

Cirrus Clouds and a Sundog over Matunuck

Cloud type: likely cirrus with possible cirrostratus
Photographed October 9th, 2026, at 4:42 p.m. EDT.
Matunuck, Rhode Island

The purpose of this photograph was to document a small patch of rainbow-like color within a thin cloud and examine the atmospheric conditions associated with it. The image was taken for the cloud assignment in Flow Visualization. The colored patch appears to be a sundog, and its position among the wispy cloud strands became the focus of the photograph. I wanted to show both the color of this feature and the surrounding cloud texture.

I took the photograph at Matunuck Beach while facing approximately west and 45° above the horizon. These viewing angles are estimates. The camera remained on Colorado time and recorded 2:42:52 p.m. MDT, equivalent to 4:42:52 p.m. EDT in Rhode Island. The Sun was outside the frame to the right. Blue sky is visible through and around the thin cloud, while narrow, white narrow streaks cross the upper part of the frame. The image does not show the horizon or the complete sky.



Figure 1. Processed cloud photograph at Matunuck Beach. The reddish side of the probable sundog faces toward the Sun, outside of the frame to the right.

I identify the main cloud as likely cirrus because its strands are thin, fibrous, and irregularly curved. The broader veil may include cirrostratus. The World Meteorological Organization describes cirrus as filamentary patches or bands and cirrostratus as a transparent veil that often produces halos [1]. I initially considered altostratus because of the cloud's sheetlike appearance. However, altostratus typically have a more uniform gray or blue-gray appearance and does not itself produce halo phenomena [1]. A separate ice-cloud layer could overlap with another cloud type, so the classification remains tentative.

The localized color and the Sun's position support identifying the bright patch as a sundog, parhelion. Sunlight is refracted through ice crystals, separating wavelengths so that the red edge appears nearest the Sun and blue lies farther away [2]. This arrangement matches the photograph. The precise Sun-to-patch angle cannot be measured from this crop, and the recalled camera elevation is approximate; these limits prevent a definitive optical identification. The effect supports the presence of the ice crystals but does not determine cloud height or distinguish from cirrostratus itself.

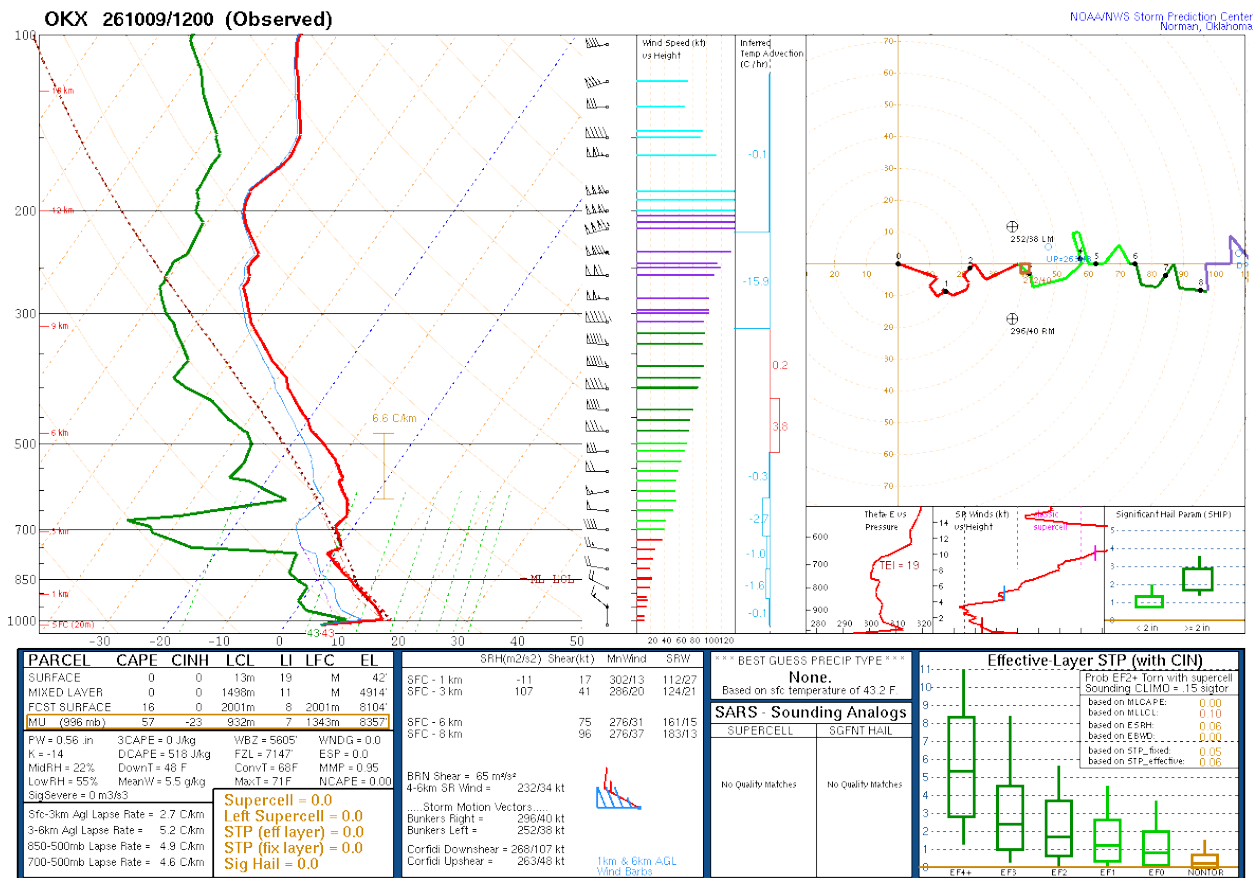


Figure 2. NOAA Storm Prediction Center observed skew-T for OKX, Upton/Brookhaven, New York at 12 UTC on October 9, 2026 (8 a.m. EDT) [3]. This is a regional morning profile from Long Island, 8 hours 43 minutes before the photograph, not a sounding over Matunuck.

The morning sounding in Figure 2. supports evidence of limited deep-convection potential at Upton. Surface-based and mixed layer CAPE, which describe the buoyant energy available to lifter air parcels, are both 0 J/kg; most unstable CAPE is only 57 J/kg [3]. A strong shallow inversion is also present: temperature increases from about 6° C near the surfaces to about 16° C near 200m. This warm layer above cooler air resists upward motion. The chart therefore supposes a generally stable morning environment but does not establish stability at every height or over Matunuck later in the afternoon.

High clouds in temperate regions commonly occupy roughly 5-13 km altitude [3] A working estimate of 8-10 km is reasonable for this ice cloud interpretation, but it is not a measured cloud base. At Upton, the 300 hPa level was about 9.35 km high and -42 °C, cold enough for cirrus ice [3]. However temperature and dew point remain separated, so the sound does not reveal a clearly saturated layer that can be assigned to the photographed cloud. Its surface parcel lifting condensation level should not be treated as the height of this cloud.

Winds in the morning profile were predominantly westerly, increasing from about 73 knots at 500 hPa to 105 knots at 300 hPa [3]. Such winds can transport ice clouds, and changes in wind with height can stretch falling crystals into curved trails. Cirrus can form when moist upper-level air cools sufficiently for ice formation and growth; the crystals then settle under gravity while air motion carries them horizontally [5]. These processes offer a physical explanation for the fibrous appearance, but a single photograph cannot establish the local shear or formation history. The cropped view also cannot establish whether a front was approaching or whether precipitation occurred before or after the image.

The image was captured with a Nikon Z6II digital mirrorless camera and a VR 70-200 mm f/2.8 lens at 200mm, f/9, 1/1250 s, and ISO 100. Natural sunlight provided the illumination, and the flash did not fire. The long focal length isolated the colored patch, while the short exposure limited camera-motion blur. The final image is 4 726 x 3 781 pixels. Its crop metadata is consistent with a 6048 x 4024 source image, the camera's full resolution FX size. Using the 35.9 x 23.9 mm sensor and the recorded crop gives an angular field of view approximately 8° x 6.4°. For an assumed cloud height of 8km and the estimated 45° viewing angle, the line-of-sight distance is $R = 8 / \sin(45^\circ) = 11$ km. The corresponding width is $W = 2R \tan(8^\circ/2) = 1.6$ km, with a height of about 1.3 km. These are conditional scale estimates, not measured cloud dimensions.

The RAW photograph was processed in Adobe Lightroom Classic. Recorded settings include a 5400 K white balance, exposure + 0.30 stops, contrast +55, shadows +57, whites +26, and blacks -32. Texture increased to +28, clarity to 48+, and dehaze to +26. Vibrance +43 and saturation +22 strengthened the colors; sharpening was set to 40. The crop concentrates attention on the sundog and curved strands. These substantial contrast and color adjustments make the structure easier to see, but the processed colors should not be treated as a calibrated measurement of atmospheric light.

The most effective part of the image is the warm colored patch within the cooler blonde skies and flowing white strands. It shows the appearance of a cloud on both its particles and the lighting geometry. Several dark circular spots distract from the scene and may be dust artifacts.

A future attempt would include a wider contextual photograph with the horizon and Sun's position, followed by the closer view, as well as measured camera bearing and elevation. A short image sequence would also reveal changes in the cloud. The photograph meets the visual goal of recording the colored feature, while its main scientific limitation is the separation between the photographed cloud and the available morning sounding.

References

- [1] World Meteorological Organization. (2017). "Cirrus," "Cirrostratus," and "Altostratus." *International Cloud Atlas*. <https://cloudatlas.wmo.int/en/descriptions-of-clouds.html>
- [2] National Weather Service, La Crosse. (n.d.). "What Causes Halos, Sundogs and Sun Pillars?" https://www.weather.gov/arx/why_halos_sundogs_pillars
- [3] NOAA Storm Prediction Center. (2026, October 9). *Observed sounding for OKX, Upton/Brookhaven, New York, at 12 UTC*. https://www.spc.noaa.gov/exper/soundings/26100912_OBS/OKX.gif
- [4] World Meteorological Organization. (2017). "Definitions of Clouds." *International Cloud Atlas*. <https://cloudatlas.wmo.int/en/clouds-definitions.html>
- [5] Heymsfield, A. J., et al. (2017). "Cirrus Clouds." *Meteorological Monographs*, 58, 2.1–2.26. <https://doi.org/10.1175/AMSMONOGRAPHS-D-16-0010.1>