

Lenticular clouds above the Rubies

By Larry Hyslop



Four distinct lenticular clouds over the Ruby Mountains, viewed from the National Weather Service office.

We watch puffy, cumulous clouds drift across the sky and imagine one looks like a sheep and another like Lady Gaga, or maybe not. But over the Ruby Mountains is a different type of cloud. Lenticular clouds are smooth-sided, domed clouds that perch atop the mountains and do not drift away.

Brian Boyd is the Lead Meteorologist for the Elko Weather Forecast Office. I set him a goal of explaining to me these strange clouds, so here goes.

Imagine a mass of air moving across the earth's surface. Above the ground, this air is moving at high speed as it encounters a mountain range like the Ruby Mountains. The air is forced upward to clear the mountain range. The wind is strong and stable on this day, so after it clears the center ridge, the air sinks back to its original height.

As air rises over the ridge, it cools and may cool below its dew point where water vapor condenses. This forms a visible cloud. On the other side of the ridge, the sinking air warms above its dew point, so the water vapor evaporates and the cloud disappears. So we see a cloud anchored above the ridge line, a smooth cloud with flat bottom and rounded top. The best days for lenticular formation are windy, humid days. Often such waves form above the Rubies but the air is too dry to form clouds.

In contrast, on summer days we often see puffy, cumulous clouds form above the mountains, but they drift away and new ones form in their place. On these days, the winds are light, the air is unstable and the air forced upward by the Rubies just continues rising, perhaps forming thunderstorms.

Air acts like a fluid, as if it was water. Air rising over a ridge and sinking beyond it may rise and sink again, as in series of a water waves. Rows of lenticular clouds can form downwind of the ridge. Since much of our winds come from the west, people in Ruby Valley have the best view of these series of lenticular clouds.

Lenticular clouds can also form on top of other lenticulars. Brian used two note pad sheets to explain this one. Air moves across the landscape in layers, not distinct but "sort of" layers. The air in each higher layer is cooler and contains less moisture. The bottom layer gets forced upward over a ridge and forms a large, strong lenticular cloud. The next layer of air is forced upward by the lower layer. Since it is drier, it must climb higher before it reaches its dew point and forms a cloud. This can result in two lenticular clouds separated vertically by a band of clear air. Stacked lenticulars form most often above isolated mountains like Pilot Peak. California's Mt. Shasta has been known to form eight such clouds.

We see lenticular clouds as simply pretty, but pilots see them as warning signs of high winds aloft. In extreme cases, a very dangerous condition called a rotor wave can develop. When winds are very

strong, the air rising over a ridge can be swept away from the mountain ridge as it sinks and some air swept back toward the ridge. This develops into a spinning tube of air downwind of the ridge. More than one pilot has approached a ridge thinking they had more than enough altitude to clear it when they were suddenly sucked downward by an invisible rotor wave. They then crashed just below the ridge line.

Elko Daily Free Press, "Nature Notes", 5/31/2012

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