

Aviation Weather Guide

ICING



Icing occurs when atmospheric conditions lead to the formation of water ice on the surface of an aircraft.

Types of Icing

Clear - Greatest threat. Large supercooled water droplets spread out and freeze as a sheet of ice. Clear or translucent in color. Temperature range of 0°C to -10°C.

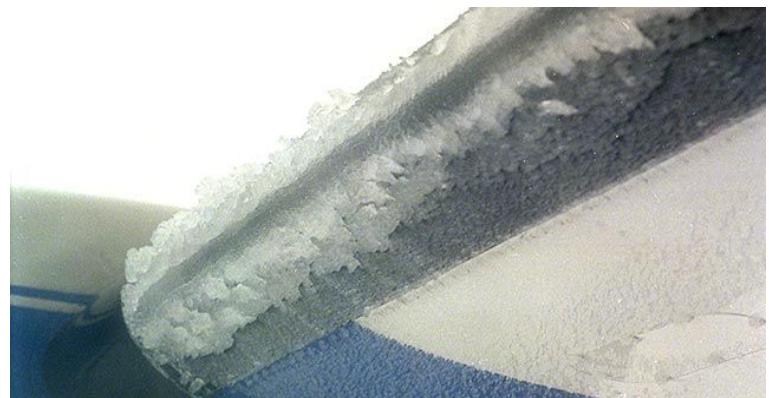
Mixed - Both large and small supercooled water droplets freeze and mix together. Clear and opaque in color. Temperature range of -10°C to -15°C.

Rime - Small supercooled water droplets freeze instantaneously on contact with cold aircraft surfaces. Milky and opaque in color. Temperature range of -15°C to -20°C.

Clear

Mixed

Rime



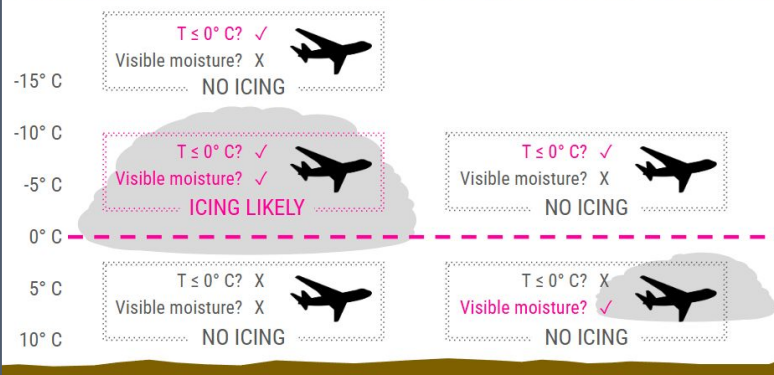
Severe clear icing on leading edge of aircraft wing

Icing Intensity

- ☞ **Light** - rate of accumulation ¼" in 15-60 minutes
- ☞ **Moderate** - rate of accumulation ¼" in 5-15 minutes
- ☞ **Severe** - rate of accumulation ¼" < 5 minutes; ice protection systems may be ineffective

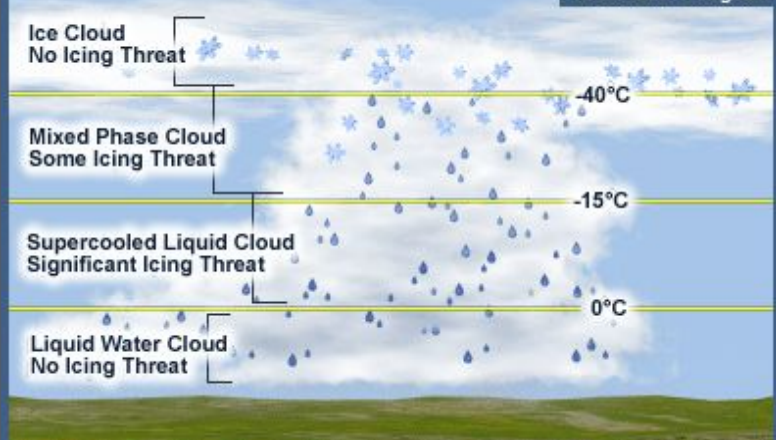
When is icing likely?

Icing is likely when the temperature is below freezing AND visible moisture is present



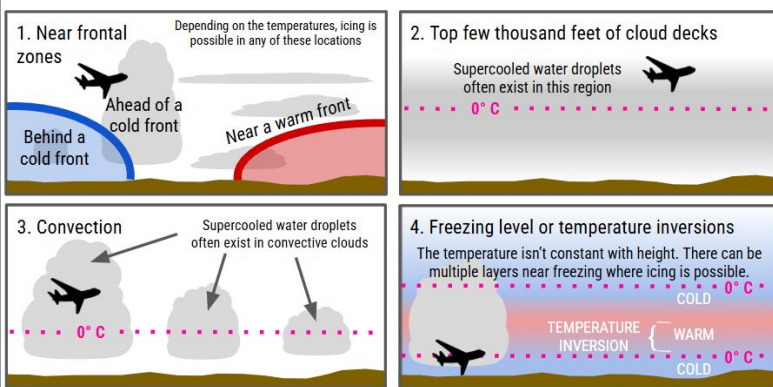
Idealized Cloud Phase and Potential Icing Threat

The COMET Program



Four common weather patterns for airframe icing

The chance for airframe icing comes down to temperature and visible moisture (clouds). Here are 4 common weather situations that can be favorable for icing.



Did you know?

NTSB findings showed that from 2008 – 2021, there were an average of 4 aircraft accidents and 5 fatalities per year that identified structural, in-flight icing as a cause or factor.



PRE-FLIGHT (MISSION PLANNING)

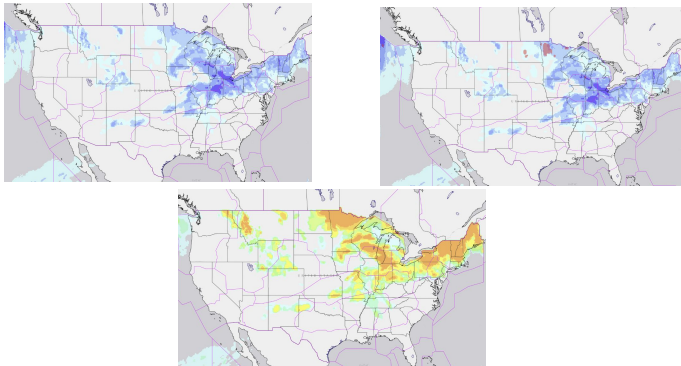
- ✈ **Check the latest pilot reports** for confirmed icing conditions along your route.
- ✈ **Consider carrying a high intensity flashlight** to detect ice accumulation on the aircraft at night.
- ✈ **Check for G-AIRMETs & SIGMETs** along your route. G-AIRMETs show areas where moderate icing is likely. SIGMETs show areas where severe icing has been reported or is likely.
- ✈ **Icing conditions are most likely, in general, from fall to spring.** If the temperature is near or below freezing (0°C) and clouds or precipitation are in the forecast, expect some icing along your route and plan accordingly!
- ✈ **Determine icing exit strategies during preflight**, which may involve climbing or descending along the planned route.

IN-FLIGHT (SITUATIONAL AWARENESS)

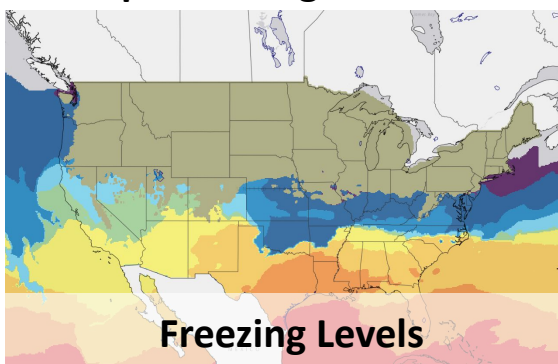
- ✈ **Stay away from thunderstorms** as ice can rapidly accumulate on an aircraft!
- ✈ **Be aware of the temperature!** Although ice accumulation is possible in temperatures as cold as -40°C, more supercooled water droplets will stick to and accumulate on aircraft in/near clouds when flying at temperatures between 0°C and -20°C.
- ✈ **Keep in mind** that water on your aircraft can become ice when flying into a region where the temperature is at/below freezing (0°C).
- ✈ **Be alert! Both freezing drizzle and freezing rain are near-surface phenomena** that can cause ice to accumulate on an airframe during taxiing, takeoff, and landing.
- ✈ **Exercise caution near mountains.** Most severe icing occurs above ridgetops on the windward side, extending to ~5,000 ft. above.

Aviation Weather Center (AWC) Icing Forecast Products

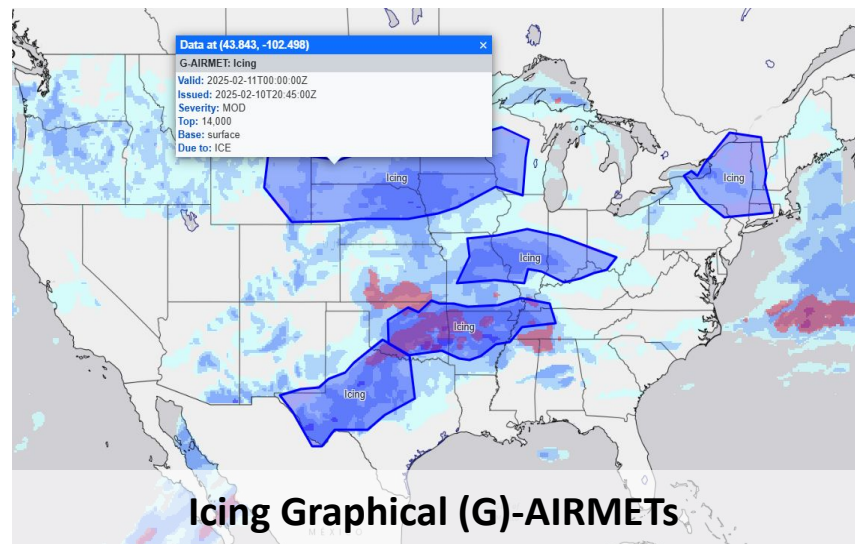
- ✈ Moderate or Greater Icing SFC-FL480
- ✈ Multiple Freezing Levels
- ✈ Freezing Levels



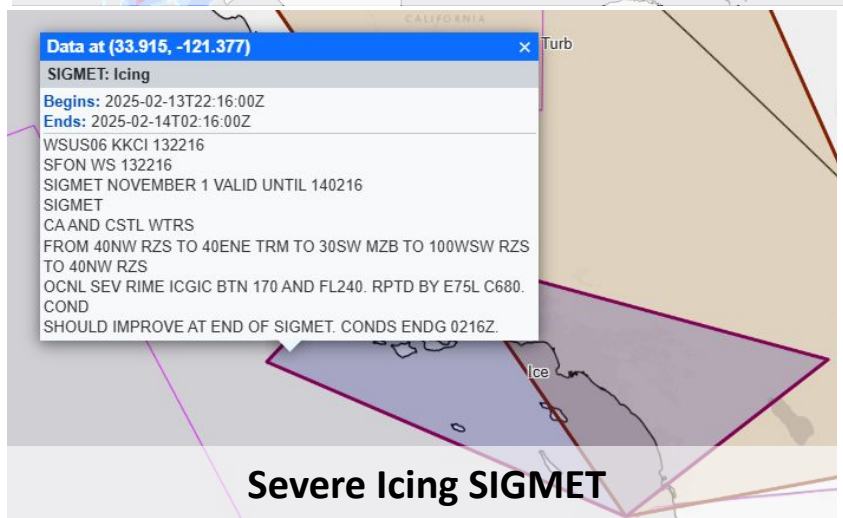
Graphical Icing Guidance



Freezing Levels



Icing Graphical (G)-AIRMETs



Severe Icing SIGMET

Icing resources available at:
AviationWeather.gov