanding the dynamics at play during this cloud formation event.

References

1. Met Office - "Cumulus Clouds." Accessed November 7, 2024. https://www.metoffice.gov.uk
2. Upperair Air Data - University of Wyoming. Accessed November 7, 2024. https://weather.uwyo.edu/upperair/
3. Colorado Climate Center - "Weather Patterns in Colorado." Accessed November 7, 2024. https://climate.colostate.edu

Appendices

- Appendix A: Original and edited photographs of the cloud observation.

- Appendix B: Skew-T Log-P diagram from October 31, 2024.