

FROST RISK:

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Factors that affect frost risk:

- **Topography:** it controls the way air moves, (katabatic breezes). When these winds are dammed or slowed up, you increase frost risk.
- **Elevation:** the higher you go, the less gasses there are in the atmosphere to limit radiational cooling from the surface, therefore it cools more rapidly under clear skies.
- **Whats up wind of a site?** Different surface types influence the resultant temperature at your vineyard. When choosing a site, determine whether the land use around the vineyard may change.
- **Soil type/moisture holding capacities:** Wet or water logged soils influence frost risk. They provide some benefit initially at temperatures near zero as water will retain heat for some time. At temperatures below minus 1 you can make things worse as the moisture in the soil influences humidity above ground to vine height. This produces a wet frost that usually does more damage to vines as compared to the same temperature at a lower humidity (dry frost).
- **Micromaps (by Microclimate NZ Ltd)** are a great way to zoom in on frost risk for a given site. A coloured map of the vineyard indicates which areas are at highest risk to frost and by how much. When combined with analysis of temperature structure and wind drift patterns above ground you have an extremely potent tool for making the appropriate selection and level of frost protection.
- **What makes a site frostier, temperature or time?** Consider these two aspects of frost when making decisions about which site is more frosty. Are some vines more tolerant to duration of freeze?

How do climate parameters above ground affect frost risk?

- **Strength of katabatic drift winds:** They determine how the lowest layers of the atmosphere mix at night. Stronger drift winds limit inversion development. They also even temperature variation across a vineyard out.
- **The inversion character:** Critical when using windmachines or helicopters to mix up air. Find out what its doing before you fly choppers or buy windmachines. You could save yourself a lot of wasted money.
- **Upper atmosphere:** Thickness levels – help determine how fast temperatures will drop under clear skies near the ground. Useful in frost forecasting.

FROST FORECASTING:

- Can you interpret a prognosis weather map for a given region? Local knowledge is extremely important.
- Recognition of local climatic phenomenon like the Wairau Valley mountain wind.
- Danger conditions for Marlborough are south and south-westerly conditions. Most weather from these directions is blocked by the Kaikoura Ranges. Condition usually clear very quickly.
- When you see or hear a forecast temperature for Marlborough be clear about where it is forecast for and how your place varies from that point.
- Use any forecast beyond 3 days as a guide only.
- Classic cold outbreaks for NZ often start with a “HIGH” or anticyclone that ridges well beneath Tasmania or down into high latitudes in the south

Tasman Sea. Cold air then has no choice but to ride up the eastern flank of the HIGH before it moves onto the country.

Is frost risk increasing in Marlborough? Records from Woodbourne suggest that frost risk in both October and November are increasing. Record breaking low temperatures have also been recorded in both March and April (frosts) in the past 2 years. Global warming means an increased oscillation of temperature, higher highs and lower lows. Frosts are not going to go away.