# ESTIMATION OF FORMATION PARAMETERS OF A THERMAL BELT DURING BUSHFIRE OPERATIONS

For a thermal belt to form, in general ticks are needed in all three boxes...

- ☐ Continental air mass?
- ☐ Low wind speed?
- ☐ Clear sky?

NOTE: Drainage lines will carry the temperature of the height of their headwater from some past time. This time lag reflects their length, gradient and vegetation cover. A drainage flow of 100m drop per hour is assumed.

With time the depth of the pool of coolest air and the drainage inversion will increase. This depth will reflect topography (e.g. damming by a pinchpoint).
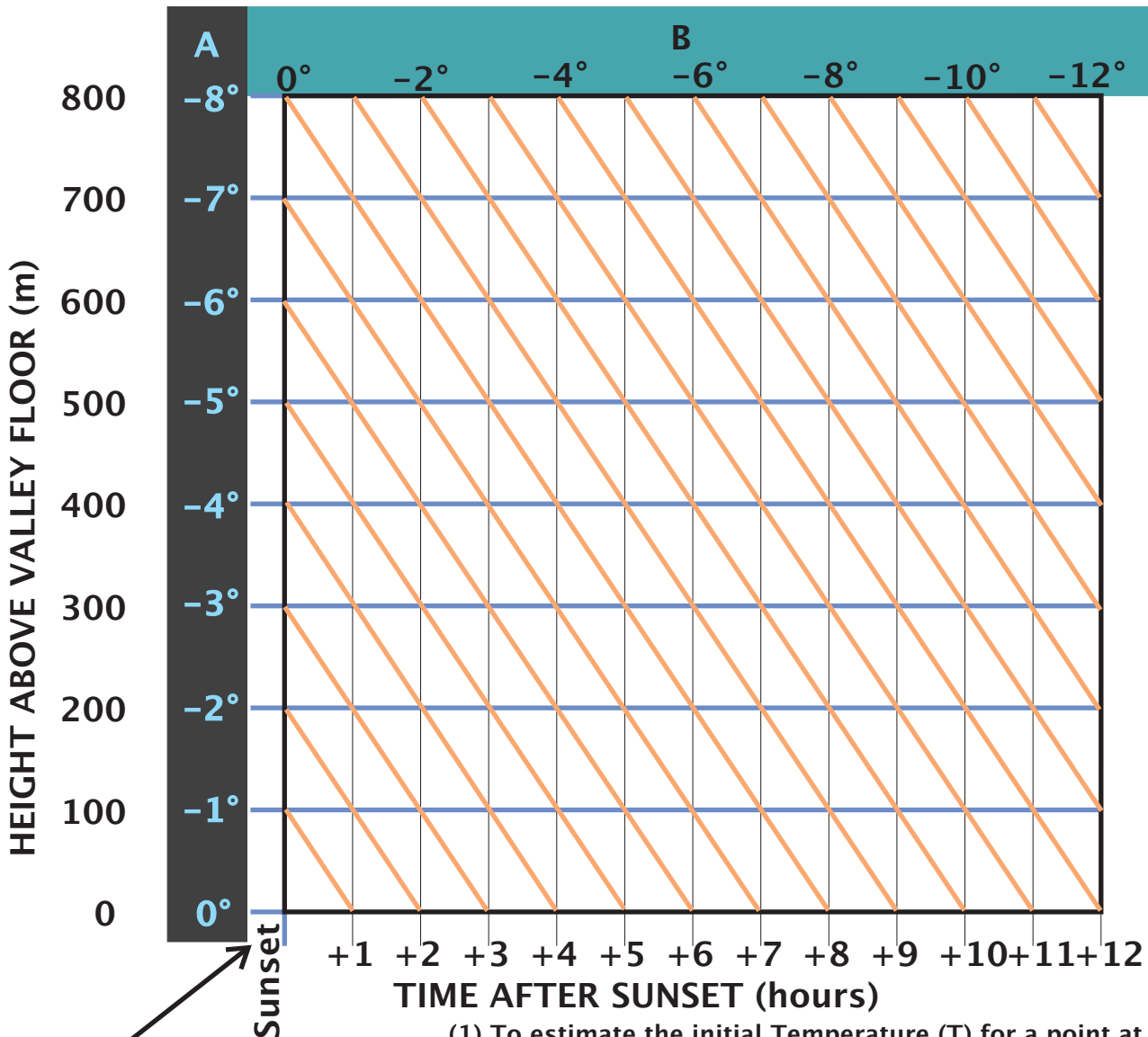
☐ T at valley floor at sunset (°C)

☐ Dew point (°C). T cannot fall below this: instead fog, dew, frost, etc will form.

(1) To estimate the initial Temperature (T) for a point at sunset, read the height above the valley floor and add the matching value in "A" to the valley floor sunset T.

(2) With time the T at a non-draining site (slopes, spurs, ridges) will cool by radiative heat loss, and will follow a blue, horizontal line to the right. Add the value in "B" to the value in from (1) above.

(3) Draining sites (gullies, creeks) will follow orange lines to the right and down, but will carry their T derived from valley floor sunset temperature plus their initial "A" value and the current "B" value.

(4) Where orange line brings colder air a blue line it passes, the lower T applies and a drainage inversion forms.

(5) Remember to hold the Dew Point (DP) constant.

(6) Sometimes high ground will have a different DP, which will be carried down orange lines.

(7) Derive the new Relative Humidity (RH) from T and DP.

(8) Use T and RH as inputs to local FDI calculations.