

# MOUNTAIN WAVE WIND EVENTS

Mountain waves occur amid stable air masses with strong temperature inversions near mountainous terrain and are most common through late fall and winter in the Appalachians.

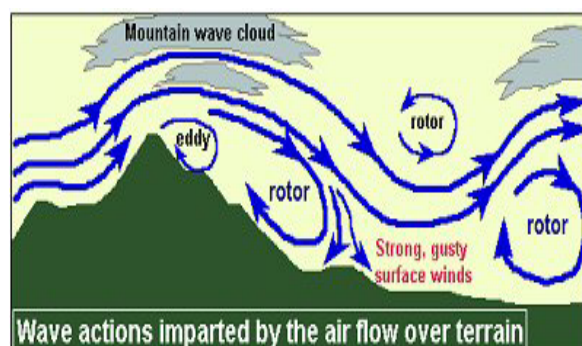
They may occur near any elevated terrain in the geographic area, as long as the **wind direction**

**aloft lies within 30 degrees of being perpendicular to a ridge line.** The southern Appalachians traditionally experience them in pre-frontal environments, often at night, as warm and moist Atlantic or Gulf air surges northwards or northwestwards ahead of an approaching low pressure system and its cold front. The most common weather pattern associated with them features a strong low pressure system moving through the Ohio Valley or Great Lakes.

## Indicators and Watchouts:

- Roll clouds aligned with ridgeline topography
- National Weather Service high wind warnings associated with pre-frontal (southeast) or post-frontal (northwest) winds
- Highly localized
- Not possible to forecast due to model and data limitations
- Higher winds often accompanied by much drier air mass
- Expect erratic fire behavior and rapid fire growth

Although their footprint is often quite narrow, **extreme winds in excess of hurricane-force (80 – 100 mph) can occur on the lee or downwind side of ridges**, with a rapid and unexpected shift in wind direction also a distinct possibility. Humid and cool conditions may be suddenly interrupted as drier air aloft accelerates towards the ground, resulting in **extreme winds and a sudden decrease in relative humidity.** Areas downwind of steep gradients in terrain are most susceptible. The east side of the Appalachians can see mountain wave events that lead to enhanced winds and subsidence in post-frontal environments as well. In addition to enhancing fire weather and potentially leading to extreme fire behavior, mountain waves can contribute to new ignitions from downed power lines and restrict air ops due to potential IFR conditions and severe to extreme turbulence.



## CHIMNEY TOPS 2 FIRE

- Date: November 28, 2016
- Location: GSMNP, Sevier County, TN
- Persistent severe drought conditions
- 87 mph wind gusts due to Mountain Wave Wind Event recorded
- Fire growth from 35 acres to 17,000 acres in 24 hours
- 14 deaths
- 2,501 structures impacted