

Fire Weather and Fire Behavior Impacts from Clouds

<http://www.predictiveservices.nifc.gov>

<http://www.weather.gov>
<http://fire.boi.noaa.gov>

High Clouds:
 Cloud bases typically
 16,000 - 50,000 ft
 (5-15 km)
 Usually seen as
 indirect indicators
 of potential behavior



Cirrus Streaks
 Single or multiple bands
 across sky indicating Jet
 Stream aloft - Possible
 instability or surface winds
 increasing fire behavior



Cirrus
 Dense, in patches, not
 increasing, or with tufts -
 No significant fire weather
 or fire behavior expected



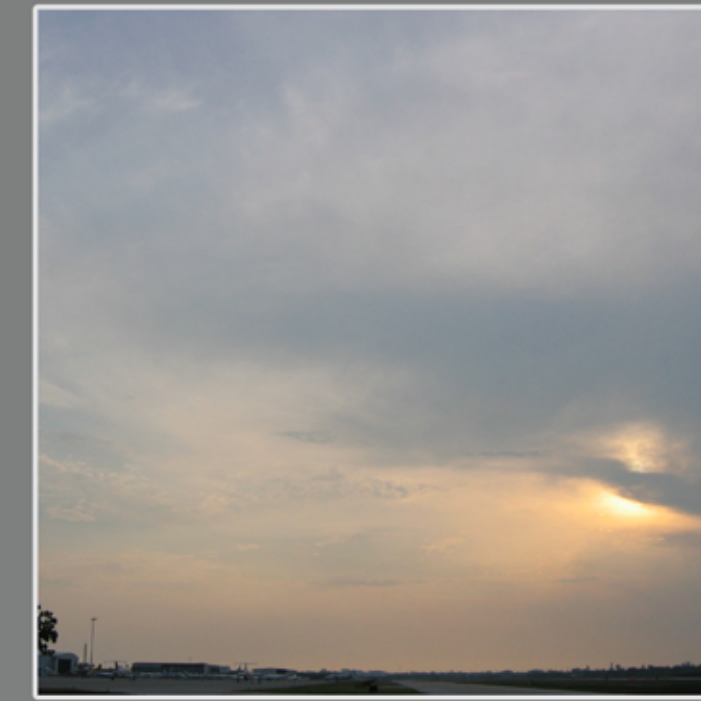
Cirrus
 Anvil shaped remains
 of a thunderstorm -
 Watch for gusty winds
 from nearby decaying
 thunderstorms



Cirrus
 In hooks or filaments,
 increasing in density -
 Often indicates cold air aloft,
 watch for possible instability
 leading to more active fire



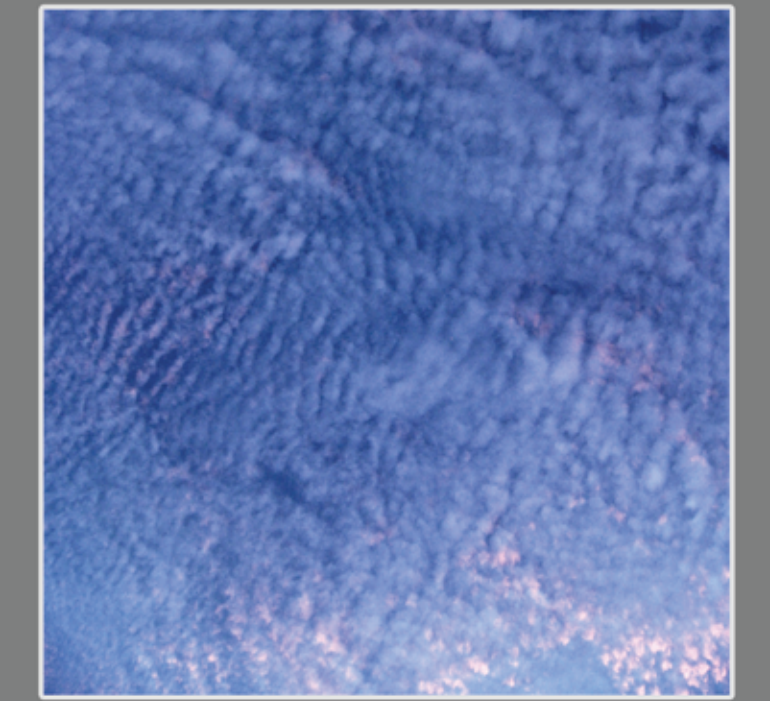
Cirrostratus
 Cirrus bands, transparent,
 relatively near the horizon -
 Typically indicates weather
 fronts are 2 to 3 days away



Cirrostratus
 Cirrus bands, covering
 majority of the sky with sun
 obscured - Typically indicates
 weather fronts are one day
 or less away



Cirrostratus
 Sun mostly visible - No
 significant impact on
 fire weather or fire
 behavior



Cirrocumulus
 Alone or with some cirrus
 or cirrostratus - very high
 instability, usually little
 impact on surface conditions

Middle Clouds:
 Cloud bases typically
 6,500 - 23,000 ft
 (2-7 km)
 Can be direct and/or
 indirect indicators of
 potential behavior



**Altostratus /
 Nimbostratus**
 Usually dense enough to
 hide the sun or moon - Often
 contains steady rain, watch
 for slippery footing, expect
 minimal fire activity



Altostratus
 Semi-transparent, one level -
 Indicates weak mid-level
 instability and increasing
 moisture, possible monsoon
 thunderstorm development
 within 24 hours



Wave Cloud
 Formed by strong winds
 over uneven terrain, often
 repeating downstream -
 These strong winds may
 surface and result in
 running fire



Altostratus
 One or more bands or layers,
 expanding, thickening -
 Indicates instability present,
 monitor for additional
 development



Altostratus
 From the spreading of
 cumulus or cumulonimbus -
 Could indicate presence of
 nearby thunderstorms, caution
 for gusty winds generally from
 the direction of the clouds



Altostratus
 Generally opaque layers,
 possibly containing virga -
 Weak instability, virga may
 result in gusty winds,
 cloud density usually
 inhibits further convection



**Altostratus Floccus (Shown) /
 Altostratus Castellanus**
 Cumulus-like tufts or flat
 base with turrets - When
 observed in morning hours,
 often indicates afternoon /
 evening thunderstorms



Altostratus
 Chaotic sky, cloud bases
 at several levels - Lower
 cloud base may block view
 of higher based storms,
 hides potential for lightning
 and gusty winds

Low Clouds:
 cloud bases up to
 6,500 ft (0-2 km)
 Usually have direct
 impacts on potential
 fire weather and
 fire behavior



Fair Weather Cumulus
 Flattened Appearance -
 Weak instability present,
 but rarely results in further
 development, active fire
 behavior still possible,
 especially under low humidity



Cumulus
 Moderate/strong vertical
 development, or towering
 cumulus - Atmosphere is
 unstable, monitor for futher
 development and increased
 fire activity



Cumulonimbus (aka Cb)
 Tops not fibrous, no anvil -
 Significant vertical motion
 present, gusty downdrafts
 likely, thunderstorms are
 possible, erratic fire activity



Stratocumulus
 Moderate instability - Showers
 and downdrafts likely,
 thunderstorms possibly hidden,
 variable fire behavior



Stratus
 Smooth appearance,
 continuous low layer - Often
 inhibits aircraft use, minimal
 fire activity



**Stratus Fractus /
 Cumulus Fractus**
 Occurs with rain or snow -
 Usually associated with cold
 front, winds may push fire



Stratocumulus & Cumulus
 Usually associated with cool
 weather - Fire activity may
 increase with afternoon
 heating and instability



Mature Thunderstorm
 Strong downdraft winds,
 lightning, heavy rain, and hail
 possible underneath - Distant
 terrain channelled winds and
 lightning possible

Special cases:
 These phenomena
 occur under
 significantly unstable
 conditions -
 Exercise extreme
 caution when they
 are observed,
 particularly when
 fire is between you
 and it



Pyrocumulus
 Unstable conditions where
 smoke moisture condenses
 to form cumulus -
 Downdrafts, rain, lightning
 possible



Tornado
 Rapidly rotating column
 that touches the ground
 under a thunderstorm -
 Seek immediate shelter in
 a sturdy building



Fire Whirl
 Localized, intense wind swirl
 under unstable conditions with
 possible speeds exceeding 50
 mph - Can scatter fire, spot
 across lines, and enter safe zones



Shelf Cloud
 Represents the leading edge
 of strong winds in advance
 of a thunderstorm - can
 extend ahead and past the
 main thunderstorm column



Virga
 Rain or snow that evaporates
 before reaching the ground -
 Sudden, gusty outflow winds
 may dramatically increase
 fire behavior



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