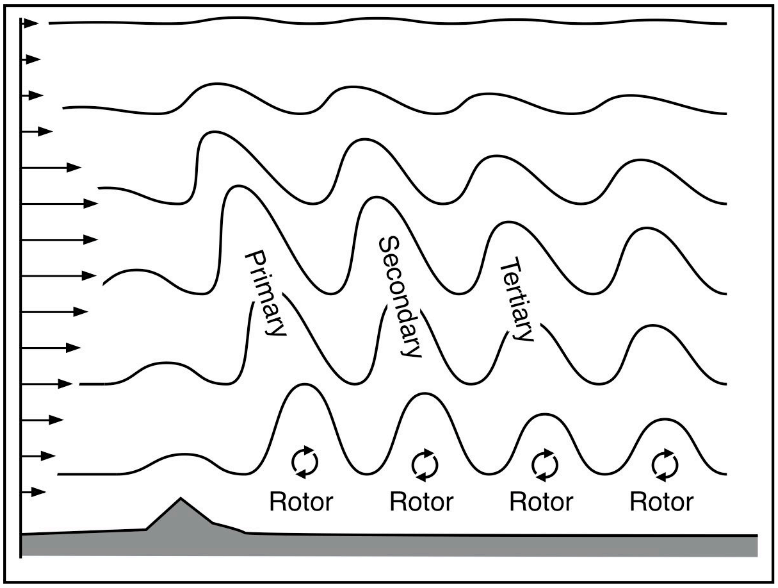

Figure 6.55 – Wind speed increasing with altitude amplifies the wave pattern initiated by the mountain ridge.

Notice that with altitude, the wave is amplified as the wind speed increases, and dies off quickly as the wind speed drops. Often, the wave will "lean" into the wind, with the area of best lift on top of, or even in front of the mountain ridge.

In general, the wave will decay as it travels further downwind. However, it is not unusual for a wave to survive for 10 or 20 oscillations.

The circular pattern below each wave peak is called a rotor. The rotor is created by the interaction of the wave with the ground. The rotor has lift on its upwind edge and sink on its downwind edge. The rotors in Figure 6.55 would be rotating clockwise. While the air in wave lift is very smooth, the air in rotors can contain turbulence severe enough to damage a glider.

The strongest waves are created by winds that blow perpendicular, or nearly so, to a mountain ridge. The wind speed at the top of the mountain needs to be at least 15 to 20 knots for wave to form. The wavelength (the distance between the peaks of the wave) can vary from 2 to 20 miles. It decreases with increasing stability of the atmosphere.

Terrain Effects

Terrain is rarely ideally suited to the formation of mountain wave. Long, straight, steep mountain ranges perpendicular to the prevailing wind direction are best. Consecutive mountain ridges can amplify or reduce wave depending on the wavelength of the flow and the distance separating the ridges. Individual peaks, branching ridges, and curving ridges all complicate the flow pattern.