

Fog

3-131. The effects of fog in the mountains are the same as for lower regions. The topography, however, causes fog to occur more frequently in the mountains. Thus, fog becomes a more significant planning consideration.

Wind

3-132. Wind associated with mountains can be broken down into the following three main categories (figure 3-9):

- **Prevailing wind** is the upper-level wind flowing predominantly from west to east in the CONUS.
- **Local wind** is also called valley wind and is created by convection heating and cooling. This wind flows parallel to larger valleys. During the day, it tends to flow up the valley and flows down the valley at night.
- **Surface wind** is the layer of air lying close to the ground. It is less turbulent than prevailing and local wind.

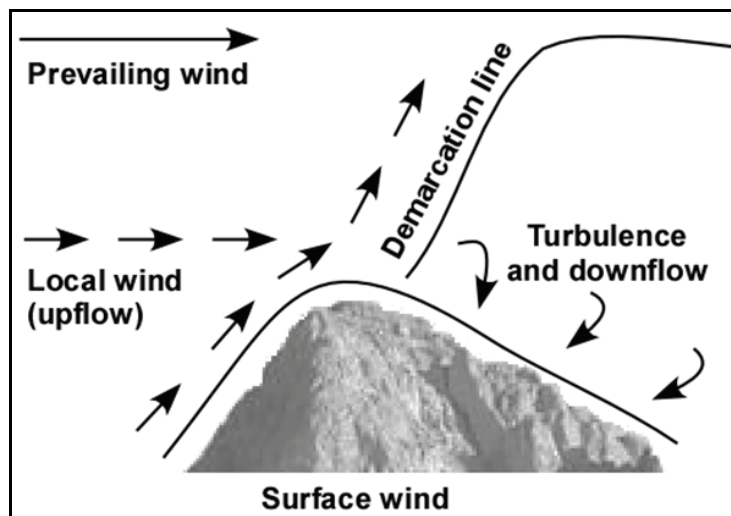


Figure 3-9. Types of wind

Demarcation Line

3-133. The demarcation line is the point separating upflow air from downflow air. It forms at the mountain's highest point and extends diagonally upward. The velocity of the wind and steepness of the uplift slope determines the position of the demarcation line. Generally, the higher the wind speed and steeper the terrain, the steeper the demarcation line. The effects of varying wind velocities on the demarcation line are described in the following paragraphs.

Light Wind

3-134. A light wind (figure 3-10, page 3-28) is 1 to 10 knots. It accelerates slightly on the upslope, giving rise to a gentle updraft. It follows the contour of the terrain feature over the crest. At some point over the crest of the hill, it becomes a gentle downdraft.

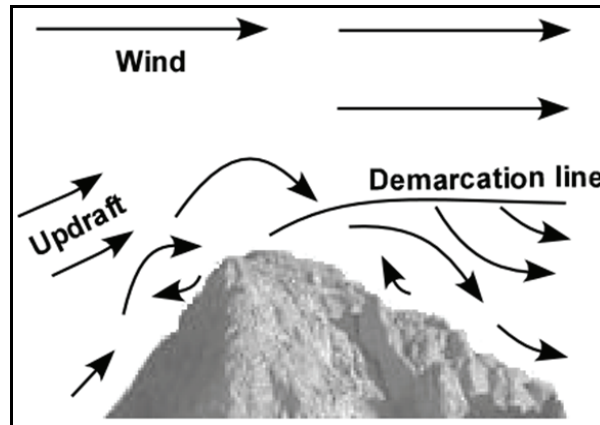


Figure 3-10. Light wind

Moderate Wind

3-135. A moderate wind (figure 3-11) is 11 to 20 knots. It increases the strength of updrafts and downdrafts and creates moderate turbulence. A downdraft will be experienced on the leeward side (sheltered from the wind) near the mountain's crest. The demarcation line forms closer to the crest and is steeper.

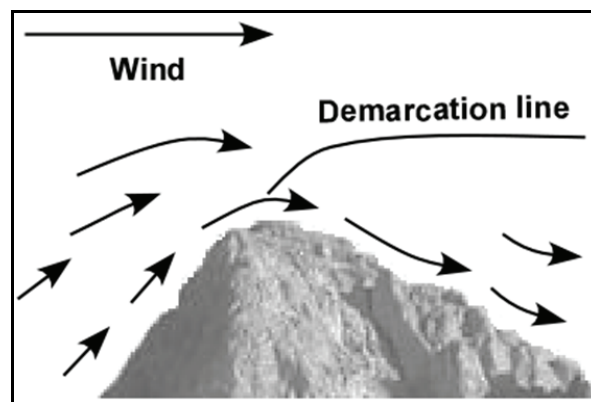


Figure 3-11. Moderate wind

Strong Wind

3-136. As wind increases above 20 knots, the demarcation line moves forward to the crest's leading edge (figure 3-12, page 3-29). It then matches the slope's steepness. The severity of updrafts, downdrafts, and turbulence also increase. Under these conditions, the best landing spot is close to the forward edge (windward side) of the terrain feature.

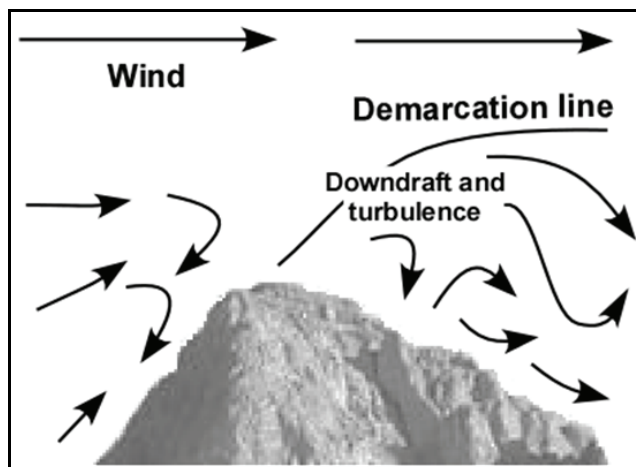


Figure 3-12. Strong wind

Mountain (Standing) Wave

3-137. A mountain, or standing, wave is a phenomenon occurring when airflow over mountainous terrain meets certain criteria and causes a complex weather pattern (figure 3-13). That pattern creates relatively smooth and strong, lifting winds on the windward side while progressing toward the leeward side very abruptly (at the crest) and dramatically. It thrusts the aircraft into an area dominated by downdrafts having sustained recorded values of at least 3,000 FPM.

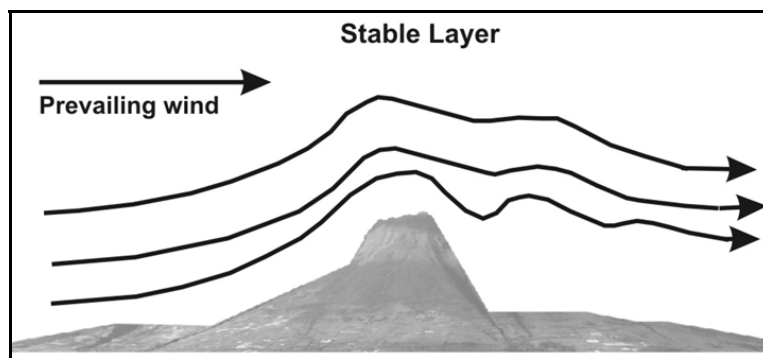


Figure 3-13. Mountain (standing) wave

3-138. The resulting turbulence of a mountain wave is determined by the following:

- Wind speed.
- Stability of the air mass.
- Degree of the slope.
- Height of the mountain.

3-139. Mountain waves are likely to occur when the following conditions are present:

- A low-level layer of unstable air.
- A stable layer of air above the lower levels.
- Wind direction fairly constant with altitude.
- Wind speed increasing with altitude—a larger increase in wind speed produces a stronger wave.
- A mountain or mountain range lying perpendicular to the airflow.