LakeErieWX
MARINE WEATHER

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Coastal & Offshore Marine Weather Forecasting – Two Day Master Class

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Seminar Summary
Coastal and offshore cruising requires many skills. Regardless of where your adventures take you, no aspect of cruising is more important than an understanding of marine weather forecasting. Attendees at the two-day Coastal & Offshore Marine Weather Seminar will develop an understanding of basic weather principles and learn a wide variety of simple forecasting skills that will improve their cruise planning and reduce the likelihood that they will be exposed to uncomfortable or hazardous weather conditions. Classroom instruction, review of past events, and several forecasting exercises combine to create an engaging learning experience.

Seminar Outline

Introduction: My background and a discussion of the seminar's structure and goals. The various NOAA government agencies responsible for producing marine weather forecasts and their areas of responsibility will be introduced.

A Solid Foundation: An understanding of the weather requires a familiarity with basic physical and meteorological principles. This section addresses concepts such as barometric pressure, global circulation, air masses, atmospheric instability and other meteorological terminology in order to build a foundation for the remainder of the seminar.

Interpreting Weather Graphics: Weather forecast graphics use a confusing array of symbols, meteorological shorthand, and color schemes to display current weather conditions and portray future weather patterns. The symbols identifying high and low pressure systems, frontal boundaries, troughs, ridges, tropical cyclones and other meteorological features will be explained.

Clouds & Precipitation: The sectors of a low pressure system signal their intentions by the types of clouds they produce. We'll examine the common types of clouds and the weather associated with them. Forecasting precipitation will also be discussed.

Waves & Ocean Currents: The height and steepness of waves can make all the difference between a pleasant trip and a wet, uncomfortable one. This section explains the dynamics of wave formation and the forces that sustain them. We will review a variety of forecasting resources to help you predict the size of the waves you will encounter. Resources for determining the location and conditions associated with the Gulf Stream will also be examined.

Wind Forecasting: Mariners have struggled to explain the capricious nature of the wind for thousands of years. This section looks at the forces that control the wind and reviews a variety of online resources that will improve your ability to predict its speed and direction. Small-scale and short-lived features such as sea and land breezes will also be presented.

Observational Tools – Radar and Satellite Imagery: Doppler weather radar and satellite imagery have a lot to offer

the weather-savvy mariner. This section will introduce common types of Doppler weather radar and satellite imagery and provide instruction in their interpretation and use. You'll learn how weather radar works (along with a few of its quirks) and how it can be used to monitor the development, intensity, and speed of approaching thunderstorms. Offshore cruisers venture beyond the reach of Doppler radar, and therefore must rely on satellite imagery to monitor approaching weather systems. We'll investigate how to use visible and infrared satellite imagery to enhance marine weather observations and forecasts.

Mid-Latitude Low Pressure Systems: If your cruising destinations are north of the tropics, you will frequently find yourself in the path of low pressure systems, known as "cyclones" in the meteorological community. Their passage often presents a significant risk to boaters in the form of strong, gusty, shifty winds, steep waves, dangerous lightning, and severe thunderstorms. This section will investigate low pressure systems in detail -- including stationary, cold and warm fronts -- and review a variety of resources for predicting the development, strength, and movement of these weather-makers.

Tropical Cyclones: Tropical cyclones include tropical depressions, tropical storms and hurricanes. Tropical cyclones, particularly hurricanes, are accompanied by high winds, towering waves, destructive storm surge, and tornadoes. This section will review the areas in which these storms form and the conditions which promote their development and movement. A variety of specialized tropical cyclone forecasting resources will be introduced.

Thunderstorms: Thunderstorms can quickly spoil a cruise in many ways—strong winds, large waves, dangerous lightning or visibility-limiting rain. This section will examine the types of thunderstorms and the atmospheric ingredients that lead to their formation. Learn why thunderstorms often 'pop-up' late on summer afternoons and why some storms have short life-spans while others persist for hours. Discover why thunderstorms sometimes remain isolated and at other times merge into damaging long-lived squall lines and convective clusters. Reduce your chances of a hair-raising or wind-swept encounter with a thunderstorm by learning to assess the potential for their development using readily available Internet resources.

Forecasting Process & Resources: This section begins with a discussion on a daily forecasting routine and strategy for managing weather forecast information. We'll also examine at a variety of weather forecasting apps and websites. Apps are a convenient and popular way to access wind & wave forecasts, marine observations, Doppler Weather Radar, and prepare the most favorable route. However not all apps are created equal and most don't provide a complete picture to prepare your forecast. Several popular weather-related apps including Squid Sailing, Predict Wind, Windy, GRLevel3, and Radarscope will be reviewed. We'll examine the underlying data sources and discuss the issues associated with relying on apps for your cruising forecasts. Several important websites for the weather-savvy mariner will also be introduced.

Instructor Biography

Mark Thornton has been sailing for more than 25 years and currently owns *Osprey*, a C&C 35. His interest in weather forecasting grew from his experiences cruising and racing on the Great Lakes. Mark is a 2006 graduate of the Penn State University *Certificate of Achievement in Weather Forecasting*, a two-year program that develops skills in general, tropical, and severe weather forecasting.

He is the president of LakeErieWX LLC, a company dedicated to providing marine weather education and forecasting resources for recreational boaters (www.lakeeriewx.com). Mark publishes a marine weather blog and teaches basic forecasting seminars to recreational boaters during the off-season. He has served as the Race Meteorologist for the Bayview Race to Mackinac since 2014. Mark is employed as a Teaching Assistant in the *Certificate of Achievement in Weather Forecasting Program* at Penn State University.