

# Flow Visualization

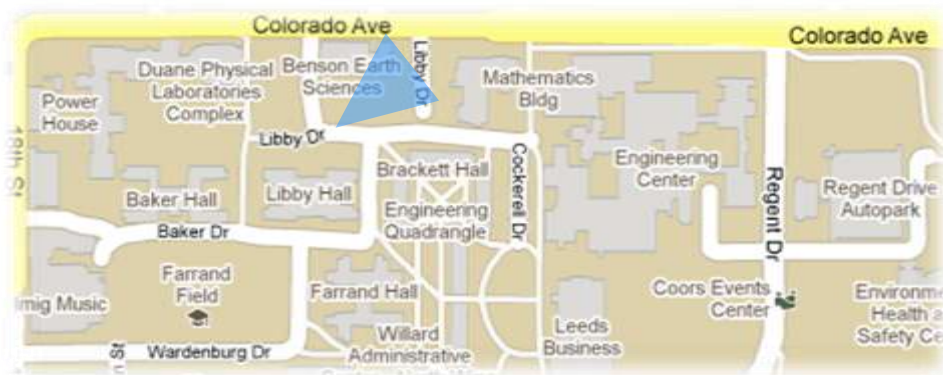
**Boris LEMATTRE**

**Spring 2011**



## **CLOUDS ASSIGNMENT 1**

This picture was taken on January 28<sup>th</sup>, at noon, in the campus of the University, toward the North-East direction (see below). I took this picture because it was a lovely day, the weather was great, and there was this only cloud in the sky with this kind of tail, like a flying saucer crossing the sky.

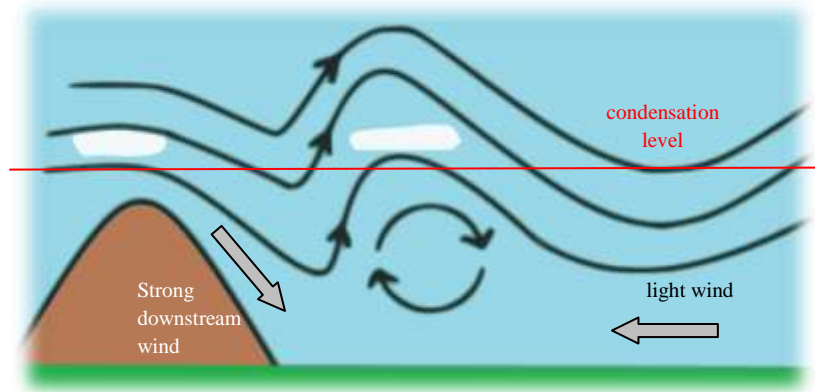


*Point of view from where the picture was taken*

Since the weather was fine and the wind was light, I first thought it was an Altocirrus, since they tend to develop in such weather. Moreover, they often occur on approaching changes in weather conditions, and as we had really changing temperature at this period, cold fronts could come fast, my first idea was that it was an Altocirrus.

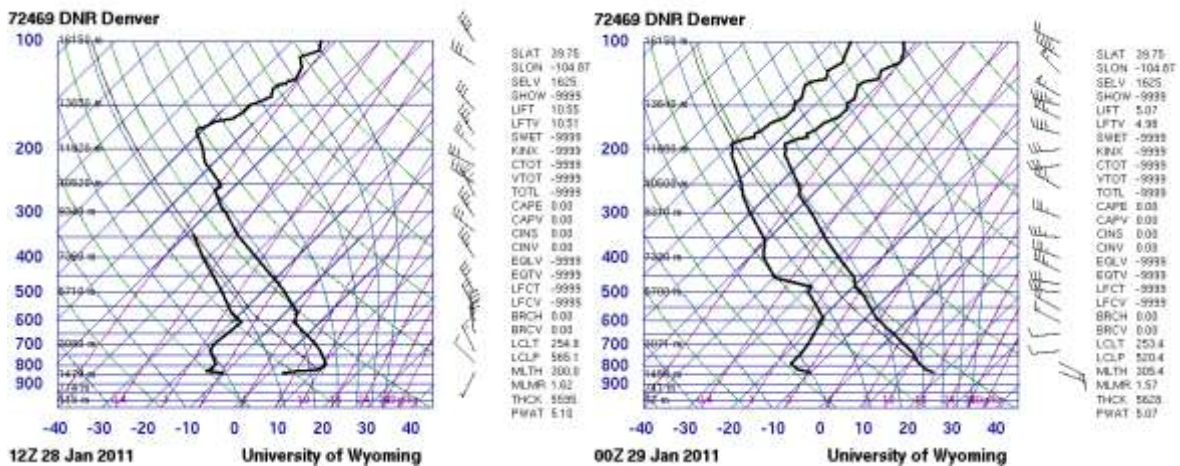
However, the shape of the cloud reminds clearly the one of an Altocumulus Lenticularis. We recognize the shape of a Cumulus, with its particular thickness, and a lens shape. The contrast is also a good hint of the nature of the cloud. Indeed, the base appears darker than the top. It is a good way to know if it is an Altocirrus, thinner and so generally without contrast, or an Altocumulus.

An Altocumulus Lenticularis is a middle level cloud. My guess for this cloud is that it is at about 10,000ft from the ground. This type of clouds results from a wave effect in the atmosphere, which can be caused by mountains for instance. That is why we can see many of them in Boulder, a place surrounded by many mountains. The wave effect the mountains produce forces the air to go above the condensation level and allows clouds to form. When this wave effect stops, the air goes under this condensation level and so the cloud disappears. This type of clouds can remain quite stationary, since the condensation effect due to the wave occurs only for the air going up, and stops for the air going down. So, wherever the wind goes, only the top of the wave will condensate and so the cloud will not follow the wind but will remain stationary. The diagram below sums this phenomenon up.



*Diagram of the formation of an Altocumulus Lenticularis*

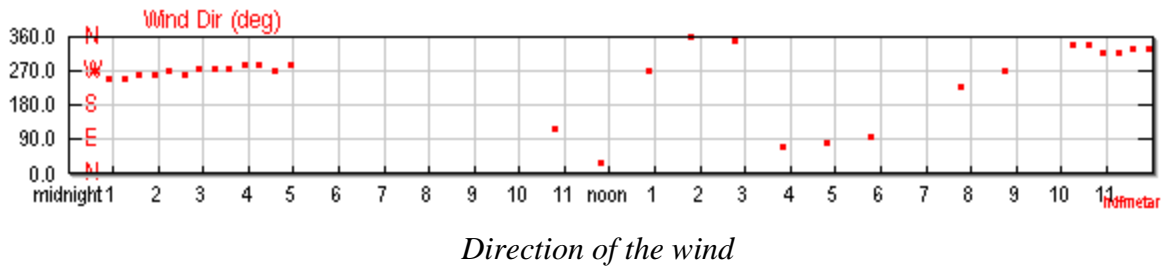
The cloud on the picture would probably be between the peak and the trough of the wave, since its edges are not well defined. That shows that it is starting to disintegrate: it is between condensation and clear air. If we look at the weather conditions for this day, we can see that the atmosphere was stable. The Skew-T reports below, taken from the University of Wyoming website, shows that for this day, between 5am (noon Zulu time the 28<sup>th</sup>) and 5pm (midnight Zulu time the 29<sup>th</sup>) the atmosphere was really stable. The CAPE coefficient remains zero for the day. Altocumulus Lenticularis tend to form in drier and more stable atmosphere than cumulus. So, the atmosphere conditions agree with the fact that the cloud is an Altocumulus Lenticularis.



*Atmosphere reports from the University of Wyoming website*

The picture was taken facing North-East direction. The weather report extracted from the website [www.wunderground.com](http://www.wunderground.com) given below shows that at this time of the day, the direction of the wind was North-North-West. This direction can be known thanks to the picture: the sharpest edge is the one where the wind flows in, and the more dissipating one is where the wind flows

out. So, assuming the picture was taking facing North-East, the wind goes from the right of the picture to the left, so from the South-East to the North-West.



Among all the pictures I have taken for this assignment, I find that this one is the funniest, since the cloud really looks like a thing; like a flying saucer for instance. This project was interesting, since we do usually not look at the sky, except if it has some beautiful colors, like in the evening. But this assignment gave us the opportunity to look up at the sky almost all the time, and see that, even in a day that one could call “normal”, beautiful and interesting phenomena can occur. Since I started taking pictures for this assignment, I cannot do without looking at the sky every time I am outside, even if I do not have my camera with me, and I just admire the beauty of the clouds, trying to figure out what could have given them those specific shapes.