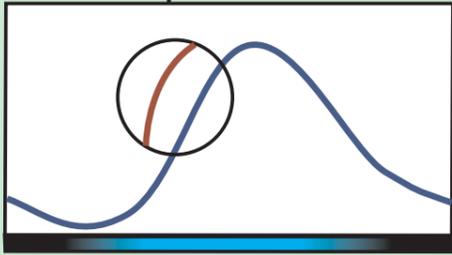


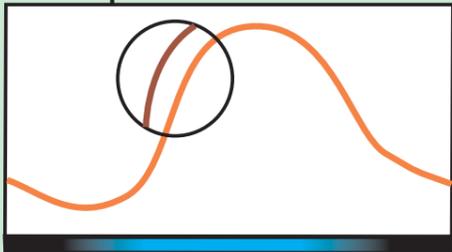
# SUMMARY OF PROCESSES LEADING TO VARIANCE FROM THE DIURNAL FIRE WEATHER CYCLE IN THE HIGH COUNTRY

## VARIATIONS ON DIURNAL WEATHER CYCLE

Wind Speed



Temperature

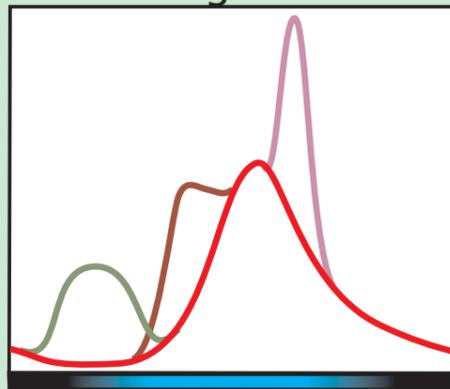


Relative Humidity



These may occur with various timings & patterns.

Fire Danger



- LEGEND
- Foehn Wind
  - Nocturnal Dew Point Depression Event
  - Dry Slot

**Foehn winds**, and to some extent **wind waves**, can act to elevate wind speeds earlier in the day than is expected.

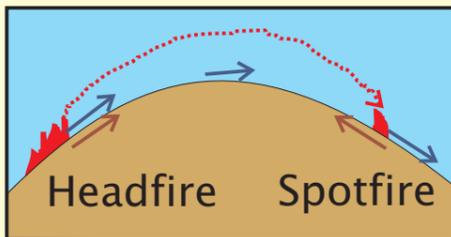
**Nocturnal Dew Point Depression Events** occur mainly above 1500m and on around one day in seven. They create a FDI peak between midnight and sunrise.

A **dry slot** is a discrete band of unstable air whose middle levels have very low RH. Any trigger for vertical mixing can drag that air to the surface – including fires and sea breeze fronts.

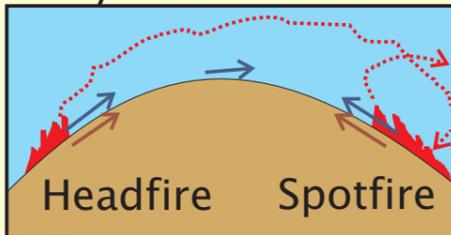
See: <http://www.highfirerisk.com.au/> for more information.

## SPREAD PROCESSES

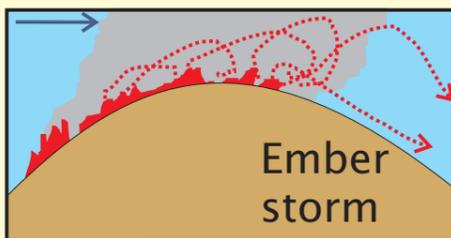
“Normal”



Eddy-dominated



Plume-driven



Normal spread: When a fire crests a ridge, the fire will back off as wind and slope come into opposition. Crews are trained to use this to their advantage. Embers can start spotfires that back up the hill.

**Eddy-dominated spread**: When lee-slope eddies dominate any spotfires that start in them spread uphill with the wind behind them. They become as intense as the main fire, and can start new spotfires. The fire can thus “leapfrog” across the landscape.

**Plume-driven fires**: When the flaming zone becomes deep enough for the plume to resist mixing up to the lifting condensation level, the condensation of water vapour greatly amplifies the fire’s energy budget. The expanding plume resists the ambient winds, and is pushed across the landscape (almost like a solid object) taking embers and fire with it.

Deep flaming comes from wind changes, elevated FDI or **channelling-driven fire spread**.

- LEGEND
- Embers
  - Slope effect
  - Wind effect

Note: terms highlighted in red are the subject of detailed research papers.

While spotting may cause a fire to end up in roughly the same place by any spread process, how it gets there, what opportunities are offered for suppression and the risks posed to crews, life and property as it travels will vary greatly.

This is a review of the implications of recent research into wildfires in southeast Australia, mostly from the Bushfire CRC (HighFire Risk project and Graham Mills, CAWCR).