17 講 北大西洋航海氣象概況 https://youtu.be/YS--XnX2mU8?si=rmGS2Ix5kNkbB4MO
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本文概括了北大西洋地區冬季的航海氣象情況,包括:

1)介紹了 pilot chart 這種氣象導航圖,可以免費下載查看;
2)分析了地中海地區的天氣特點,包括潮汐、風向風速等;
3)描述了從直布羅陀到紐約的航線,包括可能遇到的溫帶氣旋、冰山等天氣情況;
4)簡要提到了加勒比海地區的航線和墨西哥灣流的影響。
總的來說,這是一個全面概括北大西洋航海氣象的內容。

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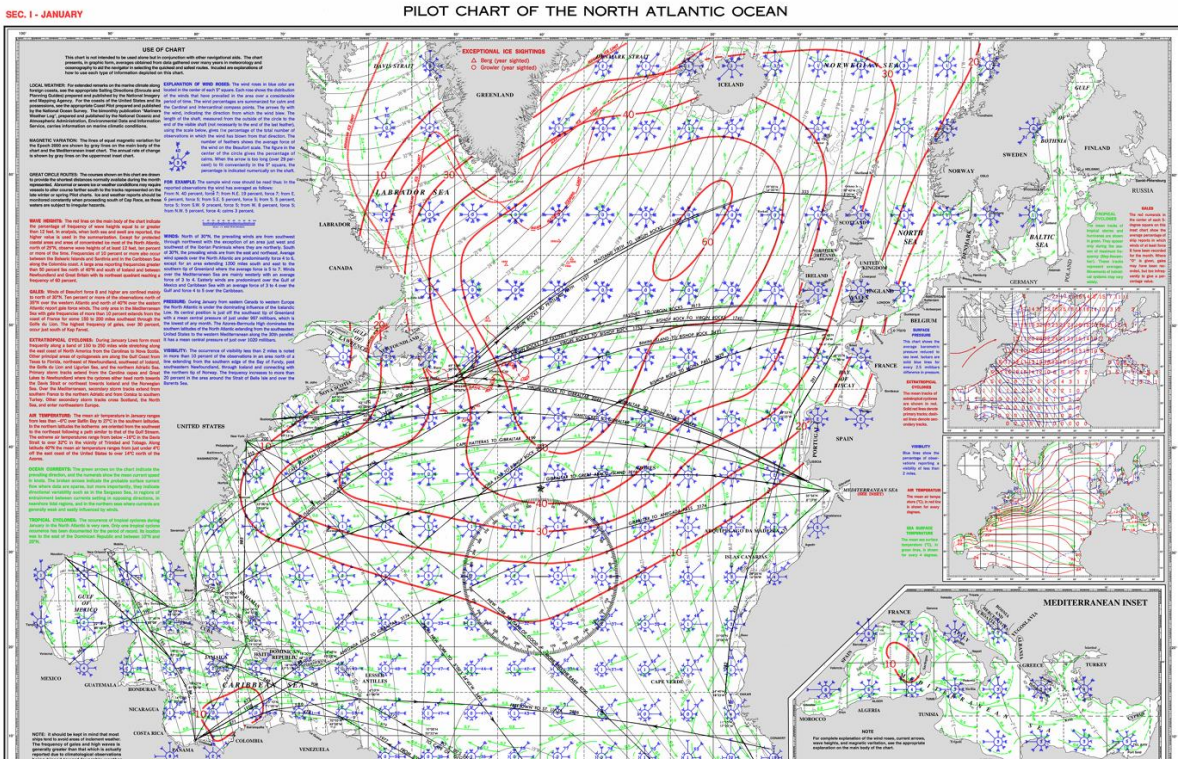
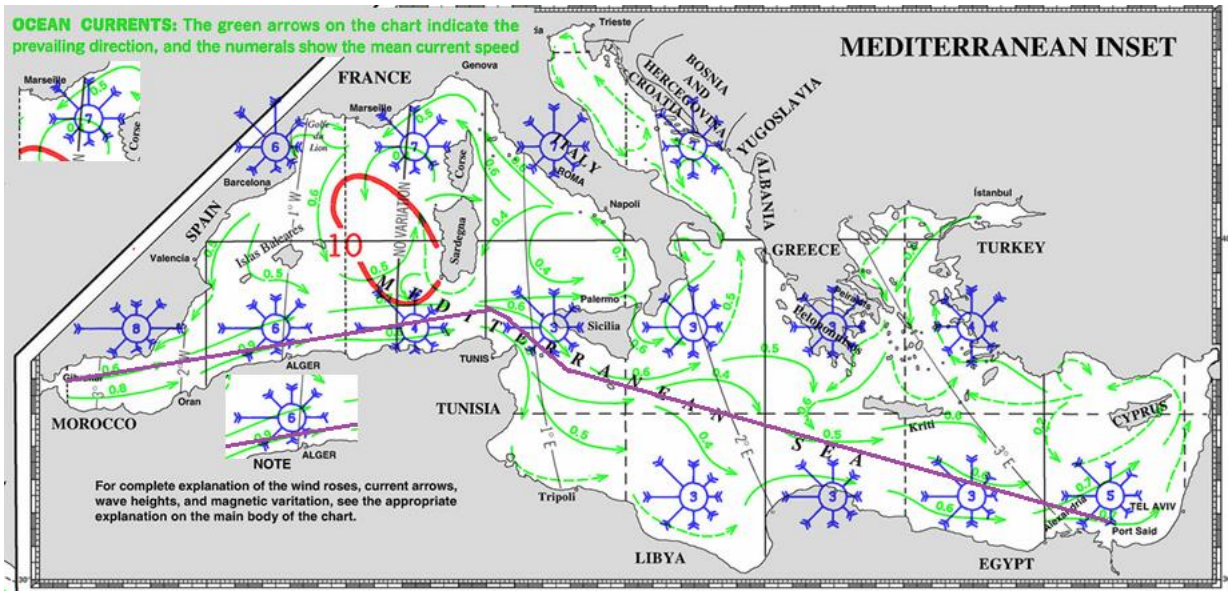


這是航海氣象的第 17 講，講完了天文跟水文，現在要講地理，也就是在各大洋區可能遭遇的天氣狀況。講到天氣，就不能不知道所謂的 pilot chart，pilot 大家都知道是領港，但是什麼是 pilot chart？ pilot chart，就是氣象導航圖。我們看網站 Blue Seas (https://www.offshoreblue.com/nav/pilot-charts.php)，可以免費提供 pilot chart 下載，這裡有南大西洋跟北大西洋，整個一個月一張，整個 12 個月是一本，在船上是一本 pilot chart，就是北大西洋的 pilot chart。我們下載其中的一張出來研究，就是一月份天氣最爛的時候的 pilot chart，等於是一張小比例尺的海圖。

講到北大西洋就要先瞭解一下歷史地理，地理，右下角 Mediterranean，就是地中海，這一隻鞋子在踢皮球的就是義大利，在踢是西西里島，一般蘇伊士運河就在右下角這裡，可能各位的手機太小，所以我把它放大一下



好，看，這裡就寫的是埃及，這裡蘇伊士運河出口 Port Said，Port Said 旁的 ALEXANDRA 亞歷山大港，這港口至少有兩三千年歷史，以前的世界奇觀，亞歷山大港一個燈塔在這邊倒掉，這裡就是地中海裡面的天氣，看到綠色的這些，就是洋流的方向，數字是流速，這邊是土耳其/希臘/愛琴海。

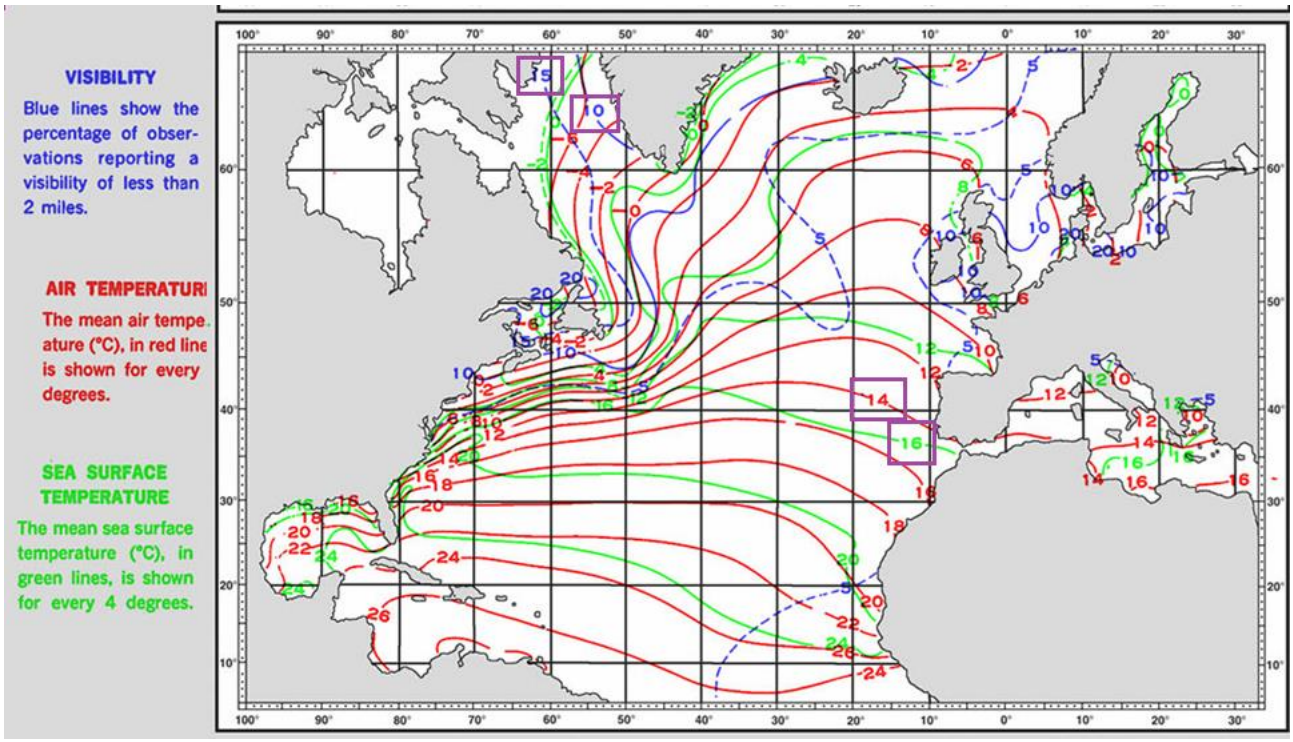
一般從什麼埃及蘇伊士運河出來跑北歐，從 Port Said 這邊出來，就是直接走西西里島下面，義大利下面這邊，經過突尼西亞啊，可能會有很多什麼？很多非洲難民啊，難民都是要跑到希臘海岸去尋求政治庇護。

紅色的十%，是暴風的幾率是什麼？10%，一月份是冬天。在地中海這一塊區域裡面，冬天/還是什麼時候，會有突然的強風，一陣狂風來了。因為一般大家的觀念，都是認為地中海裡面無風無浪，就很可能會產生什麼？Lashing 落海/貨櫃落海，甚至於就是在甲板上的 Lashing Bar 幾個橫搖以後，掃到海裡面去，除了洋流圖 0.4/0.6 的流速，還要會看 Wind rose 就是風向球，是風向玫瑰。他上面有風速跟風向的比率，在中間的數字 7 代表 7%的機率沒有風，這是在 1 月份冬天，還有什麼？其他在區域風向的比率是非常平均，大概都是 20 節的風，有風的時候，在這裡。

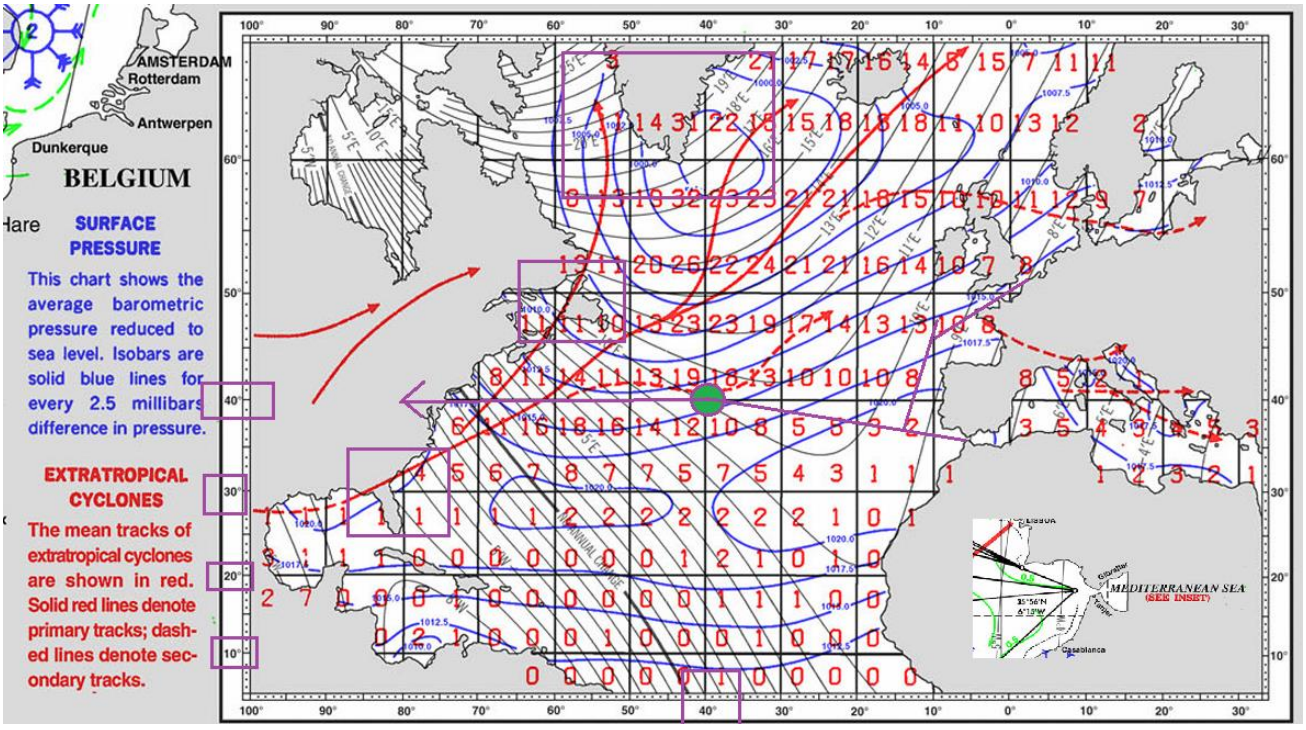
看好了，無風是 6%，吹東南風，大概是 5%，南風也是 5%，吹東風可能是 10%到 15%，是東北風/北風，吹最多的是什麼西風，冬天的時候，吹西風比較多，可能有 30%西風的大小，他風速的尾巴是幾節?大概是 20 節的，這是在地中海裡面的天氣，就雖然平常天氣很好，但可能會有突發性的強風，這就是我做大副的親身經驗，掉了 Lashing bar，要跟公司申請就 1 被罵。

好，再看這一個是什麼？應該是什麼？溫度的分佈圖。看這是 air temperature 是空氣溫度分佈圖。到底是幾度啊？有什麼 14 度、12 度、10 度、跟個什麼 8 度、6 度線，就是剛剛看

到的，地中海裡面平均氣溫是 14 到 16 度、12 度，這是冬天啊，所以氣候宜人，14 度，從這邊就是什麼海峽，看看吧，直布羅陀海峽。



地中海就是區分非洲跟歐洲，所以像義大利西西里島人，經常被人家嘲笑是什麼?是非洲北方的人，認為越接近南邊的人，就是越野蠻，綠色的，看到是海水溫度。當然海水溫度跟空氣溫度差的越多，他的蒸發就越厲害，看到氣溫 14 度，這裡可能是 16 度，還是 18 度，就可以去對照，仔細研究溫度差的沒有很多，所以水汽蒸發的還是不多。



再上來是 visibility，visibility 藍線就是可能能見度不良的情況，各位要仔細看，是藍

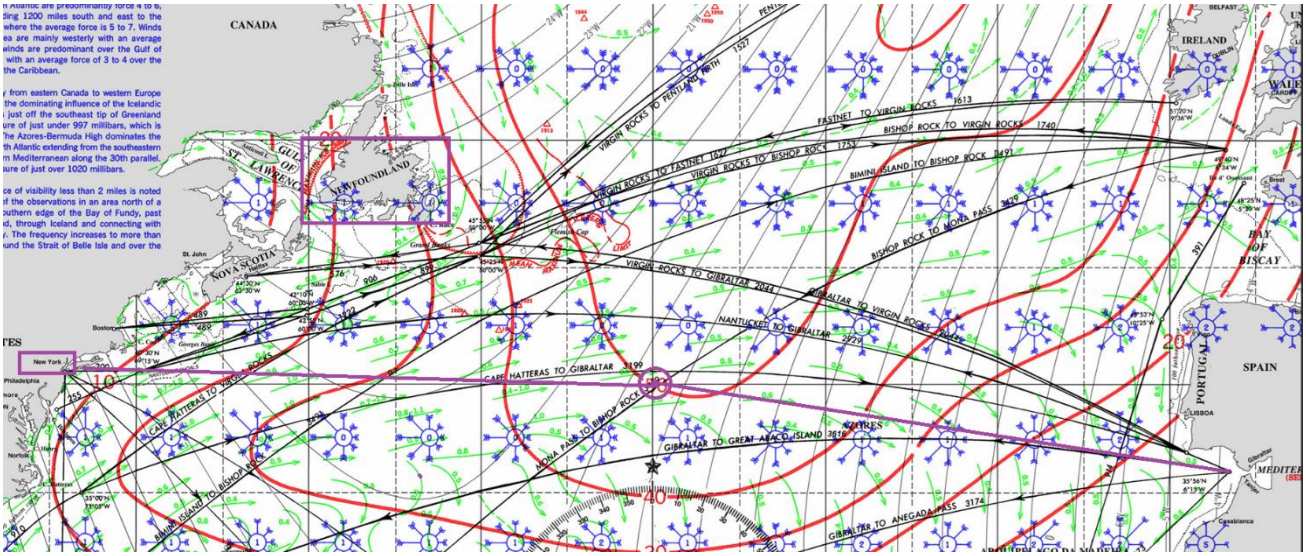
色，有 5%、10%的，能見度不良的機率。在上面看到，是什麼 surface pressure 地表的氣壓圖，這裡還有什麼 extratropic cycle 這就是熱帶風暴的路徑圖，冬天為什麼有熱帶風暴，這應該是 extratropic 應該是溫帶氣旋，所以看到緯度是 10 度/20 度/30 度/40 度/50 度/60 度，這些溫帶氣旋有可能從美國南邊的佛羅里達州，這邊下面是加勒比海，冬天有可能從什麼佛羅里達州，熱帶氣旋一路往北，吹到北邊的格陵蘭來的。

這一塊就是 Greenland 格陵蘭來的，冷空氣變成越來越大，這邊是北海，這裡就是什麼?黑海啦。應該是這樣，吧如果我沒記錯，跑歐洲線的船，大部分都是從直布羅陀跑到德國漢堡，應該是在這附近吧。再上去，黑海就沒有進去了。這邊就是北歐，什麼俄國的聖彼德堡，一般只有香蕉船在跑。這邊三個，就是英倫三島。

現在去美國的航線是從直布羅陀直放紐約，直布羅陀開出去，北上開到大約平緯再高一點，40 度左右，紐約這邊叫做什麼 newfound land 就是紐芬蘭啊，上面是 Greenland，這邊是 newfound land，這一帶經常有格陵蘭下來的冰山，現在冰山數量可能已經少了，因為冰融化了。鐵達尼號就是沉在這裡附近。

extratropic cyclone 就是溫帶氣旋，所以從直布羅陀出來到 40 度，跟西經 40 度再過去，遇溫帶氣旋的機率不大，再從 40 度到紐約這一段，除了冰山，還是可能有溫帶氣旋的產生。當然內陸裡面，也有溫帶氣旋，這是什麼玩意？這就是出名的龍捲風啊！美國人經常什麼賓州啦，路易安州都被吹的胡說八道，就是內陸的龍捲風。在外面的，就是溫帶氣旋。

好再來，看俄國，就是整個的波羅的海 BALTIC SEA，這是北海，這是德國啦，這是丹麥，德國跟丹麥之間，這應該是的漢堡，應該是叫 Bremen haven，布萊梅港。這倫敦旁邊就是 Felixstowe 菲力斯杜港，這比利時，就是 Antwerp 安特衛普港。再上來，就是荷蘭的阿姆斯特丹，對不對？是紅燈區，比利時這裡有個河/斯凱爾特河，進來是什麼，是到 Antwerp，是一個河港，這邊是法國，法國跟英國交接的地方叫做英吉利海峽，經常靠的碼頭是 Le havre 利哈佛。



至於愛爾蘭，北愛爾蘭，就沒有東區，大洋上，我們看冬天，冬天吹的最多的還是什麼？西南風啊！西南風，是暖空氣，一吹到北海這裡，就變成大霧，所以，而且連續吹三天，這邊的霧就起來了，所以北海的風浪，實在是受到英國跟法國的屏障，最難過的應該就是峽角效應，這邊的英吉利海峽，現在看全圖。

看到右邊上方，大概緯度 70 度左右，是冰島，60 度的北緯，一般來講，就已經是什麼是北極圈了。所以這邊 60 度是格陵蘭的南邊，就是北極圈的開始。冰島，就可以看到極光。這拉布拉多海下來的就是拉布拉多洋流。這些黑線，順著拉布拉多洋流線是什麼，是過洋的航線

有什麼由英國法國出發到紐約的，這邊經過的這一塊，就是 Newfoundland，紐芬蘭。這裡就是冰山出沒的地方，因為上面有一個什麼格陵蘭的冰山融化南下，在這邊再過來，就是加拿大，加拿大這邊有一個港口啊，也是貨櫃船隻經常去靠的。我看能不能找到名字 Halifax 哈利法克斯港，以前去靠的叫 Saint John 聖約翰港。因為這裡是在五六十度的高緯，所以 Saint John 聖約翰港潮差非常大，是七米左右，當然因為它是一個內陸港/河港，河水的潮差七米，就是將近兩層半三層樓的高度啊，所以放 Gangway 要小心，以後如果大家有去跑 Saint John 聖約翰港。

這邊就是美國，這邊是北邊的紐約，這裡德拉瓦河是到紐約州的 Baltimore 巴爾迪摩港，在德拉瓦河河口是 Norfolk 諾福克港。在南下是 Savannah 薩瓦納港是供應美國南方的物資的港口，如果你繞進去墨西哥灣的話，就是靠休斯頓，紐奧良。大概現在不會過去，現在跑到的是直放，直布羅陀到紐約。紐約是在叫做哈德遜河的河口

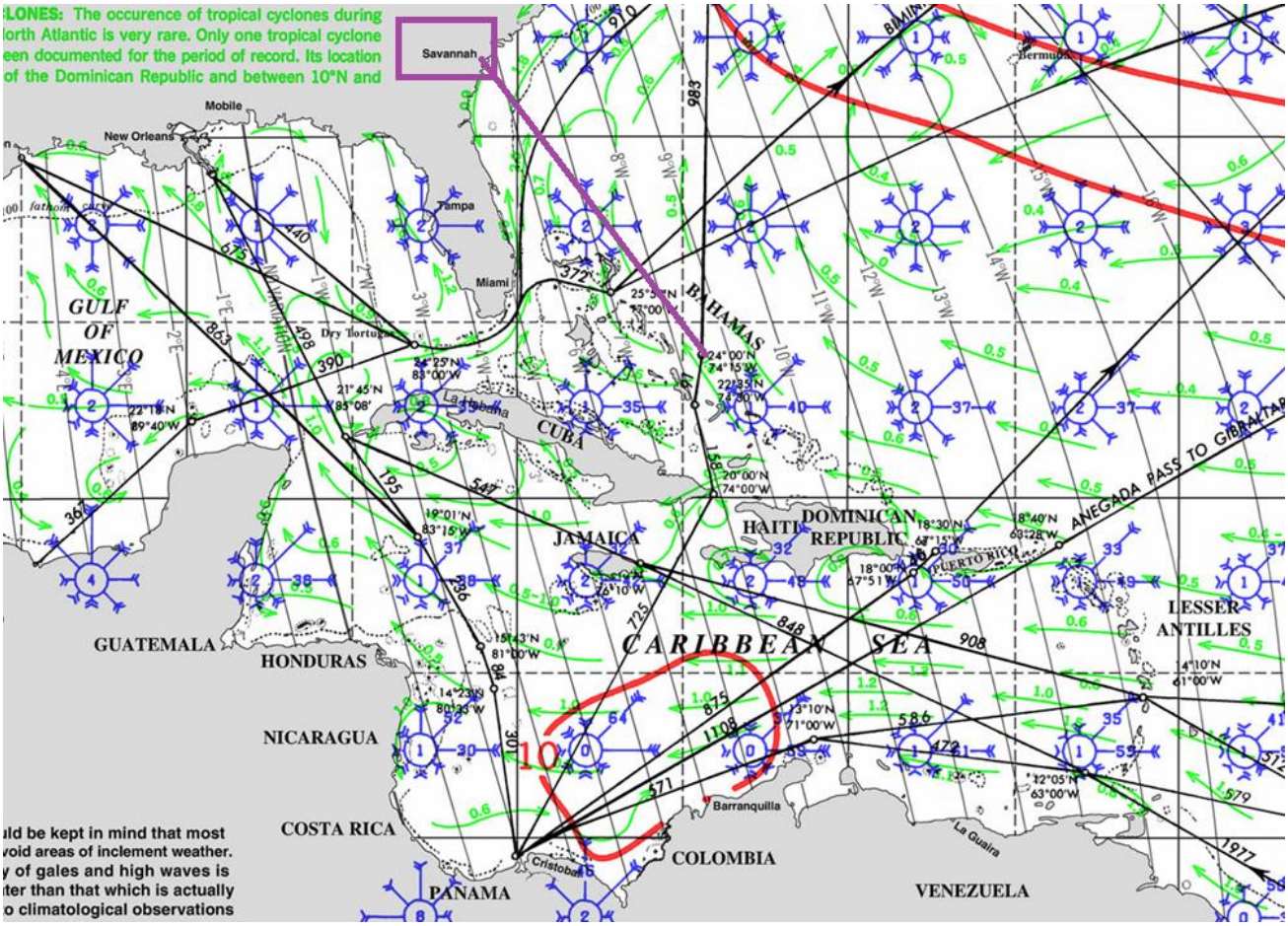
直布羅陀，就是從地中海出來的直布羅陀海峽，上面是西班牙，下面是摩洛哥，再來就是北非啦，這邊下面就是什麼西非啦，海盜區不是索馬里好。看航線有什麼從直布羅陀到什麼？Virgin Rock 維京石頭區是哪裡？是 Halifax。建議航路，所以各位可以自己去看看。

從這邊上去，就是到 Saint John 加拿大，從這邊上去，再下來就是到紐約，所謂的 40/40，看這邊是北緯 40 度，是西經 40 度與北緯 40 的交點，就是在這裡。以前認為在冬天的時候，從直布羅陀開到這一點，西經 40 度與北緯 40 的交點，再放平緯過去紐約，是最舒服的航線。從暴風機率範圍來看，這一點 40/40 剛好是暴風機率 50%的最南端，好像是有些道理，看看實情是怎麼樣？實情是頂流啊，因為你看到流水的方向都是頂的，所以現在看到地中海裡面，實線應該就是漲潮，虛線應該是落潮，這裡都是 0.5 節一路頂流頂到紐約過去，反之回頭的時候，就是順流。

所謂的赤道洋流，我們說行星風的時候，赤道無風帶因為科斯力造成赤道北邊的流水向東北方流，北半球向東北方流，南半球向東南方流，南北半球都向東流，就會有一個赤道反流，赤道反流就是由東往西流，現在在十度附近啊，就有一個赤道反流，是 0.7 節，0.5 節，不可能到 2 節 3 節的赤道反流，有的船長，不想走高緯，就說走低緯度可以吃到赤道反流兩三

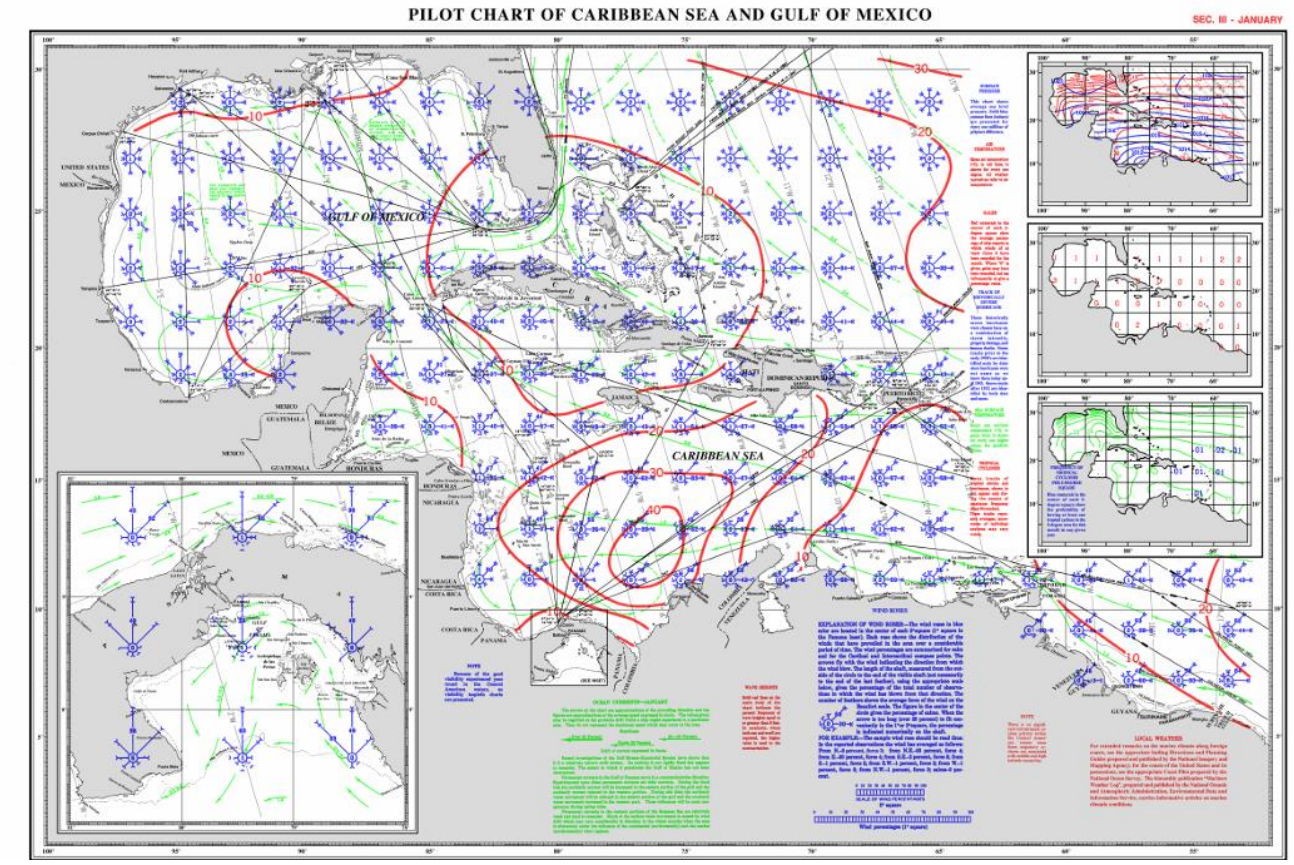
節的流速，事實是不太可能有這麼強的流水。
40/40 航線一路上會遭遇什麼天氣?有頂流對不對，到紐約走平緯是頂流，然後風大部分也是頂，因為從東邊來的風少，從西邊來的風多，風力跟流水配合。反而是跑到 30 度下面，還比較沒有這麼頂，就是 pilot chart。

在這裡，有沒有看到什麼? 溫帶氣旋，在右邊這張圖啦，所以這邊是 40/40，再跑到北緯 50 度，就可能經常會吃到溫帶氣旋，就是北半球的 pilot chart，不是北半球，是北大西洋，再去下面還有一個加勒比海，這也是兵家必經之地，



看，是 savanna，現在的公司的船跑的是港，從 savanna 南下，就是有名的什麼 Gulf Stream 墨西哥灣流，從墨西哥環流上去，所以這邊是頂流啊，尤其是古巴這邊，看到箭頭是什麼? 是頂啊。一般下來就是到右邊，然後再走海地吧? 應該是走海地跟多明尼加中間這裡再下來到巴拿馬，我記得以前是走這邊啊，

巴拿馬運河出來走這裡，然後從這邊，再上去，為什麼沒有走這裡? 可能是珊瑚礁淺灘太多了，有可能是船隻先去靠牙賣加再上去，就是黑人的第一個民主共和國/海地，這邊流水比較強，在夏天的時候有可能產生什麼熱帶氣旋，所以看完冬天，要再去看夏天的 pilot chart，這要等下一講。(這一講的畫面操作錯誤，各位要自己去 Blue Seas 去抓 pilot chart)



這是一月份加勒比海的天氣，暴風機率也是很高，40%也是有的。

Hello everyone! This is our 17th lecture on maritime meteorology, after covering astronomy and hydrology, now we are going to talk about geography, which refers to the weather conditions that may be encountered in various oceanic regions. When it comes to weather, we can't ignore the so-called pilot chart. Everyone knows that a pilot is an inspiration, but what is a pilot chart? A pilot chart is a meteorological navigation chart. I see that this website can provide pilot chart downloads for free. There are pilot charts for the South Atlantic and the North Atlantic, with one chart for each month, making a total of twelve charts, which together form a pilot chart book on board. We can download one chart, for example, for the worst weather in January, and this is the pilot chart, which is like a small nautical chart.

Talking about the North Atlantic, we need to first understand a bit of historical geography. In this geography, in the bottom right corner is the Mediterranean, with Italy kicking the football, Sicily is being kicked, and the Suez Canal is located in the bottom right corner. It might be hard to see on your small screens, so let me enlarge it. Here it says Egypt, and here is Port Said. This port has the remains of a famous lighthouse that collapsed thousands of years ago, and here in the Mediterranean Sea, we see these green areas, which represent tidal currents. Whether it is ebb or flow, I can't tell now as it's been too long

since I've sailed, but it is your responsibility to know.
Here we have Turkey, Greece, the Aegean Sea, and coming out from Egypt, if we head towards Sicily and then Italy, and further down, we will pass through Turkey where there may be many refugees heading to the Greek coast seeking political asylum. The red stones here indicate a 10% chance of winter storms in this area of the Mediterranean, where sudden strong winds may occur in winter or other times, creating rough seas unexpectedly. While common belief is that the Mediterranean is calm and windless, there could be instances of sudden rough seas or gusts that might wash items off the deck into the sea, including the zero.
So next we are going to look at this Windrows, which is a wind vane, and this is a wind rose. The wind rose shows the wind speed and its proportions. In the middle, the number 7 represents a 7% chance of no wind. This is in January, winter. In this area, the wind direction is very uniform, mostly around 20 knots of wind. When there is wind, here, for example, we see that calm winds are at 6%, southeast winds around 5%, same for southwest winds, east winds could be 10% to 15%, northeast winds, north winds, but the most common is west winds. In winter, the prevailing winds are west winds, possibly around 30% with wind speeds of about 20 knots. This is the weather in the Mediterranean. Although the weather is usually good, sudden strong winds can occur.
This is based on my firsthand experience working on a rushing bar; one needs to apply for permission. Let's look at another thing, which should be about saltwater. Let's see the distribution of temperatures. We see the air temperature is about 14 degrees, 12 degrees, 10 degrees, 8 degrees, 6 degrees. This is for the Mediterranean region where the average temperature ranges from 14 to 16 degrees in winter, making the climate very pleasant. Around 14 degrees here, this is a strait, which I now forget. It's the Strait of Gibraltar, separating Africa and Europe. Places like Italy's Sicily island are often jokingly referred to as northern Africans due to their proximity to the south, being seen as more savage by some. The green color represents the sea surface temperature, and the greater the difference with the air temperature, the higher the evaporation rate. When the air temperature is 14 degrees, the water temperature here may be around 16 to 18 degrees, indicating moderate evaporation. Next, let's consider visibility, which indicates the likelihood of fog. Pay close attention; if this is in blue, there is a 5% to 10% chance of fog. Moving on to service pressure and surface weather maps, followed by other details.
The probability of temperate cyclones is not high. From this 40 degrees to New York, besides icebergs, what other temperate cyclones may occur? Of course, there are temperate cyclones inland. What is this all about? This is the famous

tornado! Americans often talk nonsense about Pennsylvania and Louisiana, which are inland tornadoes. Outside, it's temperate cyclones. Now, let's take a look. What is this, Russia? This is the entire Baltic Sea area, this is the North Sea. We say this is Germany, this is Denmark, between Germany and Denmark, this should be our Hamburg, it should be here, this is called Bremelhaven, Bremen. Next to London is Felixstowe, this is Belgium, Antwerp. And then, it's Amsterdam in the Netherlands, right? This is the red light district, and in Belgium, there is a river here, leading to Antwerp, which is a river port.
On this side is France, and the place where France and England meet is called the English Channel. The frequent dock here is Lehav. As for Ireland, Northern Ireland does not have an east side, in the ocean, in winter, the most common wind is the southwest wind! This southwest wind is warm air, blowing to the North Sea, turns into thick fog. Therefore, if it blows continuously for three days, the fog on this side will start, so the North Sea is actually protected by the barrier of England and France, and the most difficult thing should be the corner effect.
Here is the English Channel, now let's look at the whole map, and we see the upper right side, at around latitude 70 degrees, is Iceland, and at 60 degrees north latitude, generally speaking, it is the what.
Arctic Circle, so this side is 60 degrees, so the south of Greenland is where the Arctic Circle begins. In Iceland, you can see the aurora. This Labrador Sea is the Labrador Current that comes down. So what we see, these black lines, are the paths of the Labrador Current, the routes that ships take from England and France to New York. And over here, passing through this area, is Newfoundland. This is where icebergs appear, because there are icebergs melting from Greenland and flowing southward, passing by Canada. Here in Canada, there is a port where ships frequently dock. Let's see if we can find the name of the port we used to dock at, called Saint John. Because this area is at high latitudes of fifty to sixty degrees, the tidal range is very large, reaching seven meters.
Later on, if anyone goes that way, this is the United States, up north is New York and the Delaware River leads to New York, Baltimore. And at the mouth of this river is Norfolk. Heading southward, Savannah is a port that supplies goods to the southern United States. And if you navigate further, you'll reach Houston and New Orleans. We probably won't go there now, we are heading straight from Gibraltar to New York. We already know that here at the mouth of what seems to be called the Haedes River, coming out of the Mediterranean, is the Strait of Gibraltar. Above is Spain, below is Morocco, and further down is North Africa. And to the west is what, West Africa, the pirate area is not Somalia, right?
Let's take a look at this route from Gibraltar to the Virgin Rocks, where is

that? Recommended route, so you all can go and check it out, going up here takes you to Saint John, Canada. Going up here, then coming down, will take you to New York, the so-called 4040. Look here, it's 40 here, 60 here, 50, 40, and 4040 is right here. This is where it was thought to be the best route from Gibraltar to this point and then straight to New York, the most comfortable route. Let's see how the situation is, the situation is a head current because you see all the water currents are heading this way, so now when we look here, it should be high tide, and the dotted lines should be low tide, and here it's all zeros.
Sailing five knots all the way to New York, so when you turn back, you'll be going with the current. This is called the Equatorial Countercurrent. When we talk about the planetary winds, there's no wind belt at the equator because the Coriolis force causes the equatorial north winds to flow northeast. In the Northern Hemisphere, it flows to the northeast, and in the Southern Hemisphere, it flows to the southwest. In the Southeast, the flow is eastern. Both northern and southern hemispheres flow eastward, resulting in an Equatorial Countercurrent where the flow is from east to west. We can now see this near the tenth degree, and there's this Equatorial Countercurrent, which is at 0. 7, 0. This cannot be zero. 2 to 3 knots of Equatorial Countercurrent.
Some captains, they don't want to go high and say you can sail the Equatorial Countercurrent at two to three knots. It's unlikely to have such strong currents. We see what kind of weather we will encounter along the way. There will be top flow, right? We say it's a top flow to New York. Also, the winds, mostly, are top because there are fewer winds coming from the east and more from the west. The wind and current, when cooperating, tend to be less top below 30 degrees, this is the pilot chart. Have we seen any mid-latitude cyclones here on the right side of this chart? This is at 40 degrees. So, when we run to 50 degrees, we may often encounter mid-latitude cyclones. This is the pilot chart for the North Atlantic. In the future, when we go down, there is the Caribbean Sea, which is a must-pass area. We see here, this is Savannah. Now our company's ship runs from here. From Savannah, heading south, this is the famous Gulf Stream, the flow from the Gulf of Mexico circulation. So, in this area, especially near Cuba, we see the arrow pointing up, indicating a top. Generally, coming down here, then going to Haiti, should go between Haiti and the Dominican Republic down to Panama. I remember before going this way, out of Panama into this area, and then going back up. Why didn't they go this way? Maybe because there are too many coral reefs and shallow shoals. It's possible the ships first go to Jamaica and then up. This is the first democratic republic in Haiti, where the currents are stronger, possibly leading to tropical cyclones. This happens in summer, so after looking at winter,

we need to look at summer. We'll discuss this in the next lecture.