

## The Mid Latitude Low

Mid Latitude lows tend to develop along stationary fronts. In particular, they tend to develop along a boundary between a cold, polar air mass and a warm, tropical air mass. As they develop, a wedge of warm air pushes into the cold air, and this is termed the warm sector. It lies between the cold front and the warm front. It is usually when the warm front and cold front are nearly at right angles that the system is nearing its strongest stage. At this time, precipitation patterns with the fronts are well established. As the cold front rotates around the southern end of the low, it will catch up to the warm front and the occlusion process will begin. This is generally the time when the low begins to lose its strength.

The point where the occluded front, the warm front and the cold front meet is called the triple point, and if conditions are right, a new low, sometimes called a secondary low can develop here. In some cases, a secondary low can become stronger than the original low. If no secondary low develops, then gradual weakening of the low will occur as the warm air mass is lifted off the surface, leaving little contrast in air mass at the surface. The low will either dissipate at this point, or will continue as a well developed rotary circulation, but with no fronts, and little significant precipitation.

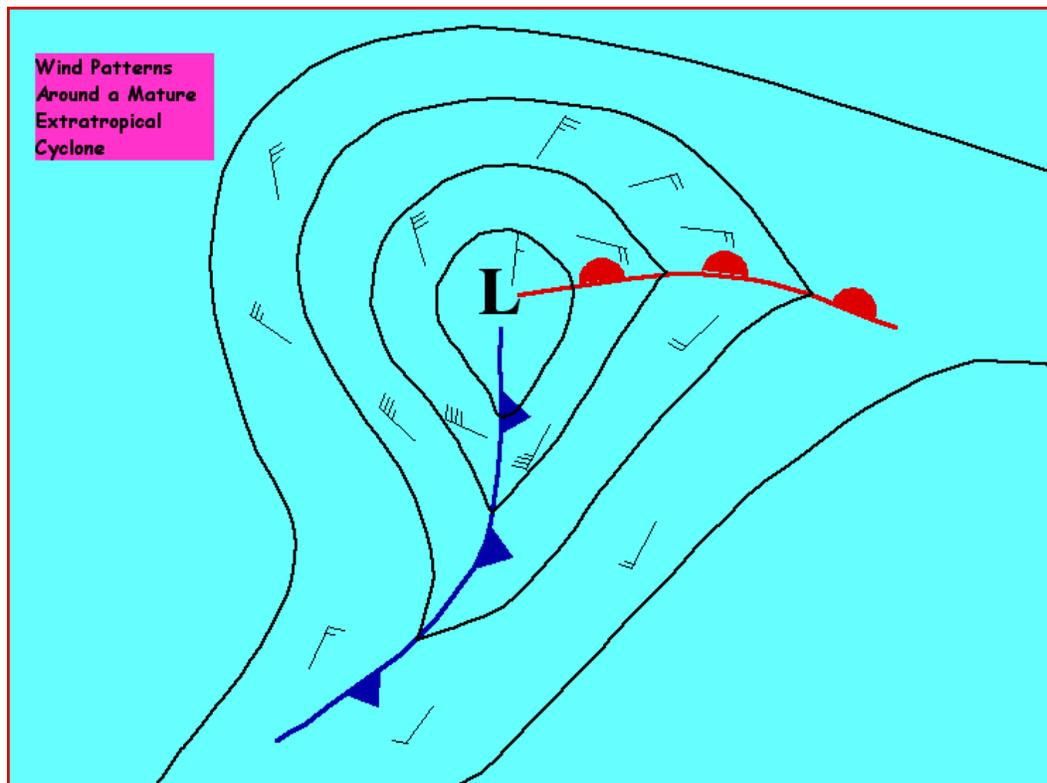
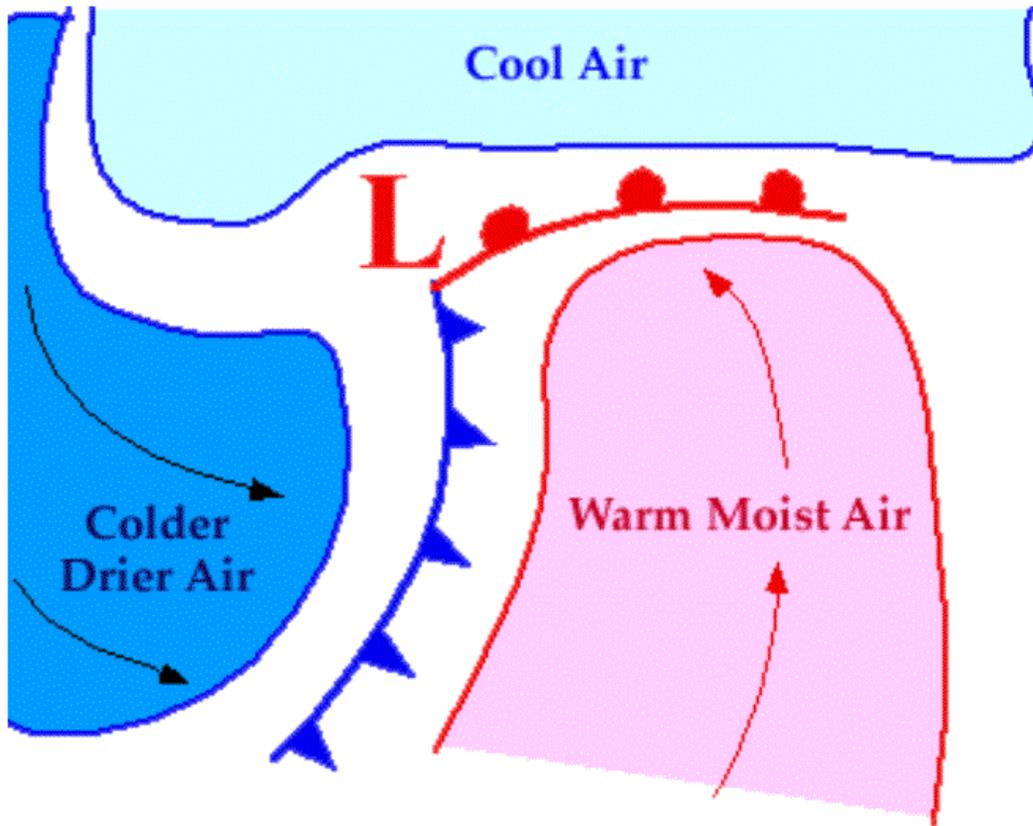
An understanding of the basic structure of the mid latitude low and of fronts allows some basic short term forecasting to be done. To start, compare your present weather conditions with your understanding of the mid-latitude low which will give you a strong indication of where you are located with respect to the low.

- ✓ *What is your wind speed and direction?*
- ✓ *What is your temperature?*
- ✓ *What is the cloud cover like?*
- ✓ *What type of precipitation (if any) is occurring?*

Once you know where you are with respect to the low, then checking the **trends** of weather parameters in combination with your understanding of the structure of the mid-latitude low and its fronts will give you a strong indication of what is likely to occur in the short term.

- ★**Check the clouds:** *Is there a "classic" warm frontal cloud sequence underway? Are the clouds indicative of a position in the warm sector?*
- ★**Check the barometer:** *Is it falling or rising? Is the trend fast or slow?*
- ★**Check the wind:** *Is the wind direction backing or veering? Is the wind speed increasing or decreasing?*
- ★**Check the temperature:** *Is it rising or falling?*

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## Obtaining and Using Weather Charts

A list of useful web sites which provide publicly available weather charts and information is included in this document.

It is best to become familiar with these web sites ashore while you have access to a high speed connection. Figure out which products are going to be most useful for you and then you can prioritize what you want to obtain while at sea dealing with a much slower connection speed. There are also methods to receive charts at sea by email even when full web access is not available. One of the most useful web sites is the **Ocean Prediction Center** web site, which provides products that will cover the regions of interest for both the Marion Bermuda race and the Marblehead Halifax race.

**Surface analysis charts** are produced 4 times per day by the OPC (0000, 0600, 1200, and 1800 GMT). They will typically be available about 3 hours after the observation times. Charts are produced for both the western Atlantic and the eastern Atlantic, and there are links available to merge the two charts into one, full ocean analysis.

Terms and symbols on the surface analysis charts:

- ★VALID: The date and time (GMT) that the data used to produce the chart was gathered.
- ★ISSUED: The date and time that the chart was produced.
- ★WARNINGS:
  - ▶**Gale Warning**: Sustained winds of 34-47 knots
  - ▶**Storm Warning**: Sustained winds of 48-63 knots
  - ▶**Hurricane Force Warning**: Sustained winds of 64 knots or more
- ★ARROWS: Show the forecast motion of warning category lows (or expected warning category lows) for 24 hours after the valid time of the chart.

**Surface forecast charts** are produced twice per day based on forecast cycles beginning at 0000 GMT and 1200 GMT. Forecasts for 24 hours and 48 hours are produced on both forecast cycles by the OPC, and 72 and 96 hour forecasts are produced only with the 1200 GMT forecast cycle. The charts become available anywhere from 4 to 7 hours after the start of the forecast cycle.

Terms and symbols on the surface forecast charts:

- ★VALID: The exact date and time (GMT) that the meteorologist expects the conditions shown on the forecast chart to occur. This includes positions of highs, lows, isobars and fronts.
- ★ISSUED: The date and time that the chart was produced.
- ★WARNINGS: Same as with analysis charts
- ★ARROWS: Show the forecast motion of warning category lows (or expected warning category lows) for 24 hours after the valid time of the chart.

# Sources of Information

## Books

USA Today "The Weather Book", Jack Williams, Vintage Books, division of Random House

*A good overview of general weather concepts. Explanations are not at all comprehensive, but graphics are excellent.*

The AMS Weather Book, Jack Williams, American Meteorological Society

*A more recent version of a general weather concept book by the same author as the USA Today book above.*

Glossary of Meteorology, American Meteorological Society, available in book form or CD form

*The most comprehensive collection of meteorological terms available.*

The Atmosphere, Frederick K. Lutgens, Edward J. Tarbuck, Prentice Hall

*An introductory college text book. An excellent reference with very good explanations of most concepts. Many easy to understand graphics, includes a companion CD*

Meteorology, The Atmosphere and the Science of Weather, Fifth Edition. Moran, Joseph M. and Morgan, Michael D. Prentice-Hall, 1997

*An introductory college text book. An excellent reference with very good explanations of most concepts.*

Maritime Meteorology, Maurice M. Cornish, Elaine E. Ives, Thomas Reed Publications

*A excellent reference for marine weather, although from a British viewpoint. Outstanding, concise explanations of many basic concepts.*

Weather for the Mariner, William J. Kotsch, Naval Institute Press

*A good reference for marine weather, although initially published in the 1960's. Some information is outdated, and recent developments in the science are not included, but the general concepts are solid.*

Heavy Weather Avoidance and Route Design, Ma-Li Chen, Lee S. Chesneau, Paradise Cay Publications

*An excellent presentation of 500 millibar concepts and their use in choosing routes. Geared toward commercial ships, but concepts are equally applicable to recreational vessels.*

## Web Sites

Ocean Prediction Center: <https://ocean.weather.gov>

*The best place to start for marine weather. Lots of information on the site, many links to other sites. You can get to any National Weather Service site within a few clicks from this site.*

National Hurricane Center/Tropical Prediction Center: <https://www.nhc.noaa.gov>

*Tropical storm and hurricane info for the Atlantic and eastern Pacific. Links to many other tropical weather sites around the world.*

University of Wisconsin Satellite Data Server:

<https://www.ssec.wisc.edu/data/geo/#/animation>

*An excellent gateway to many different satellite images.*

GOES Image Viewer: <https://www.star.nesdis.noaa.gov/goes/>

*The government gateway to the newest GOES satellites covering the Atlantic and Pacific.*

Dundee Satellite Receiving Station: <http://www.sat.dundee.ac.uk/>

*Links to worldwide satellite images.*

National Data Buoy Center: <https://www.ndbc.noaa.gov>

*Access to all coastal buoy observations.*

Tides and Currents: <https://tidesandcurrents.noaa.gov>

*Access to all US tide and current predictions.*

American Meteorological Society: <http://www.ametsoc.org>

*The scientific society for meteorologists.*

Texas A & M Weather Interface: [http://leonardo.met.tamu.edu/Weather\\_Interface/](http://leonardo.met.tamu.edu/Weather_Interface/)

*Access to a wide variety of text products.*

Lee Chesneau's Marine Weather: <http://www.marineweatherbylee.com/>

*Access to a wide variety of marine charts and text products.*

NOAA Glossary: <https://w1.weather.gov/glossary/>

*A comprehensive glossary of terms, including abbreviations commonly used in chart and text products from the National Weather Service.*

Best Method to find official weather information from foreign countries:

*Use a search engine (like Google) and search for "<name of country> meteorological service". Usually the search will return a link to the national meteorological service of that country.*