

Clouds 1

The intention of this image was to observe Earth's atmosphere in the presence of air instability, resulting in the formation of clouds. This specific image details both high altitude cirrus clouds and the intersection of several contrails created by jet aircraft engines. It was taken in the evening, around 6 pm, in a westward direction. The sun is behind and below the clouds and reveals certain features in both the cirrus clouds and the contrails that would not be observed under normal lighting conditions.

This dynamic image details a large group of cirrus clouds with three distinct contrails in front of them. The skew-T plot depicts a convergence of the moisture and temperature profiles at approximately 10 km, which is consistent with the average height for cirrus clouds. Cirrus clouds form high in the atmosphere, usually above 6 km. They appear fibrous and silky, these ones being very quite curved. The cirrus clouds observed in this image are also quite dense, with the ones on the left being even more so than the others. Cirrus clouds are made up of ice crystals that are formed from the freezing of water droplets. The day of the photograph was quite mild, warm even into the evening. Even on a warm day, cirrus clouds can be observed because they are so high in the atmosphere that the temperatures are still below the freezing point of water regardless of the temperature at lower altitudes. The skew-T plot shows a temperature curve that is steeper than the adiabatic curve, meaning that the atmosphere was stable at the time of the picture.

The contrails in the image are condensation trails generated by the exhaust of aircraft engines. These “clouds” consist mainly of soot and water vapor. This particular image contains three separate contrails. The two on the right are larger than the one on the left, meaning that they were created by aircrafts with larger engines. Within the contrails are ripples that are the result of vortices created by the wings traveling at high speeds through the air. The contrails are somewhat fractured because they had been in the atmosphere for several minutes and had begun to dissipate.

The image was taken as the sun was setting on an October evening so that the clouds would be illuminated from behind and below. Since these clouds are quite high in the atmosphere, their undersides are clearly detailed in this image. The cirrus clouds appear wispy and fibrous, typical of these types of clouds. The only light source is the sun because no artificial source would reach the subject of this image.

The field of view is very large. Although it is difficult to precisely measure the field of view, the width is several miles (probably around three or four). The skew-T plot depicts a convergence of the moisture and temperature profiles at approximately 10 km, which is consistent with the average height for cirrus clouds. Therefore, the distance depicted in this image is roughly 10 km or just over six miles. The focal length of the lens was 13.3 mm. The camera used was a Kodak DX7630 Zoom, a digital camera. The original image width was 2856 pixels and the height was 2142 pixels. The ISO setting was 100, and the shutter speed was 1/724 seconds to prevent any type of motion blur. The aperture was set to 5.5 to allow enough light in, but to also prevent the intense sunlight from taking away from the image. Too much light would be distracting and would hide many of the cloud/contrail features. Photoshop was used but not

significantly. The brightness as well as the contrast was intensified slightly to further reveal the cloud features. No other alterations were made.

The image reveals the fibrous appearance of cirrus clouds high in the atmosphere. It also details the vortices created within contrails by an airplane's wings. I observed the scene as I was coming home from class, but did not have my camera with me at the time. It became apparent that these multiple contrails as well as cirrus clouds could be captured in a single frame, certainly a rare occurrence. I rushed home and managed to capture this, but the contrails had already begun to dissipate. While still in fairly good condition, I would have liked to capture fresher contrails, as they would have revealed more information about them. However, I am content with the image that I produced, and am lucky to have captured what I did.