



雨树落落

英国最具影响力的青少年科普读物之一

(英)索韦(Solway, A.) 著
李慧杰 译

A Pirate Adventure

海盗遭遇记

【气候】



哈尔滨工业大学出版社
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A Private Adventure

【气候】 海盗遭遇记



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有些单词被印刷成粗体，**就像这样**。你可以在第30页中找到它们的意思，还可以在单词第一次出现时，在相关书页下方的方框内发现它们的含义。

Sailing the oceans

海上航行

Sailing across an ocean is easy in a modern ship. Ships have powerful engines that take the ship wherever it needs to go.

Satellites also help ships. Satellites are machines that circle high above the Earth. Some satellites tell the captain where the ship is. Other satellites watch the weather. They send weather reports to the ship. These reports help the captain to **forecast** if the weather is going to change.

Three hundred years ago ships did not have powerful engines. They only had sails. They could not go anywhere unless the wind was blowing. There were no satellites. Sailors had to forecast the weather. They did this by watching the clouds and feeling which way the wind was blowing.

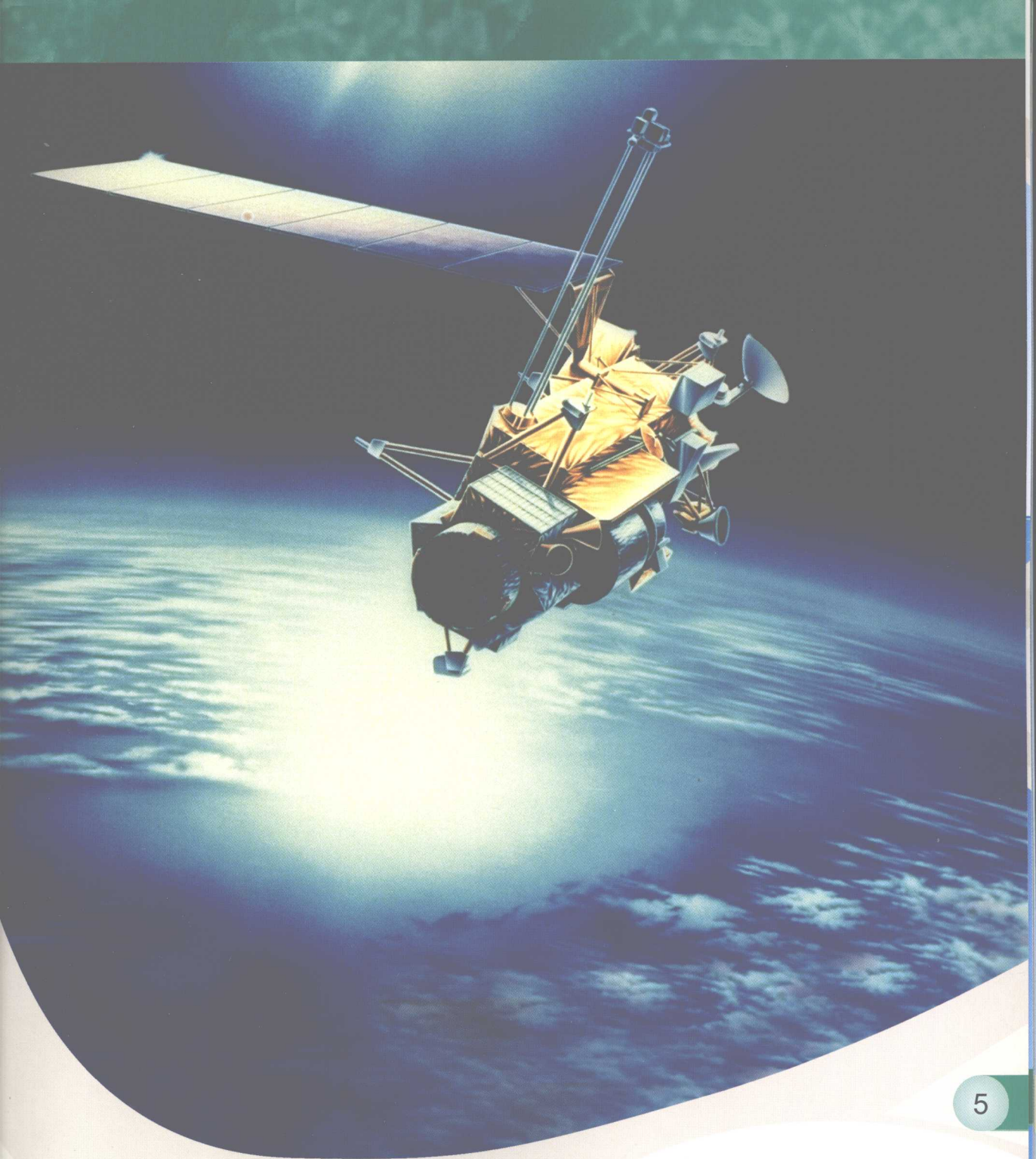
And on top of all this, they had to watch out for pirates!

乘坐现代的轮船在海上航行是一件容易的事。动力强劲的发动机保证了轮船在海上自由地航行。

人造卫星也有助于轮船的航行。人造卫星是盘旋在地球上空的机械装置。有些人造卫星能告诉船长目前轮船的方位。还有一些人造卫星密切地关注天气情况，将气象报告传送到船上。这些报告有助于船长**预测**天气是否将会发生变化。

300年前，船上没有强劲的发动机。船上只有船帆。如果海上没有风，它们哪儿也去不了。当然，更没有人造卫星来导航，水手们只能依靠观察云团和感觉风向来预测天气。

然而对水手来说，他们最该小心提防的是海盗！



▲ This is a modern weather satellite. Satellites make it easier for us to forecast the weather correctly.

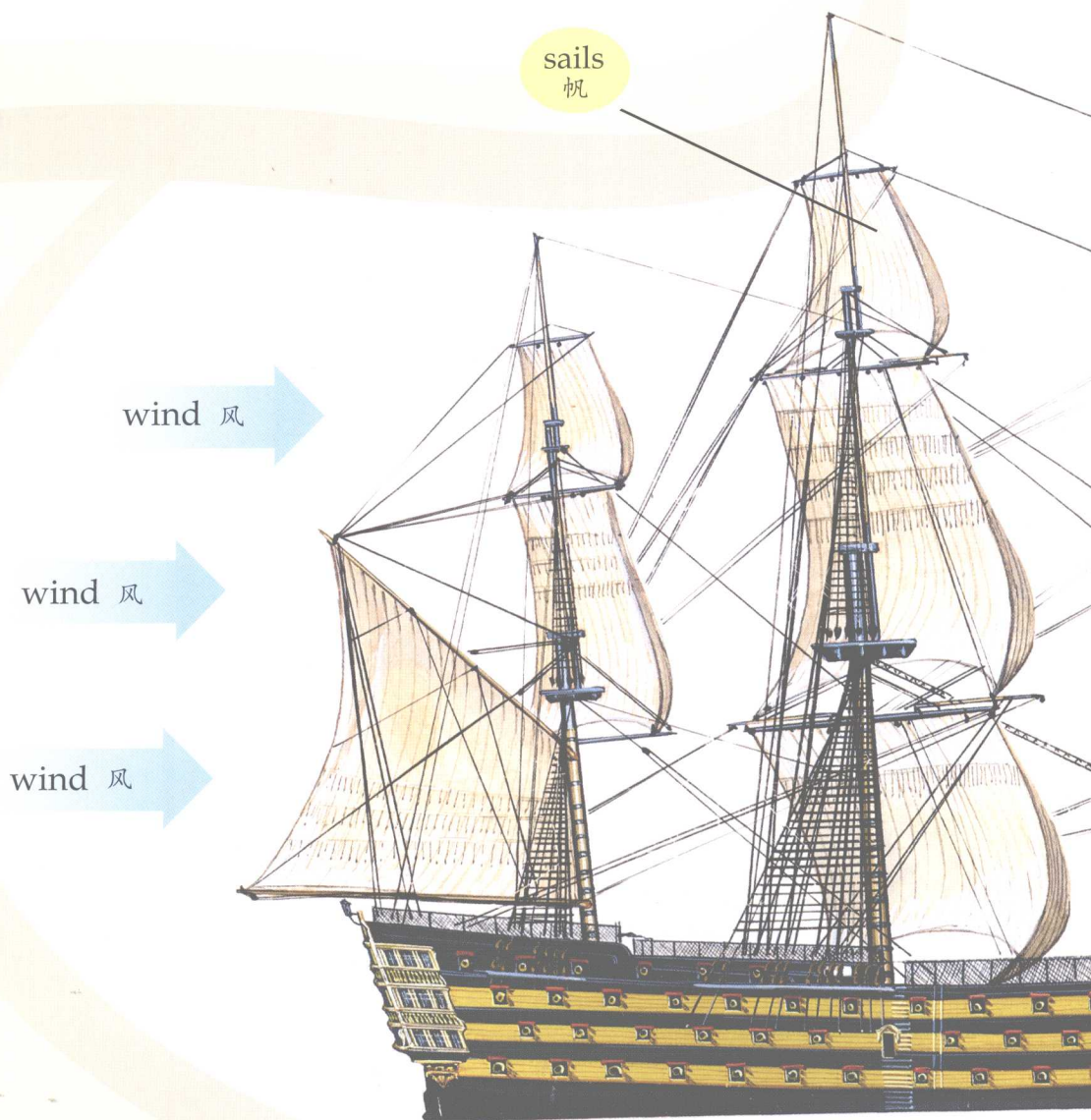
这是一个现代人造气象卫星。有了人造卫星，我们很容易就能准确地预测天气。

An offshore wind

离岸风

So, how would you like to travel on a sailing ship from the 1700s? The trip will have to start in the evening. In the evenings there is often an **offshore wind**. This means that the wind is blowing from the land to the sea.

那么，你愿意搭乘一艘18世纪的帆船出海吗？旅行将在一个傍晚开始。傍晚时分总会刮起**离岸风**。离岸风是指从陆地刮向海洋的风。



During the day, there is often a wind blowing from the sea towards the land. This is called an **onshore wind**. You can find out why on the next page.

在白天，风总是从海洋吹向陆地，这叫做**向岸风**。在下一页，你就会明白离岸风和向岸风的形成原因了。

- ◀ In the 1700s, there were no engines on ships. Ships needed wind to make them move. The sails caught the wind. The power of the wind made the ship move forwards in the water.

18世纪，船上没有发动机。船是依靠风前进的。船帆捕捉风力使船在水中前进。



Land and sea breezes

陆地风和海洋风

The warmth of the Sun is the main reason why winds blow. During the daytime, the Sun heats the Earth. Land warms up faster than the sea. The air over the land gets warm faster than the air over the sea. Warm air rises. Cooler air then blows in from the sea. It takes the place of the rising warm air. There is an **onshore wind**.

At night the land cools more quickly than the sea. In the evening the air over the sea is warmer than the air over the land. The warmer air rises. Cooler air blows from the land. It takes the place of the rising warm air. There is an **offshore wind**.

It is fine weather as your ship sails out of the harbour. But what will it be like in the morning?

太阳散发的热量是风吹动的主要原因。白天太阳使地球变热。陆地比海洋变暖的速度更快一些。陆地上空的空气也比海洋上空的空气变暖的速度快。陆地上空的暖空气上升，来自海洋的凉爽空气就吹入到陆地，取代上升的暖空气。这就是**向岸风**。

晚上陆地比海洋变冷的速度快。傍晚，海面上的空气比陆地上的空气更温暖。海面上空的暖空气上升，来自陆地的凉爽空气就吹入到大海，取代上升的暖空气。这就是**离岸风**。

当你驶出港口时，风向正适合航行。不妨设想一下，早晨出发我们将遇到的情况是什么样的？

These diagrams show how onshore and offshore winds work. ►

右图标示出向岸风和离岸风的形成原因。

Onshore wind 向岸风



Warm air rises.
暖空气上升。

Land heats up more quickly
than sea and warms the air.

陆地比海洋变热得快，使陆地上
方的空气变暖。



Cooler air from the sea
replaces rising air on land.

来自海洋的凉爽空气取代陆地
上方升起的暖空气。

wind 风



Sea heats up more
slowly, so air is cooler.

海洋变热的速度要慢一些，所
以海面上方的空气较凉爽。

Offshore wind 离岸风



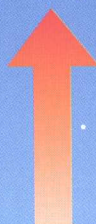
Warm air rises.
暖空气上升。

Cooler air from the land
replaces rising air over sea.

来自陆地的凉爽空气取代海面
上方升起的暖空气。

Land cools more
quickly than sea.

陆地比海洋凉得快一些。



wind 风



Sea water stays warm for longer
than land, and keeps air warmer.

海水比陆地保温的时间长，使得海面上方
的空气更温暖一些。

A pile of air

乌云密布

Your ship sails all night. By morning the land is out of sight. The weather is fine. The wind is blowing the ship in the right direction. It is a good time for you to learn more about weather **forecasting**. Forecasting weather means being able to tell what the weather will do.

The Earth is covered by a layer of air. This layer is called the **atmosphere**. The weight of the atmosphere presses down on the Earth. The weight of the atmosphere is called **air pressure**. Air pressure has a big effect on the weather.

Air pressure is not the same everywhere. In some places the air is warm. Warm air rises. This makes the air pressure lower. In other places the air is cool. Cool air sinks. This makes the air pressure higher.

你的船航行了一整夜。早晨的时候，看不见陆地了。天气很好，风向也很好，恰好把船吹向正确的航行方向。此时正是你学习一些**天气预测**知识的好时机。天气预测能告诉你天气将做什么样的变化。

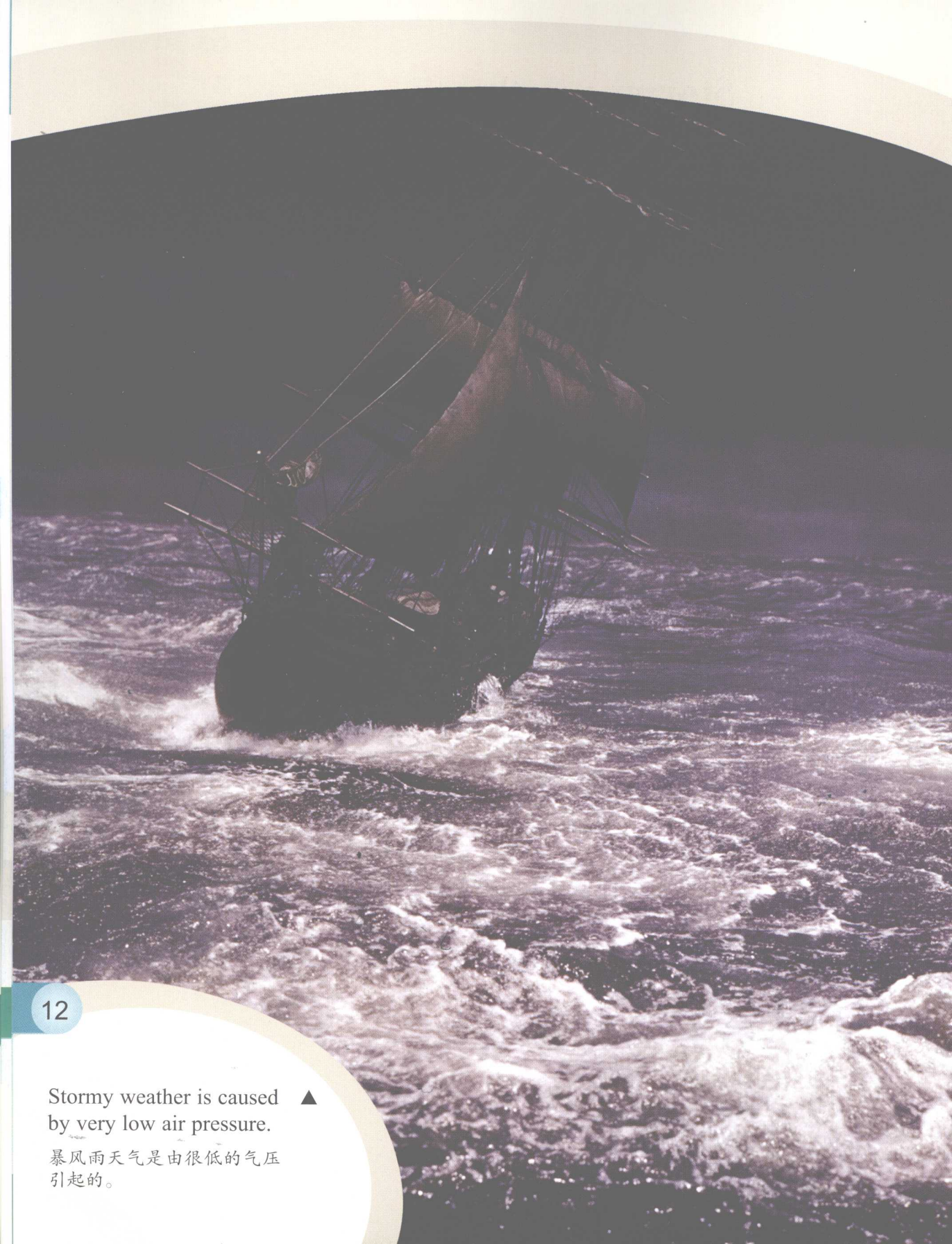
地球被一个空气层所笼罩着。这个空气层叫做**大气层**。大气层的重量向下压在地球上，叫做**气压**。气压对天气有很大的影响。

地球上各处的气压各不相同。有些地方的空气温暖，暖空气上升，气压较低。其他一些地方的空气凉爽，冷空气下沉，气压较高。

▼ This photo of the Earth's atmosphere was taken in space. The blue lines are the atmosphere. It is thousands of kilometres thick. You can see the Moon in the distance.

这张地球大气层的照片是在太空拍摄的。蓝光是大气层，它有几千公里厚。你能看到远处的月球。





Stormy weather is caused ▲
by very low air pressure.

暴风雨天气是由很低的气压引起的。

Stormy weather

暴风雨天气

It is the first afternoon of your sea journey. You look ahead. You see a dark shape in the distance. Is it land? No, it is storm clouds!

Soon the waves grow bigger. It gets dark as the storm clouds rush towards the ship. Rain starts falling. The wind becomes stronger and stronger.

Winds blow because of differences in **air pressure**. Air rushes away from places where the air pressure is high. Air moves to places where the air pressure is low. Air rushes more quickly into places where air pressure is very low. This can cause very strong winds called **gales**.

这是你海上航行的第一个下午。向前看，远处一片灰暗。那是陆地吗？不是，那是暴风雨！

很快海浪变得大起来了。暴风雨扑面而来，天变暗了。下雨了，风刮得越来越猛烈。

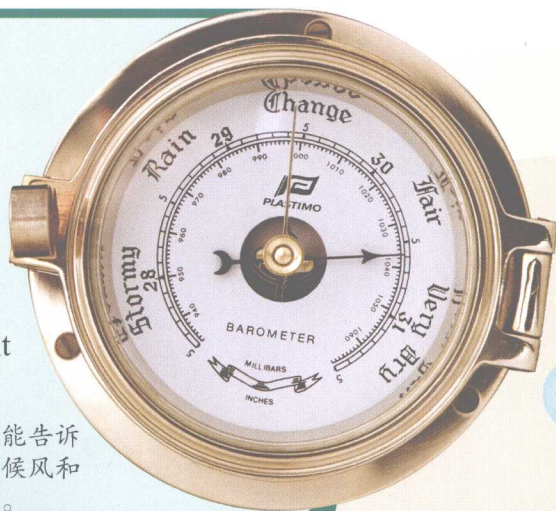
刮风是因为**气压**各不相同造成的。空气在气压高的地方能快速离开，并能快速地移动到气压低的地方。气压越低的地方，空气涌入的速度就越快，这就会引起很强的风，这种风叫做**大风**。

Air pressure watch

气压表

A barometer is used to measure air pressure. It can be used to forecast the weather. This means it can tell us if the weather will change. The weather is usually fine when the air pressure is high. If the air pressure becomes low, it means that rain is on the way.

气压计用来测量气压，**预测**天气。也就是它能告诉我们天气是否将发生变化。通常气压高的时候风和日丽。如果气压变低，那么很快就会下雨了。



South and then west

先向南然后再向西航行

Your ship is sailing across the Atlantic Ocean from Europe to North America. The shortest route would be to sail west. But ships sailing to North America from Europe always started by sailing south.

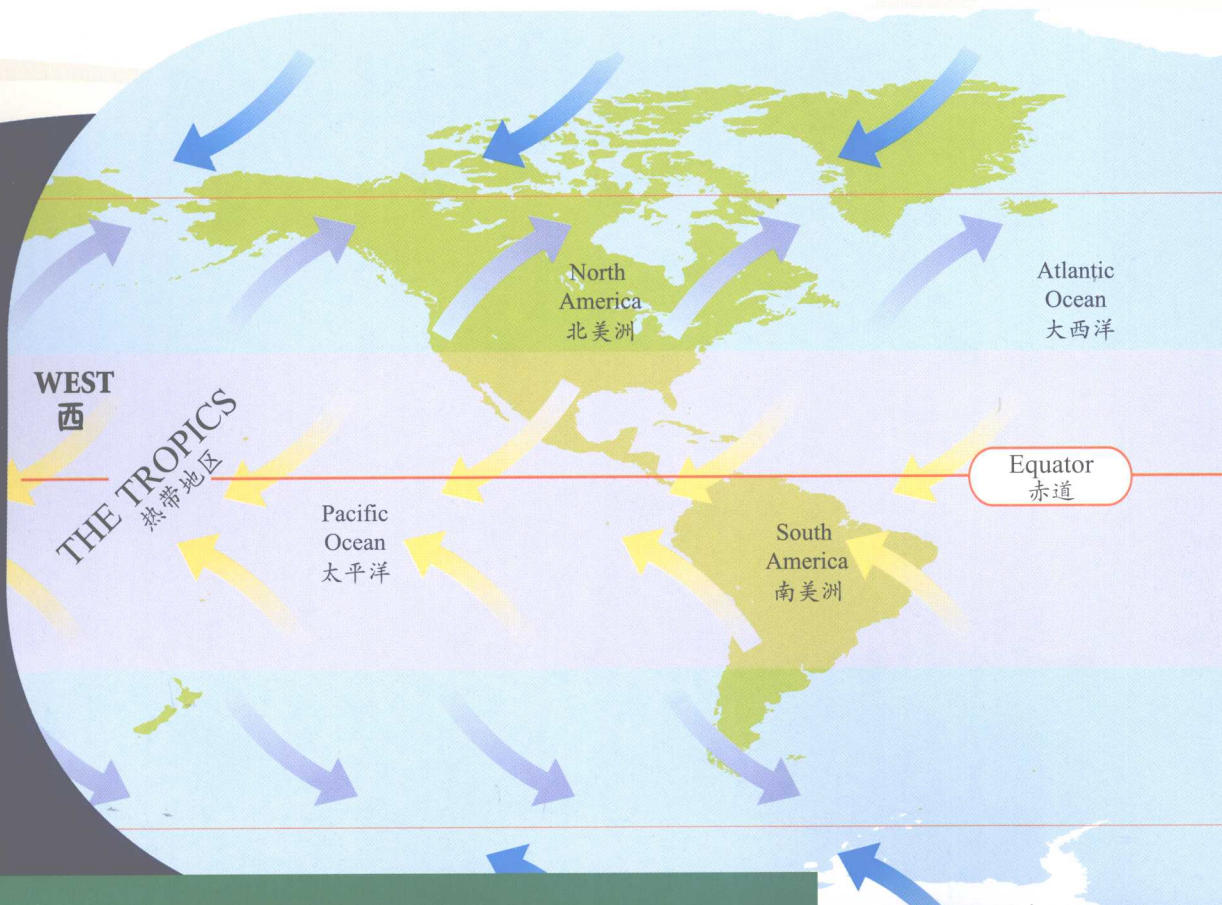
The ships sailed south until they reached the **tropics**. The tropics are the warm parts on either side of the **Equator**.

The winds usually blow from east to west in the tropics. This makes it easier and quicker to sail west.

你的船正穿越大西洋从欧洲驶向北美洲。最短的航行路线是向西行驶。但是从欧洲开往北美洲的船总是先向南行驶。

船一直向南驶到**热带地区**。热带地区是指**赤道**两侧的温暖地带。

在热带地区，风总是从东刮向西，所以船到达热带地区之后，很轻松地就能向西行驶了。



Every part of the world has a **prevailing wind**. This is the direction the wind most often blows.

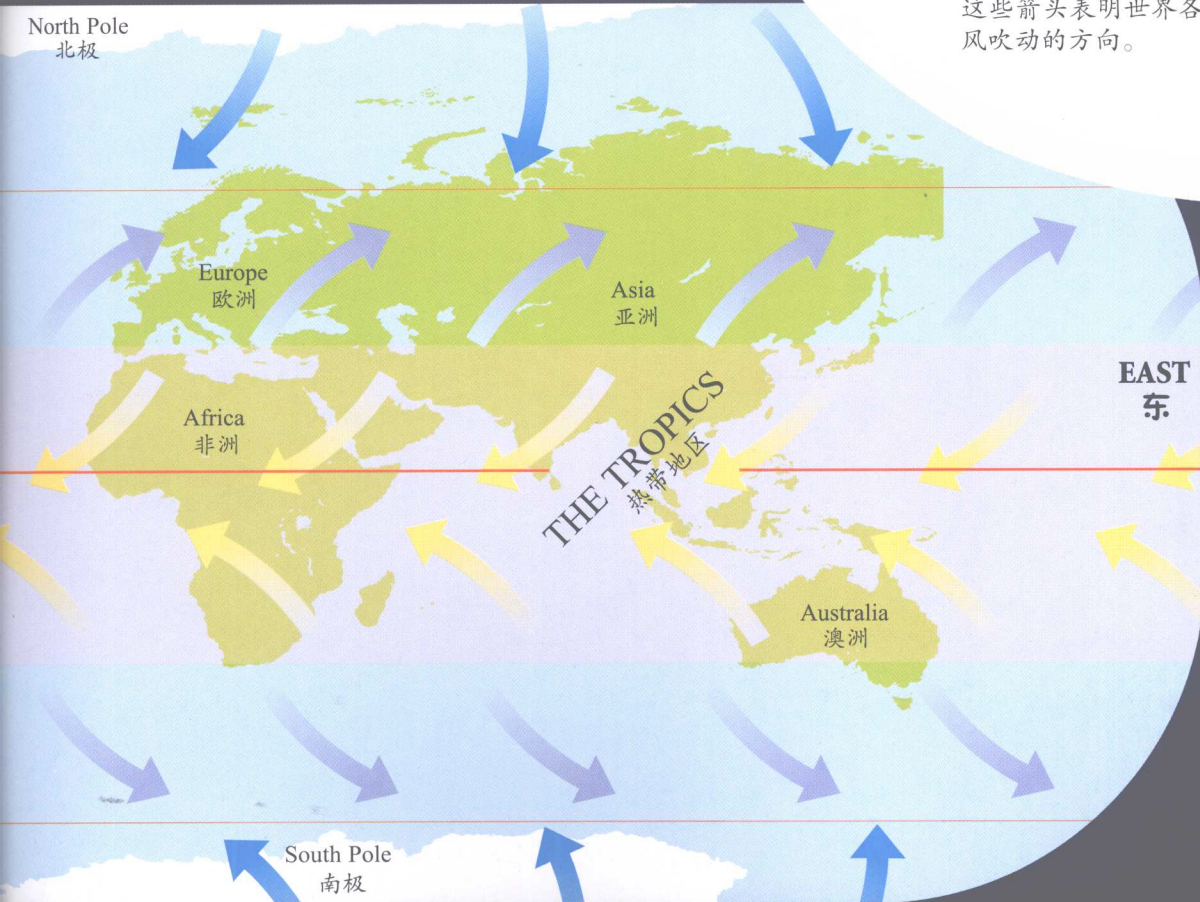
In the tropics the prevailing winds blow from east to west. Near the North and South Poles the winds also blow mainly from east to west. In between these two places, the prevailing winds blow from west to east.

世界的每一个地方都有**盛行风**，盛行风是指出现次数最多的风向。

在热带地区，盛行风是从东向西刮。在南北极附近，盛行风也主要是从东向西刮。在两者的中间区域，盛行风是自西向东刮。

◀ The arrows show the direction that the world's prevailing winds blow.

这些箭头表明世界各地盛行风吹动的方向。



Pirate attack!

海盗来袭击了！

Your ship has reached the tropics. The weather is very hot. In the tropics it is hot for most of the year. But near the North and South Poles it is cold all year round.

These places have very different **climates**. The climate is the general type of weather that a place has. The weather in a place can change from day to day. But over a long time, the climate of a place stays the same.

One of the sailors on your ship has climbed to the top of the mast. He sees a ship in the distance. The ship is sailing towards you. As it gets closer, the ship fires its cannon. It is a pirate ship!

你的船已经到达了**热带地区**。天气非常炎热。在热带地区一年中的大部分时间天气都很酷热，但是在南北极却是终年寒冷。

这些地方**气候迥异**。气候是指一个地方通常具有的天气模式。一个地方的天气可能天天都会变化，但是在较长的一段时间内，这个地方的气候总是保持相同。

你们船上的一个水手爬上桅杆顶部，向远处眺望。他看到远处有一艘船，正向你们驶来。那艘船越来越近，并且向你们发射大炮。那是一艘海盗船！

Pirate watch

小心海盗

Pirates are people who attack and rob ships at sea. In the 1700s there were many pirates. The most famous were Blackbeard and Captain Kidd.

那些在海上袭击并抢劫船只的人叫做**海盗**。在18世纪，海盗横行，最著名的海盗是黑胡子和柯德船长。

