

Introduction to Weather Forecasting for Cruising Sailors

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Overview

- Introduction
- Weather forecasting goals for cruisers
- Sources of information
- Tips & Hints
- Learning more

Goals of Weather Forecasting for Cruisers

Why do we care about weather?

- Safety
- Comfort
- Speed
- Enjoyment

Nature of cruise determines type of weather forecast

- Day sail / overnight cruise/ multiday cruise
- Different resources brought to bear

Day sail

- Ultra-short term forecast important
- Localized to a single area
- Most important factors are wind and waves
 - Local wave forecast
 - Precision in wind direction and speed

Overnight Cruise

- Concern is 48-72 hour forecast
- Wind important
- Waves important but harder to forecast
- May be concerned about broader area

Multiday Cruise

- Long-range forecasts matter
- Winds matter - general direction as a navigation tool
- Large geographic scope
- Need for updating during the cruise

Weather information resources

Gathering weather information in the 21st century

Before you go

Web sites

- <http://www.crh.noaa.gov/lot/> - National Weather Service Chicago Office
- <http://www.wunderground.com> - Best free general weather resource
- <http://www.sailflow.com/> - Sailing-oriented with wind forecasts
- <http://www.accuweather.com/premium> - paid service is worth it

TV / Radio/ News

- Tom Skilling - WGN / Tribune / www.chicagoweathercenter.com/
- Local news in the towns you'll be visiting (generally available on the web)

On the Water

NOAA Weather Radio

- Best source of reliable weather information on the water
- NOAA MSC 11/12 - Great Lakes Weather Radio information - <http://www.nws.noaa.gov/om/marine/pub.htm>
- NOAA Guide to Marine Weather Services - Great Lakes - http://www.nws.noaa.gov/om/brochures/mw_lakes.pdf

Satellite Weather Information

- Raymarine - <http://www.raymarine.com/Default.aspx?site=1§ion=2&page=1331>
- Sirius Satellite Weather
- Garmin - <https://buy.garmin.com/shop/shop.do?pID=244> - XM Satellite Weather
- Furuno - <http://www.furunousa.com/products/productdetail.aspx?product=BBWX1> - XM Satellite Weather

iPhone Apps

- Accuweather for iPhone (\$0.99)- <http://bit.ly/ffPXQD>
- BoltMeter (\$2.99) - <http://bit.ly/gio0tn>
- WindFinder Pro (\$1.99) - <http://bit.ly/hM7Epg>
- WGN Chicago WeatherCenter (\$1.99) - <http://bit.ly/g0oi8D>

iPad Apps

- Accuweather for iPad (\$0.99) - <http://bit.ly/elxT3y>
- Hurricane HD (\$3.99) - <http://bit.ly/epwMKk>
- MarineCast (\$3.99) - <http://bit.ly/ecmksc>

Tips & Hints

On the water knowledge

Terminology

- Wind direction - where it's coming from
- Wave hight - really “significant wave height” - *average height of the 1/3 highest waves, trough to crest*
- Small Craft Advisory - definition is by area. For Great Lakes it is “sustained wind or frequent gusts between 22 and 33 knots inclusive, and/or seas or waves greater than 4 feet”. No definition of what a small craft is!
- Wind speed - 2 minute average wind speed.

Wind

- Prevailing southwesterlies
- Clockwise around H, counterclockwise around L
- Wind blows more or less parallel to isobars on surface map, across them at high-altitude map
- Stand back to the wind, rotate 30 degrees to the right - L is to your left, H is to your right
- Wind flows from high pressure to low
- Higher pressure gradient = faster winds

Lake Breeze and Land Breeze

- Develop because land warms and cools quicker than water
- Early afternoon lake breeze / sea breeze
 - Cool air from lake goes toward warmer land
 - Most prominent in spring and summer when land is warm, water is cool
- Early evening land breeze - from land to lake
 - Cool air from land goes towards warmer water
 - Most prominent in fall and winter when water is warm, nights are cool
- *See how these breezes interact with prevailing wind - San Francisco is different than Chicago*

Pressure

- Low pressure (L)
- High pressure (H)
-

High Pressure

- Clockwise wind flow, slightly outward
- Low humidity
- Cooler temp
- Pushing away moisture and bad weather
- Lighter winds
- Clear skies
- Cooler nights due to lack of cloud cover

Low Pressure

- Counterclockwise wind flow, slightly inward
- High humidity
- Warm temp
- Bad weather - sucking in moisture from around
- Warmer evenings due to cloud cover

Clouds

- Cloud appreciation society - <http://cloudappreciationsociety.org>
- NOAA Cloud Chart - <http://www.nws.noaa.gov/om/brochures/cloudchart.pdf>
- Clouds tell you about next 12 hours
- Isolated, wispy, white or very high clouds mean good weather
- Dense, crowded, towering and dark clouds are mean worse weather coming
- Sharper thunderclouds = worse storms

Fronts

- Boundaries between two air masses
- Defined by what type of air is replacing the other - ie warm front is an edge of warmer air mass replacing cold air mass
- You can tell a front is passing when
 - Temperature changes rapidly
 - Pressure changes rapidly
 - Winds “converge”

Cold Fronts

Phenomenon	Prior to front passing	While front passes	After front passes
Temperature	Warm	Cooling Suddenly	Steadily cooling
Pressure	Decreasing steadily	Lowest, then sudden increase	Increasing steadily
Winds	Southwest to Southeast	Gusting and shifting	North to West
Precipitation/Conditions	Brief showers	Thunderstorms	Showers then clearing
Clouds	Increasing: Cirrus, cirrostratus, cumulonimbus	Cumulonimbus	Cumulus
Visibility	Fair to poor; haze	Poor but improving	Good
Dew Point	High and steady	Sudden drop	Falling

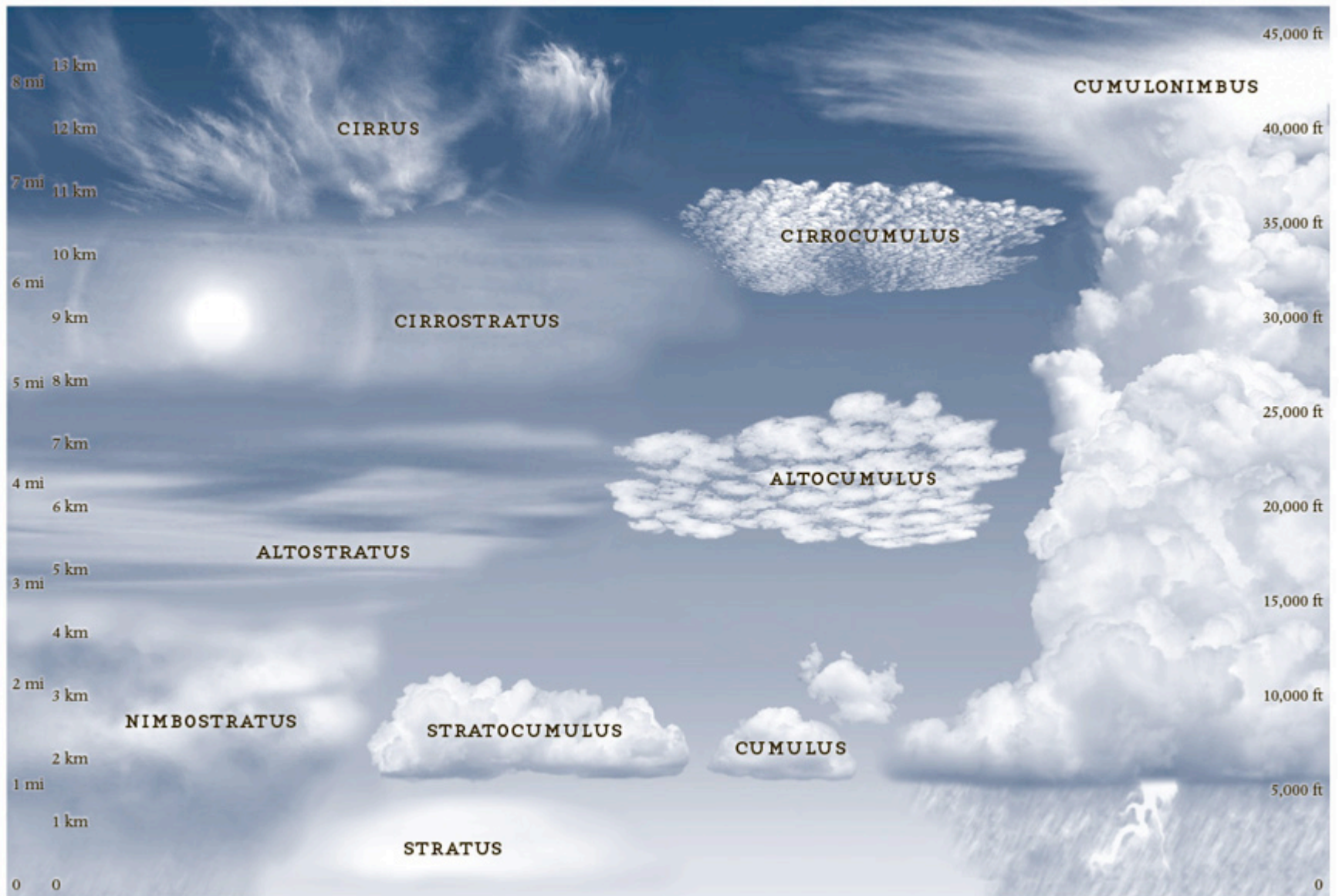
Warm Front

Phenomenon	Prior to front passing	While front passes	After front passes
Temperature	Cool	Warming suddenly	Warmer then steadying
Pressure	Decreasing steadily	Leveling off	slight rise, followed by a decrease
Winds	south to southeast (backing)	Variable	South to southwest (veering)
Precipitation/Conditions	Showers, drizzle, sleet or snow	light drizzle	None or light rain
Clouds	Cirrus, cirrostratus, altostratus, nimbostratus then stratus	Status or cumulonimbus	Clearing with scattered stratus
Visibility	Poor	Poor but improving	Fair in haze
Dew Point	Steady rise	steady	rise then steady

Squall lines

- Line of severe thunderstorms that forms along or ahead of a cold front - tend to outrun the front
- Heavy precipitation, hail, lightening
- Tend to bow out, with localized high pressure right behind line - strong winds due to descending air
- “Kinks” in squall line involve a localized low pressure which often breed tornados

THE TEN MAIN CLOUD TYPES



Altitudes are the typical heights of cloud bases in mid-latitude regions. They will be higher in the tropics and lower near the poles. Illustration by Anthony Haythornthwaite. © The Cloud Appreciation Society, 2009.

Clouds Part II

- Good weather coming:
 - Cumulus - thermals & breeze!
- Bad weather coming:
 - Cirrostratus (wispy clouds in sheets, look like scales) - storm coming
 - Altostratus (thick, high, dark sheets) - rain
 - Cumulonimbus (thunderheads) - storms!

Weather Proverbs and what they mean

<http://www.wxdude.com/proverb.html>

Red sky at night, sailors delight. Red sky in morning, sail take warning

Weather moves west to east.

Red sunset = sun passing through dust in clear, dry air, so likely will be good weather tomorrow - H pressure

Red sunrise = high pressure has passed to the east already, making it likely that bad weather is coming given normal 2-4 day cycle

***Mare's tales, Mare's tales make lofty
ships carry low sails***

Scaly-looking cirrocumulus clouds usually indicate changing, worsening weather accompanying a warm front

***When the glass falls low, prepare for a
blow. When it rises high, let all your
kites fly. The hollow wind begins to
blow, the clouds look black and the
glass is low***

Pressure changes = wind = changing weather

Halo around the sun or moon, rain or snow soon

High level ice crystals cause halos around the sun or moon. Cirrostratus clouds often indicate an approaching warm front and low pressure
The brighter the halo, the higher the probability of precipitation

Weather Education Resources

[Learn more](#)

Books

- World of Weather, by Grenci - <http://amzn.to/gDwH5F>
- Meteorology Today, by Ahrens- <http://amzn.to/gLNgXs>
- International Marine Weather Predicting Simplified - <http://amzn.to/gxQnsU>
- Modern Marine Weather - <http://amzn.to/h4cGYF>
- Cloudspotter's Guide - <http://amzn.to/fOezsq>

Classes & Education

- Penn State Online Certificate in Weather Forecasting - www.worldcampus.psu.edu/WeatherForecastingCertificate.shtml
- College of DuPage Department of Meteorology - <http://weather.cod.edu>
- NauticEd.org Weather Clinic - www.nauticed.org/courses/view/weather

Educational Websites

- Web Weather for Kids - <http://eo.ucar.edu/webweather/>
- JetStream (NOAA) - <http://www.srh.noaa.gov/jetstream//>