

# Report-Cloud ②

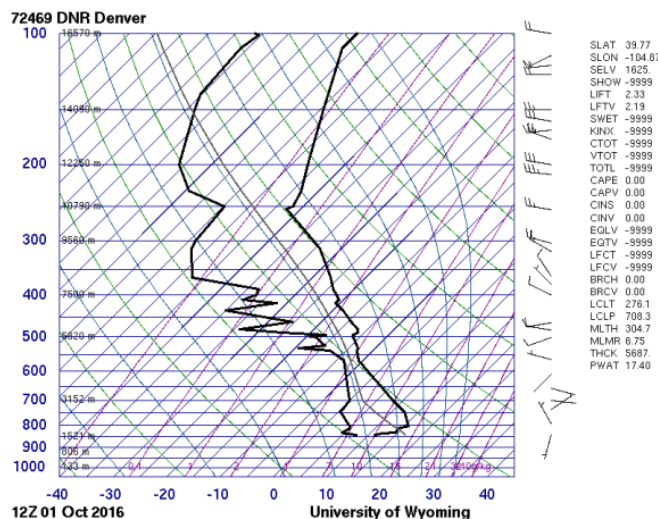
11/27/2016

Flow Visualization: The physics and Art of Fluid Flow



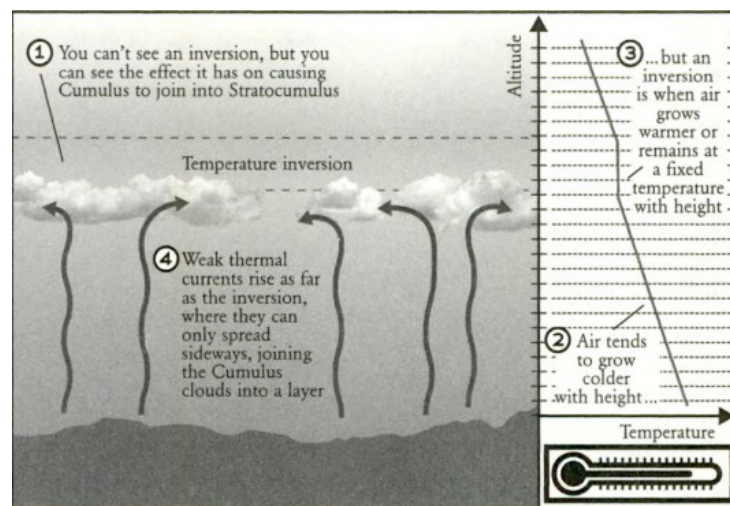
The image was taken on October 1 on my way driving to the Aspen. It was about 12pm and the weather is sunny. According to the estimation, the local attitudes is about 8000 ft. The camera was facing the West, at the top of the mountain. The atmosphere is unstable.

The type of the cloud is probably stratocumulus. Stratocumulus are low layer or patches of cloud, with well-defined bases. They are usually composed of clumps or rolls, and often show strong variations in tone-from bright white to dark grey. Their cloud elements may be joined into continuous, unbroken layers or have gaps between them [1]. The stratocumulus is a very common cloud that could be observed worldwide and the typical attitudes is about 2,000-6,500 ft. Within the stratocumulus, the weather is usually sunny. While occasionally it would have light rain or snow. The following picture is the Skew-T plot at that day. The information of that plot is consistent with the above description.



There three important stratocumulus variables which include opacus, when the layers are thick enough to completely mask the sun or noon. Translucidus, when it is thin enough to show the outline of the sun or noon. And perlucidus, when there gaps between the cloud elements. The details of another species of stratocumulus, such as duplicatus, undulatus, radiatus and lacunosus, would not be introduced here. The cloud that shown in the first image, is probably the perlucidus. Because there are distinct gaps between the different elements of cloud.

One thing that need to be mention that, it is very easy to confused stratocumulus with cumulus. The cumulus is clumpy, well defined and forms at similar altitudes. While the stratocumulus tends to be closer together and to have flatter tops [1]. While the cumulus could have some relationships with the stratocumulus. The following picture shows one of the reasons why cumulus could spread and join to form a puffy layer of stratocumulus.



The spreading and joining of cumulus is one of the reason of stratocumulus forming. That's because of the temperature gradient inversion. Typically, the air tends to grow colder with height. However, sometimes an inversion will happen, when air grows warmer at a fixed temperature with height. In this case, the cumulus could join into stratocumulus below the temperature inversion layer. For the image that I have, it could possible show the above process. Because the cloud looks like have the characteristics of both cumulus and stratocumulus.

For the photographing techniques. The Canon EOS Rebel T5 is applied to take the image. The image dimension is 5184\*3456 pixel. The exposure time is 1/160 sec, the ISO is 100 and focal length is 18mm. For the processing, the brightness is enhanced and the bottom part of image is cut off to push the cloud part forward. The further improvement should include the contrast adjustment. In the present image, the contrast of the scene is good while the contrast of the cloud parts is not very clear.

[1]. "The Cloud Spotter's Guide: The Science, History and Culture of Clouds", Gavin Pretor-Pinney, (Founder of the Cloud Appreciation Society)