

# 3. Mist and Fog Forecasting Techniques

... a suspension in the air of microscopic water droplets or wet hygroscopic particles, reducing visibility at the earth's surface.

- used when visibility is  $\geq 1000\text{m}$  and  $\leq 5000\text{m}$  and  $\text{RH} > 95\%$

- $T^{\text{dry}} - T^{\text{dew}} \leq 0.5 \text{ C.}$

# Fog is defined as ...



... a suspension of microscopic water droplets in the air reducing visibility at the earth's surface to:

- < 1000m for met. observations, aviation and shipping
- < 200m (dense fog) for public service purposes
- $T_{\text{dry}} \approx T_{\text{dew}}$ .

- Freezing fog
  - Supercooled drops which freeze on impact with a surface (produce rime)
- Ice fog
  - Tiny suspended ice particles
  - Requires  $T \leq -30^{\circ}\text{C}$



There are three main types:

- Radiation fog
- Warm Advection fog
- Upslope fog

# RADIATION FOG



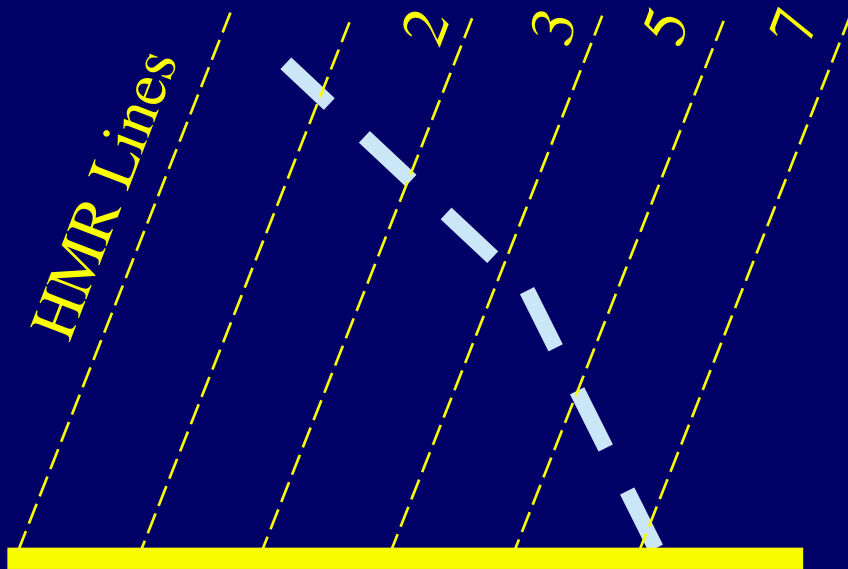
- Overnight clear skies
- Moist air in lowest 100m
- Moist ground
- Light surface wind = fog
- >5KT surface wind = low cloud (turbulent stratus)
- Valleys or 'bowls'
- Fog point

- Definition: The screen temperature at which fog may be expected to form
- The fog point may be much lower than the air mass dew point
- Why?



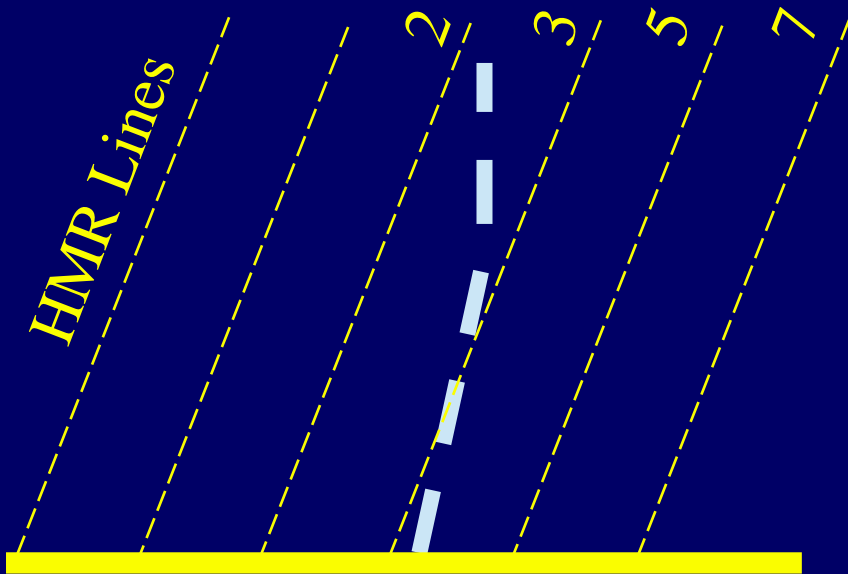
- Fall in surface temperature on radiation night
- Air cools to dew point
- Dew deposition
  - Latent heat given out during condensation slows temperature fall
  - Air near the ground becomes drier
- Dew point falls
- So fog point < Air mass dew point

## Large positive hydrolapse



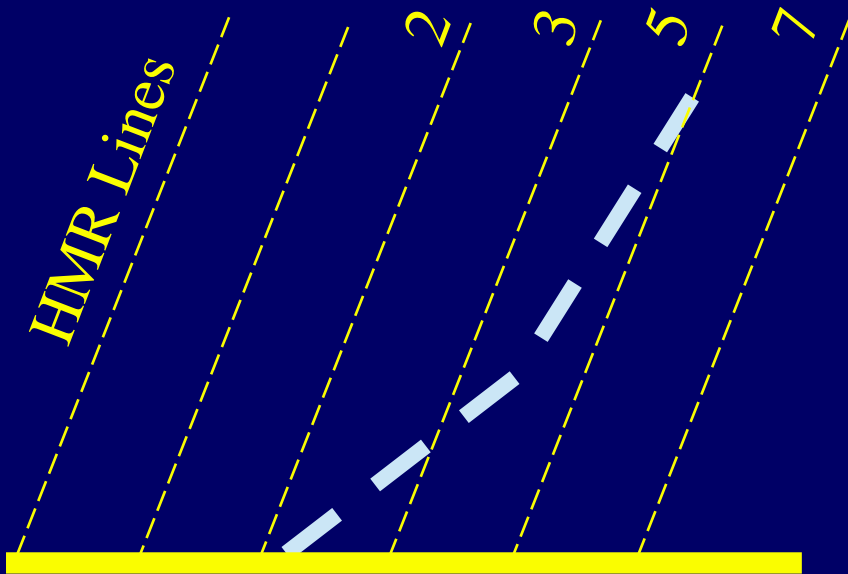
- Much drier air aloft
- Moisture losses at ground not replaced by diffusion
- Large amount of cooling for fog
- Fog point  $\ll$  airmass dewpoint

## Small positive hydrolapse



- Slightly drier air aloft
- Drying at surface soon produces negative hydrolapse
- Less cooling for fog
- Fog point slightly  $<$  airmass dewpoint

## Negative hydrolapse



- More moist air aloft
- Moisture losses at ground readily replaced from above
- No further cooling for fog
- Fog point = airmass dewpoint

Saunders