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Advection Fog/Radiation Fog Comparisons

The following tables are taken from the DLAC 1 Lesson 1 teletraining session:

Characteristics

Characteristics	Advection Fog	Radiation Fog
Duration	Can last for several days	Generally short duration (< 24 hrs), often dissipating by afternoon
Intensity	Can range from thin to dense, but dense conditions may cover large area. Changes in intensity tend to be more gradual than with radiation events.	Varies with denser fog likely over open areas or near water bodies
Coverage	May be advected over large areas and across great distances	Typically remains in one place, patchy and localized
Depth	Varies with the boundary layer but tends to be deeper than radiation fogs since it is often driven by synoptic scale factors	Varies with the depth of the radiation inversion. Can be as deep as advection fogs, but tends to be shallower as it is formed more by local factors
Time of day	Can form and advect into a region almost any time of day. Some tendency to develop in late afternoon or evening hours over coastal areas.	Tends to form late at night or in early morning hours. Can also form following precipitation that clears near or after sunset.

Dominant Processes in Advection or Radiation Fog Events

Advection Fog	Radiation Fog
Fog that develops when warm air moves over a colder underlying surface • Surface may be cold ground, snow cover, water, or ice • Cooling of warm air mass continues until the dew point is reached	Surface-based cloud caused by nocturnal cooling at and/or near the ground surface
Formed primarily by boundary layer dynamic and adiabatic processes including advection of moisture, temperature • Radiative processes still play a role but are not dominant.	Forms and completes its life cycle in situ (Can be advected under the right conditions)
Can occur with light or moderate low-level winds that can be less than 10 kts, but can also occur with winds stronger than 10 kts	Boundary layer dynamic and adiabatic processes are negligible. Winds generally 5 kts or less.

Low-Level Factors

Advection Fog	Radiation Fog
Differential heating between the underlying surface and the air mass being advected	Moist low-level conditions below a capping inversion

• Rapid development can occur as preconditioned air mass moves over cooler surface. Preconditioning of the atmosphere generally lasts 2-3 days prior to advection fog episodes, especially along coastal areas.	
Air parcel trajectories that originate over a moisture source sufficient to establish a moist boundary layer condition	Rapid cooling of the lower boundary layer below the inversion
Depth of the surface-based moist layer increases as a result of mechanical turbulence and convective mixing of buoyant moist air	Presence of a low-level anticyclone creating favorable conditions by • Suppressing surface winds • Drying the air aloft through subsidence, enhancing radiative cooling at the surface • Providing capping inversion
Large-scale anticyclonic winds and subsidence • Provide capping inversion so boundary layer can saturate • Moderate vertical shear often exists near the capping inversion	Moderate vertical shear often exists near the capping inversion

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