



海洋技术专业

# 英语阅读

主 编 汤 勇

*English Reading for Marine Technology Specialty*

大连海事大学出版社

# 海洋技术专业英语阅读

English Reading for Marine Technology Specialty

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## 内容简介

伴随着海洋测量和工程技术的快速发展,海洋技术专业的知识更新速度不断提高。物理海洋观测、水声学测量技术、卫星遥感技术和海洋工程技术等方面有了日新月异的进步。笔者根据国外相关领域的发展现状,组织编写上述海洋技术方面的英语文献阅读资料,旨在使海洋技术专业本科生通过原文阅读,掌握相关的专业词汇和基本句法,在提高专业英语阅读能力的同时,了解国际海洋技术的发展现状。

本书共分4个部分:第一部分为物理海洋,第二部分为海洋工程,第三部分为水声学探测,第四部分为海洋遥感。每个部分由若干单元构成,每个单元包括2~3篇精读文章和2~3篇泛读文章。本书可作为高等学校海洋技术专业本科生的教材,也可作为从事相关海洋工作的研究生、科研人员的参考书。

# 前 言

《海洋技术专业英语阅读》教程是面向海洋技术专业高年级本科生的专业英语教材,其目的是在大学英语的基础上,使学生掌握相关的专业词汇和基本句法,扩大词汇量和专业阅读量,培养学生阅读和翻译科技文献的能力。本书介绍了国际海洋技术的发展现状,以促进海洋技术专业高年级学生专业的学习与提高,为学生进一步扩大阅读范围打下基础。

《海洋技术专业英语阅读》教程所选用的素材均来自国内外权威的教材与科技文献,力求体现专业性、实用性。

本书共分4个部分:第一部分为物理海洋,第二部分为海洋工程,第三部分为水声学探测,第四部分为海洋遥感。每个部分由若干单元构成,每个单元包括2~3篇精读文章和2~3篇泛读文章。每篇文章后都给出专业词汇表和生词表,书后配有总词表。

本书的第一部分由张钟哲编写,第二部分由陈庆义编写,第三部分由汤勇编写,第四部分由李微编写。

本书可作为高等学校海洋技术专业本科生的教材,也可作为从事相关海洋工作的研究生、科研人员的参考书。

因编写时间仓促,编者水平有限,对于书中所出现的错误和不足,恳请读者批评指正。

编 者

2015年11月

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# Part One

## Physical Oceanography

### Unit One Foundations of Oceanography

#### Text

#### Passage 1

##### The History of the *Oceanography*

Our knowledge of oceanic currents, winds, waves, and tides goes back thousands of years. Polynesian navigators traded over long distances in the Pacific as early as 4000 BC. Pytheas explored the Atlantic from Italy to Norway in 325 BC. Arabic traders used their knowledge of the reversing winds and currents in the Indian Ocean to **establish** trade routes to China in the Middle Ages and later to Zanzibar on the African coast. And, the connection between tides and the sun and moon was described in the Samaveda of the Indian Vedic period extending from 2000 BC to 1400 BC. Those oceanographers who tend to accept as true only that which have been **measured** by instruments, have much to learn from those who earned their living on the ocean.

Modern European knowledge of the ocean began with voyages of discovery by Bartholomew Dias, Christopher Columbus, Vasco da Gama, Ferdinand Magellan, and many others.

They laid the foundation for global trade routes stretching from Spain to the Philippines in the early 16th century. The routes were based on a good working knowledge of trade winds, the westerlies, and western **boundary** currents in the Atlantic and Pacific.

The early European explorers were soon followed by scientific voyages of discovery led by (among many others) James Cook on the *Endeavour*, *Resolution*, and *Adventure*, Charles Darwin on the *Beagle*, Sir James Clark Ross and Sir John Ross who surveyed the Arctic and Antarctic **regions** from the *Victory*, the *Isabella*, and the *Erebus*, and Edward Forbes who studied the vertical distribution of life in the ocean. Others collected oceanic observations and produced useful charts, including Edmond Halley who charted the trade winds and monsoons and Benjamin Franklin who charted the *Gulf Stream*.

Slow ships of the 19th and 20th centuries gave way to satellites, drifters, and **autonomous** instruments toward the end of the 20th century. Satellites now observe the ocean, air, and land. Thousands of drifters observe the upper two kilometers of the ocean. Data from these systems, when fed into **numerical models** allows the study of earth as a system. For the first time, we can study how biological, chemical, and physical systems **interact** to influence our environment.

### Definitions

The long history of the study of the ocean has led to the development of various, specialized disciplines each with its own interests and vocabulary. The more important disciplines include:

Oceanography is the study of the ocean, with emphasis on its character as an environment. The goal is to obtain a description sufficiently quantitative to be used for predicting the future with some certainty.

**Geophysics** is the study of the physics of the earth.

**Physical Oceanography** is the study of physical **properties** and **dynamics** of the ocean. The primary interests are the interaction of the ocean with the atmosphere, the oceanic heat budget, water **mass** formation, currents, and coastal dynamics. Physical Oceanography is considered by many to be a sub-discipline of geophysics.

**Geophysical Fluid Dynamics** is the study of the dynamics of fluid motion on **scales** influenced by the **rotation** of the earth. **Meteorology** and oceanography use geophysical fluid dynamics to calculate **planetary** flow fields.

**Hydrography** is the preparation of **nautical charts**, including charts of ocean depths,

currents, internal **density** field of the ocean, and tides.

**Earth-System Science** is the study of earth as a single system comprising many interacting subsystems including the ocean, **atmosphere**, **cryosphere**, and **biosphere**, and changes in these systems due to human activity.

### Eras of Oceanographic Exploration

The exploration of the sea can be divided, somewhat arbitrarily, into various eras:

**Era of Surface Oceanography:** Earliest times to 1873. The era is characterized by systematic collection of mariners' **observations** of winds, currents, waves, temperature, and other **phenomena** observable from the deck of sailing ships. Notable examples include Halley's charts of the trade winds, Franklin's map of the Gulf Stream.

**Era of Deep-sea Exploration:** 1873 – 1914. The era is characterized by a few, wide-ranging oceanographic expeditions to survey surface and subsurface conditions, especially near colonial **claims**. The major example is the *Challenger* Expedition, but also the *Gazelle* and *Fram* Expeditions.

**Era of National Systematic Surveys:** 1925 – 1940. The era is characterized by detailed surveys of colonial areas. Examples include *Meteor* surveys of the Atlantic, and the *Discovery* Expeditions.

**Era of New Methods:** 1947 – 1956. The era is characterized by long surveys using new instruments. Examples include **seismic** surveys of the Atlantic by *Vema* leading to Heezen's maps of the sea floor.

**Era of International Cooperation:** 1957 – 1978. The era is characterized by **multinational** surveys of ocean and studies of oceanic processes. Examples include the Atlantic Polar Front Program, the *NORPAC* cruises, the International Geophysical Year cruises, and the International Decade of Ocean Exploration. **Multiship** studies of oceanic processes include *MODE*, *POLYMODE*, *NORPAX*, and *JASIN* experiments.

**Era of Satellites:** 1978 – 1995. The era is characterized by global surveys of oceanic processes from space. Examples include Seasat, NOAA 6 – 10, NIMBUS – 7, Geosat, Topex/Poseidon, and **ERS** – 1 & 2.

**Era of Earth System Science:** 1995. The era is characterized by global studies of the interaction of biological, chemical, and physical processes in the ocean and atmosphere and on land using *in situ* (which means from **measurements** made in the water) and space data in numerical models. Oceanic examples include the World Ocean Circulation Experiment

(WOCE) and Topex/Poseidon, the Joint Global Ocean **Flux** Study (JGOFS), the Global Ocean Data **Assimilation** Experiment (GODAE), and the SeaWiFS, Aqua, and Terra satellites.

## Specialized Vocabulary

1. oceanography	[ˌəʊʃiəˈnɒgrəfi]	n.	海洋学
2. Gulf Stream			墨西哥湾流
3. geophysics	[ˌdʒi(:)əʊˈfɪziks]	n.	地球物理学
4. Physical Oceanography			物理海洋学; 海洋物理学
5. Geophysical Fluid Dynamics		n.	地球物理流体动力学; 地球物理动力学
6. hydrography	[haɪˈdrɒgrəfi]	n.	水文学; 水道测量学
7. Earth-System Science			[自] 地球系统科学
8. oceanographic	[ˌəʊʃiənəʊˈgræfɪk]	adj.	海洋学的; 有关海洋学的(等于 oceanographical)
9. ERS			欧洲遥感卫星
10. in situ	[in ˈsaɪtjuː; -ˈsi]		在原地, 就地; 在原来位置

## Word Bank

1. establish	[ɪˈstæblɪʃ]	v.	建立, 创办; 安置
2. measure	[ˈmeɪʒə]	v.	测量; 估量; 权衡
		n.	测量; 措施; 程度; 尺寸
3. boundary	[ˈbaʊndəri]	n.	边界, 界限
4. region	[ˈriːdʒən]	n.	区域, 地区; 范围; 部位
5. autonomous	[ɔːˈtɒnəməs]	adj.	自发的; 自治的; 自主的
6. numerical model			数值模型
7. interact	[ɪntərˈækt]	v.	互相影响; 互相作用
8. property	[ˈprɒpəti]	n.	性能, 属性, 性质; 道具; 内容; 财产; 所有权
9. dynamics	[daɪˈnæmiks]	n.	动力学, 力学
10. mass	[mæs]	n.	块, 团

11. scale	[skeil]	<i>n.</i>	规模; 比例; 鳞; 刻度; 天平; 数值范围
		<i>v.</i>	衡量; 测量; 攀登; 生水垢; 剥落; 刮鳞; 依比例决定
12. rotation	[rəu'teɪʃən]	<i>n.</i>	旋转; 循环; 轮流
13. meteorology	[ˌmi:tɪə'lɒlədʒi]	<i>n.</i>	气象状态; 气象学
14. planetary	[ˈplænɪtəri]	<i>adj.</i>	行星的
15. nautical chart			[测][水运]海图; [水运]航海图
16. density	[ˈdensəti]	<i>n.</i>	密度
17. atmosphere	[ˈætməˌsfɪə]	<i>n.</i>	大气; 空气; 气氛
18. cryosphere	[kraɪˈɔsfɪə]	<i>n.</i>	冰冻圈, 冰冻层; 冰雪圈; 低温层
19. biosphere	[ˈbaɪəsfɪə]	<i>n.</i>	生物圈
20. era	[ˈiərə; ˈɛərə]	<i>n.</i>	[天]纪元, 时代; 年代
21. exploration	[ˌeksplɔːˈreɪʃən]	<i>n.</i>	探测; 探究
22. observation	[ˌɒbzəˈveɪʃən]	<i>n.</i>	观察; 监视; 观察报告
23. phenomenon	[fiˈnɒmɪnən; fə-]	<i>n.</i>	现象
24. claim	[kleɪm]	<i>n.</i>	要求; 声称; 索赔; 断言; 值得
		<i>v.</i>	提出要求; 要求; 声称; 需要; 认领
25. seismic	[ˈsaɪzmɪk; ˈsaɪs-]	<i>adj.</i>	地震的; 因地震而引起的
26. multinational	[ˌmʌltɪˈnæʃənəl]	<i>adj.</i>	多国的; 跨国公司的
		<i>n.</i>	跨国公司
27. multiship	[ˌmʌltɪˈʃɪp]	<i>n.</i>	多船
28. measurement	[ˈmeʒəmənt]	<i>n.</i>	测量值; 尺寸
29. flux	[flʌks]	<i>n.</i>	通量, 流量
30. assimilation	[əˌsɪmiˈleɪʃən]	<i>n.</i>	同化; [生化]同化作用; 吸收

## Passage 2

### Ocean and Seas

There is only one ocean. It is divided into three named parts by international agreement: the Atlantic, Pacific, and Indian oceans (International Hydrographic Bureau, 1953). Seas, which are part of the ocean, are **defined** in several ways.

*The Atlantic Ocean* extends northward from Antarctica and includes all of the Arctic Sea, the European *Mediterranean*, and the American Mediterranean more **commonly** known as the *Caribbean Sea*. The boundary between the Atlantic and Indian Ocean is the **meridian** of *Cape Agulhas* (20°E). The boundary between the Atlantic and Pacific is the line forming the shortest distance from *Cape Horn* to the *South Shetland Islands*. In the north, the Arctic Sea is part of the Atlantic Ocean, and the *Bering Strait* is the boundary between the Atlantic and Pacific.

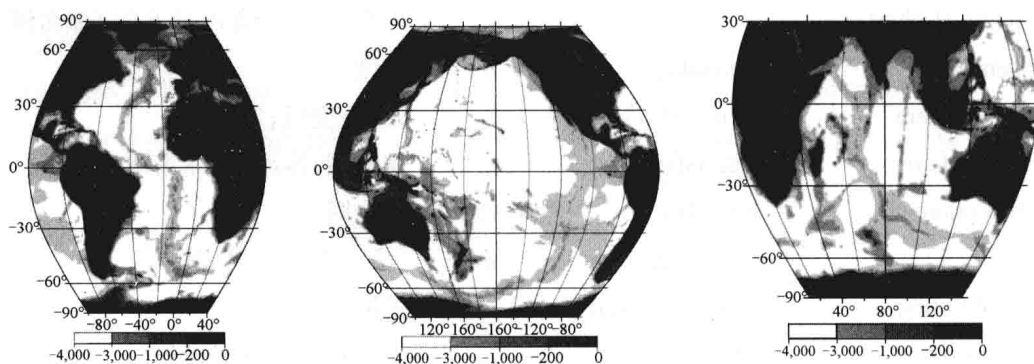


Fig.1.1 The Atlantic Ocean (left), the Pacific Ocean (mid) and the Indian Ocean (right) viewed with an Eckert VI equal-area projection

*The Pacific Ocean* extends northward from Antarctica to the Bering Strait. The boundary between the Pacific and Indian Ocean follows the line from the *Malay Peninsula* through Sumatra, Java, Timor, Australia at *Cape Londonderry*, and Tasmania. From Tasmania to Antarctica it is the meridian of South East Cape on Tasmania 147°E.

*The Indian Ocean* extends from Antarctica to the continent of Asia including the Red Sea and *Persian Gulf*. Some authors use the name Southern Ocean to describe the ocean surrounding Antarctica.

*Mediterranean Seas* are mostly surrounded by land. By this definition, the Arctic and Caribbean Seas are Mediterranean Seas, the Arctic Mediterranean Sea and the Caribbean Mediterranean Sea.

*Marginal seas* are defined by only an indentation in the coast. The Arabian Sea and South China Sea are marginal seas.

### Dimensions of the Ocean

The ocean and seas cover 70.8% of the surface of earth, which amounts to 361,254,000 km<sup>2</sup>. Oceanic **dimensions** range from around 1,500 km for the minimum width of the Atlantic to

more than 13,000 km for the north-south **extent** of the Atlantic and the width of the Pacific. Typical depths are only 3 – 4 km. The small ratio of depth to width of the **ocean basins** is very important for understanding ocean currents. **Vertical velocities** must be much smaller than **horizontal** velocities. Even over distances of a few hundred kilometers, the vertical velocity must be less than 1% of the horizontal velocity.

The relatively small vertical velocities have great influence on **turbulence**. Three-dimensional turbulence is fundamentally different than two-dimensional turbulence. In two dimensions, **vortex lines** must always be vertical, and there can be little vortex stretching. In three dimensions, vortex stretching plays a fundamental role in turbulence.

## Specialized Vocabulary

- |                           |                     |  |
|---------------------------|---------------------|--|
| 1. the Atlantic Ocean     |                     | 大西洋                                    |
| 2. Mediterranean          | [ ,meditə'reiniən ] | <i>n.</i> 地中海                          |
|                           |                     | <i>adj.</i> 地中海的                       |
| 3. Caribbean Sea          |                     | 加勒比海(在中美、南美及西印度群岛之间)                   |
| 4. Cape Agulhas           |                     | 厄加勒斯角(地名)                              |
| 5. Cape Horn              |                     | 合恩角                                    |
| 6. South Shetland Islands |                     | 南设得兰群岛(英属南极地区群岛)                       |
| 7. Bering Strait          |                     | (连接北冰洋和太平洋的)白令海峡                       |
| 8. the Pacific Ocean      |                     | 太平洋(等于 the Pacific)                    |
| 9. Malay Peninsula        |                     | 马来半岛(在亚洲东南部)[亦作 Malaya]                |
| 10. Cape Londonderry      |                     | 伦敦德里角                                  |
| 11. the Indian Ocean      |                     | 印度洋                                    |
| 12. Persian Gulf          |                     | 波斯湾                                    |
| 13. Mediterranean Sea     |                     | 地中海(在欧、亚、非三大洲之间)<br>[亦作 Mediterranean] |
| 14. marginal sea          |                     | [海洋]边缘海                                |

## Word Bank

1. define	[di'fain]	v.	定义
2. commonly	['kɒmənli]	adv.	一般地;通常地;普通地
3. meridian	[mə'ridiən]	n.	[天]子午线,经线;顶点
		adj.	子午线的;最高点的
4. dimension	[di'menʃən]	n.	尺寸;面积;规模;方面;[数]维
5. extent	[ik'stent]	n.	程度;范围;长度
6. ocean basin			大洋盆地
7. vertical velocity			[物]垂直速度
8. horizontal	[ˌhɒri'zɒntəl]	adj.	水平的;地平线的;同一阶层的
		n.	水平线,水平面;水平位置
9. turbulence	[ˈtɜːbjʊləns]	n.	湍流
10. vortex line			涡线;涡旋线,涡流线

## Reading

### Passage 1

#### Sea-Floor Features

Earth's rocky surface is divided into two types: oceanic, with a thin dense crust about 10 km thick, and continental, with a thick light crust about 40 km thick. The deep, lighter continental crust floats higher on the denser **mantle** than does the oceanic crust, and the mean height of the crust relative to sea level has two distinct values: continents have a mean **elevation** of 1,100 m, the ocean has a mean depth of -3,400 m.

The volume of the water in the ocean exceeds the volume of the ocean basins, and some water spills over on to the low lying areas of the continents. These shallow seas are the **continental shelves**. Some, such as *the South China Sea*, are more than 1,100 km wide. Most are relatively shallow, with typical depths of 50 - 100 m. A few of the more important shelves are: *the East China Sea*, the Bering Sea, *the North Sea*, *the Grand Banks*, *the Patagonian Shelf*, *the Arafura Sea* and *Gulf of Carpentaria*, and *the Siberian Shelf*. The



shallow seas help dissipate tides, they are often areas of high **biological productivity**, and they are usually included in the exclusive economic zone of **adjacent** countries.

The crust is broken into large plates that move relative to each other. New crust is created at the **mid-ocean ridges**, and old crust is lost at trenches. The relative motion of crust, due to **plate tectonics**, produces the **distinctive features** of the sea floor sketched in Fig. 1.2, including mid-ocean ridges, trenches, **island arcs**, and **basins**. The names of the sub-sea features have been defined by the **International Hydrographic Organization** (1953).

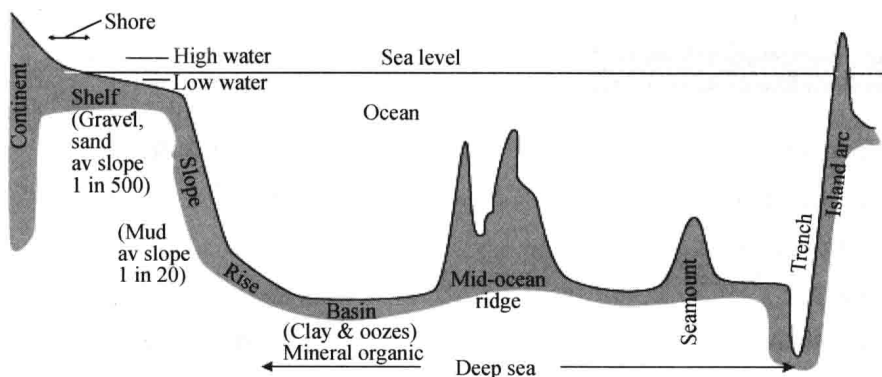


Fig. 1.2 Schematic section through the ocean showing principal features of the sea floor.

Note that the slope of the sea floor is greatly exaggerated in the figure

Basins are deep depressions of the sea floor of more or less circular or oval form.

**Canyons** are relatively narrow, deep furrows with **steep slopes**, cutting across the continental shelf and slope, with bottoms sloping continuously downward.

Continental shelves are zones adjacent to a continent (or around an island) and extending from the low-water line to the depth, usually about 120 m, where there is a marked or rather steep descent toward great depths.

**Continental slopes** are the declivities seaward from the shelf edge into greater depth.

**Plains** are very flat surfaces found in many deep ocean basins.

**Ridges** are long, narrow elevations of the sea floor with steep sides and **rough** topography.

**Seamounts** are **isolated** or comparatively isolated elevations rising 1,000 m or more from the sea floor and with small summit area.

**Sills** are the low parts of the ridges separating ocean basins from one another or from the adjacent sea floor.