



教育部高职高专规划教材

环境专业英语

第二版

刘亚珍 谭慧明 主编



化学工业出版社



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· 北京 ·

全书分为 10 部分 (Parts), 22 单元 (Units), 每个单元均由课文和阅读材料组成。课文和阅读材料选自原版英文教科书、著作、期刊等。主要内容包括: 环境问题; 水污染及控制工程; 大气污染及防治; 固体废物及处理方法; 其他污染及控制技术; 环境监测; 环境法规; 环境质量评价; 环境的可持续发展。每篇课文均配有单词、注释和练习题。教材设置专业术语词汇表(英文解释)和附录, 附录中的内容包括了读、译、听、说、写五大技巧, 供师生参考使用。

本书为高职高专环境类专业的教材, 也可供同等英语程度环境技术人员或相近领域人员使用。

图书在版编目 (CIP) 数据

环境专业英语/刘亚珍, 谭慧明主编. —2 版. —北京:
化学工业出版社, 2011. 12
教育部高职高专规划教材
ISBN 978-7-122-12753-2

I. 环… II. ①刘… ②谭… III. 环境科学-英语-
教材 IV. H31

中国版本图书馆 CIP 数据核字 (2011) 第 227529 号

责任编辑: 王文峡
责任校对: 边涛

装帧设计: 尹琳琳

出版发行: 化学工业出版社(北京市东城区青年湖南街 13 号 邮政编码 100011)
印 装: 三河市延风印装厂
787mm×1092mm 1/16 印张 12 $\frac{3}{4}$ 字数 316 千字 2012 年 5 月北京第 2 版第 1 次印刷

购书咨询: 010-64518888 (传真: 010-64519686) 售后服务: 010-64518899

网 址: <http://www.cip.com.cn>

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定 价: 26.00 元

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第一版前言

本书是为高职高专环境专业高年级学生编写的环境专业英语教材。

本书的编写宗旨是力求将环境知识和专业英语的学习与高年级英语学习融为一体，既培养和提高学生阅读英语原著和报刊的能力，又向学生提供广泛的环境专业知识及有关的英语知识。全书分为9个PART，每个PART根据内容不同含1~5个Unit，每个Unit含1篇课文和1篇阅读材料。全书共有20篇课文，20篇阅读材料，以英语语言难易程度为序。课文选材广泛，涉及环境专业诸多方面，如环境问题、污染防治、环境监测与评价、环境管理、环境法规等，均选自近年来英、美等国的环境专业的期刊、文献；课文注释中解释了有关环境专业术语及背景知识；课文练习精练实用。希望本教材能够帮助高职高专环境专业学生及英语爱好者更好、更快地阅读环境专业文章，并拓宽知识面。

本书由辽宁石化职业技术学院李居参主编，承德石油高等专科学校孙乃有、黄河水利职业技术学院扈畅、辽宁石化职业技术学院司颐和刘亚珍分别编写了部分课文、阅读教材、练习题和注释。本教材是三所院校五位教师共同劳动的结晶。全书最后由李居参统稿，由渤海大学外语学院李素荣主审。

本教材涉及内容较广，可能出现错漏，希望读者不吝指正，使本书在使用过程中不断得到改进。

编者

2003年3月于锦州

第二版前言

本书自 2003 年 7 月第一版出版发行以来,在全国高职高专院校环境专业得到普遍使用,收到了一定的效果。但是随着环境科学新法规的不断出台,新技术、新工艺的不断引进与出现,企业对外技术交流和贸易不断扩大,社会对环境专业人才的专业英语的要求越来越高。为体现新工艺、新技术,树立可持续发展的科学发展观,适应新的教学改革形势的需要,对本书的第一版的部分内容进行了补充和修订。关于第二版的内容,特作如下说明:

1. 《环境专业英语》(第二版)保留了第一版教材中的经典内容和主要编写思路;

2. 删除了第一版教材中第十六单元和第十八单元中关于环境监测和美国环境空气质量标准的内容,补充了室内空气质量问题和环保政策等方面的内容,反映了当前大气污染防治领域中最突出的环境问题,体现了以人为本的选材理念;

3. 删除了第一版教材中第二十单元中关于清洁生产方面的内容,补充了环保政策等方面的内容,体现了新的环保政策与法规对环境监测和治理等方面的指导意义,有利于培养学生的环保意识,提升其职业素质;

4. 第二版教材增选了人们普遍关注的环境热点问题,如土壤污染和大气污染防治新技术等方面的内容;

5. 调整了部分习题的编号与内容,使其内容与课文内容和新的环保理念更加匹配。

本书第一版由孙乃有、扈畅、刘亚珍、司颐编写。第二版的修订工作由辽宁石化职业技术学院刘亚珍副教授和辽宁工业大学谭慧明副教授负责,其中 Unit 1~Unit 11 由刘亚珍执笔修订编写,Unit 12~Unit 22 由谭慧明执笔修订编写,全书最后由刘亚珍统稿,由辽宁工业大学外国语学院张祝祥教授主审。化学工业出版社对第二版的修订给予了支持,同时还得到全国各地的同行和读者的热情支持和帮助,在此一并表示感谢!

由于编者水平有限,书中不妥之处在所难免,敬请读者批评指正。

编者

2011 年 9 月于锦州

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Part 1

Environmental Problems

Unit 1

Text: Global Environmental Issues

Due to deforestation, air/ocean/lake/river/marsh pollution caused by chemical compounds, the global warming caused by the excess emission of carbon dioxide from automobiles, the depletion of the ozone layer caused by chlorofluorocarbon, the population increase of the world and other reasons, the degradation of the environment has reached the point where the existence of all living creatures including the human race is threatened globally.¹ The following is a list of current environmental issues:

- Climate Change
- Ozone Layer Depletion
- Acid Depositions
- Deforestation
- Decrease in Variation of Living Creatures
- Spread of Harmful Wastes
- Desertification
- Oceanic Environments
- Lake and Marsh Environments

Explanation of Major Environmental Issues

Climate Change

It is a serious problem that we are witnessing the fastest rate of climate change in the 1990's since the end of the last glacial period. The ice formed off the shore of Iceland used to contribute to maintaining the abyssal current, but since 1984, new ice formations have not occurred due to the global warming. The ocean temperatures of the Atlantic Ocean, the Pacific Ocean, and the Indian Ocean have been rising for the last 35 years. The ocean absorbs carbon dioxide. This mechanism used to function well to stabilize the climate, but now it is losing its stabilizing effect and the growth of plankton has an effect on the ocean temperature. As the ocean temperature goes up, fish indigenous to high temperature migrate to the coastal zone, while fish indigenous to low temperature are driven out. The amount of methane, which causes a greenhouse effect, has been increasing in Siberia as the temperature goes up.² The tropics are expanding, while

the polar region is shrinking. The reduction of oceanic and atmospheric fluctuations such as the El Nino southern fluctuation has been increasing. The reason is that the tropics have been expanding.

Depletion of Ozone Layer

Due to a gradual destruction of the ozonosphere in the stratosphere by chlorofluorocarbon (CFC) and other chemicals discharged by humans, the amount of ultraviolet rays reaching the surface of the earth has been increasing. Although the prohibition of chlorofluorocarbon discharge and the decrease of its emission among the developed nations were agreed as the Montreal Protocol, the ozonosphere destruction is still progressing at twice as fast as the expected rate.³ The cause is unknown. The ozone layer depletion in the Antarctic Region was the worst in 1996; since then, the ozone layer depletion in the Arctic Region has become critical. There is a theory that the greenhouse effect retards the speed of restoration of the depleted ozone layer.

Acid Depositions

The damage from acid rain is especially noticeable in the Southeast Asian countries. Due to government restrictions against the discharge of sulfur oxide in Europe and North America, acid rain has decreased. However, at the same time, farm crop harvest has decreased due to a drastic decrease of soil sulfur content and a new type of grain disease. As to the acid rain caused by nitrogen oxide or automobile emissions, there is no substantial improvement as seen in the sulfur oxide.

It could be inferred that the contaminants are cooled down and descend to the ground after they were warmed up in the tropical regions and ascended in steam, whereby they are delivered to the poles. Therefore, the worst damage from the acid deposition is located in the Polar Regions; we do not know the current extent of actual damage.

Deforestation

Forest resources are being consumed all over the world at a non-sustainable rate; deforestation is progressing. In Europe, the damage caused by air pollution, climatic variations, fire, and noxious insects is seen on a quarter of all trees.⁴ The forest fire in Indonesia caused significant pollution. Ashes spread in the air by this fire caused damage to the health of living creatures and the environment.

Decreasing Variety of Living Creatures

More than 13 million species of living creatures reportedly inhabit the earth. Of those, human beings recognize only 13%. Human activities increase the rate of extinction of species by thousands of times. It is expected that 200,000 species of living creatures, which account for almost 20% of all living species in the coral reef, will be extinct in the next 40 years.

Although the reasons for the extinction of living species have not been clearly known, global changes in the biochemistry recycle, decrease in biomass and lower fertility rate among living species on this planet could account for some of the reasons.

Oceanic Environment

Environmental pollution in the coastal areas is worsening due to various developments. 34% of the entire coastal areas is said to be facing serious risk of severe pollution, while 17% is considered moderate risk.

Selected from "G. Watters. *Health and Environment*, World Health Organization, Geneva, 1995"

New Words

- deforestation *n.* 采伐森林, 森林开伐
marsh *n.* 湿地, 沼泽, 沼泽地
desertification *n.* (土壤) 荒漠化, 沙漠化
abyssal *a.* 深渊的, 深海的
the Atlantic Ocean *n.* 大西洋
plankton *n.* 浮游生物
indigenous *a.* 本土的
Siberia 西伯利亚 (俄罗斯一地区)
tropic *n.* 回归线, 热带; *a.* 热带的
polar region 极地
ultraviolet *a.* 紫外线的, 紫外的; *n.* 紫外线辐射
the Montreal Protocol 蒙特利尔公约
the Antarctic Region 南极地区
the Arctic Region 北极地区
retard *vt.* 延迟, 使减速, 阻止, 妨碍, 阻碍
noxious *a.* 有害的
Indonesia *n.* 印度尼西亚
inhabit *vt.* 居住于, 存在于, 占据, 栖息
coral *n.* 珊瑚, 珊瑚虫
reef *n.* 暗礁; *v.* 收 (帆)
biomass *n.* (单位面积或体积内) 生物的数量
fertility rate *n.* 人口出生率, 生育率
moderate *a.* 中等的, 适度的, 适中的; *v.* 缓和
glacial period *n.* [地] 冰川时期
El Nino 厄尔尼诺

Notes

1. Due to deforestation, air/ocean/lake/river/marsh pollution caused by chemical compounds, the global warming caused by the excess emission of carbon dioxide from automobiles, the depletion of the ozone layer caused by chlorofluorocarbon, the popu-

lation increase of the world and other reasons, the degradation of the environment has reached the point where the existence of all living creatures including the human race is threatened globally.

译为：由于人们过度地采伐森林，空气、海洋、湖泊、河流、沼泽受到各种化合物的污染，汽车排放的尾气中二氧化碳含量过高致使全球变暖，氯氟烃致使臭氧层出现空洞，世界人口剧增以及其他诸多缘故，全球环境恶化，其严重程度已经危及到包括人类在内的一切生物的生存。

2. The amount of methane, which causes a greenhouse effect, has been increasing in Siberia as the temperature goes up.

译为：随着气温的升高，西伯利亚地区的沼气数量不断地增加，这引发了温室效应。

3. Although the prohibition of chlorofluorocarbon discharge and the decrease of its emission among the developed nations were agreed as the Montreal Protocol, the ozone-sphere destruction is still progressing at twice as fast as the expected rate.

译为：根据《蒙特利尔公约》中的规定，禁止发达国家排放氯氟烃，并且要减少汽车尾气的氯氟烃排放量，尽管如此，臭氧层遭到破坏的速度仍然比预期的速度高出一倍。

4. In Europe, the damage caused by air pollution, climatic variations, fire, and noxious insects is seen on a quarter of all trees.

译为：在欧洲，空气污染、气候变化、火灾、病虫害等毁掉了1/4的树木。

Exercises

I. Put the following into Chinese.

- | | |
|-------------------------------------|-------------------------|
| 1. chemical compounds | 5. ozonosphere |
| 2. climate change | 6. automobile emissions |
| 3. the depletion of the ozone layer | 7. methane |
| 4. the Glacial period | 8. deforestation |

II. Put the following into English.

- | | |
|--------|---------|
| 1. 氯氟烃 | 5. 酸雨 |
| 2. 沙漠化 | 6. 厄尔尼诺 |
| 3. 平流层 | 7. 污染物 |
| 4. 紫外线 | 8. 生物化学 |

III. Answer the following questions in English.

1. What are the major causes attributable to the degrading environment?
2. Among the current environmental issues, which one is of the most serious? And why?
3. What is the impact of the global warming on the environment?
4. Why is the worst damage from the acid deposition located in the Polar Regions?
5. What are the possible reasons for the increasing speed of the extinction of the living species on the world?

Reading Material

Climate Change

Introduction

According to the National Academy of Sciences, the earth's surface temperature has risen by about 1°F (0.6°C) in the past century, with accelerated warming during the past two decades. There is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities. Human activities have altered the chemical composition of the atmosphere through the buildup of greenhouse gases—primarily carbon dioxide, methane, and nitrous oxide. The heat-trapping property of these gases is undisputed although uncertainties exist about exactly how the earth's climate responds to them. Go to the emissions section for much more on greenhouse gases.

Our Changing Atmosphere

Energy from the sun drives the earth's weather and climate, and heats the earth's surface; In turn, the earth radiates energy back into space. Atmospheric greenhouse gases (water vapor, carbon dioxide, and other gases) trap some of the outgoing energy, retaining heat somewhat like the glass panels of a greenhouse.

Without this natural "greenhouse effect" (see Figure 1-1), temperatures would be much lower than they are now, and life as known today would not be possible. Instead, thanks to greenhouse gases, the earth's average temperature is a more hospitable 60°F (15.6°C). However, problems may arise when the atmospheric concentration of greenhouse gases increases.

Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide have increased nearly 30%, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15%. These increases have enhanced the heat-trapping capability of the earth's atmosphere. Sulfate aerosols, a com-

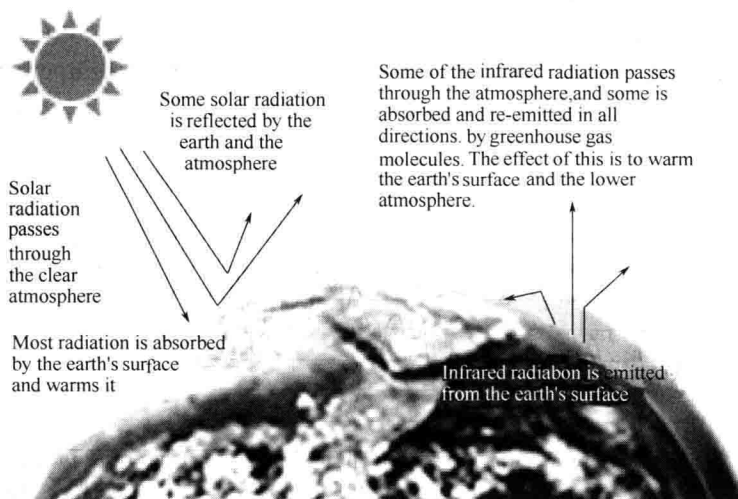


Figure 1-1 The greenhouse effect

mon air pollutant, cool the atmosphere by reflecting light back into space. However, sulfates are short-lived in the atmosphere and vary regionally.

Why are greenhouse gas concentrations increasing? Scientists generally believe that the combustion of fossil fuels and other human activities are the primary reasons for the increased concentration of carbon dioxide. Plant respiration and the decomposition of organic matter release more than 10 times the CO₂ released by human activities; but these releases have generally been in balance during the centuries leading up to the industrial revolution with carbon dioxide absorbed by terrestrial vegetation and the oceans.

What has changed in the last few hundred years is the additional release of carbon dioxide by human activities. Fossil fuels are burned to run cars and trucks, heat homes and businesses, and power factories are responsible for about 98% of U. S. carbon dioxide emissions, 24% of methane emissions, and 18% of nitrous oxide emissions. Increased agriculture, deforestation, landfills, industrial production, and mining also contribute a significant share of emissions. In 1997, the United States emitted about one-fifth of total global greenhouse gases.

Estimating future emissions is difficult, because it depends on demographic, economic, technological, policy, and institutional developments. Several emissions scenarios have been developed based on differing projections of these underlying factors. For example, by 2100, in the absence of emissions control policies, carbon dioxide concentrations are projected to be 30%~150% higher than today's levels.

Changing Climate

Global mean surface temperatures have increased 0.3~0.6°C since the late 19th century (see Figure 1-2). The 20th century's 10 warmest years all occurred in the last 15 years of the century. Of these, 1998 was the warmest year on record. The snow covers in the Northern Hemisphere and floating ice in the Arctic Ocean has decreased. Globally, sea level has risen 4~8 inches (0.1~0.2m) over the past century. Worldwide precipitation over land has increased by about one percent. The frequency of extreme rainfall events has increased throughout much of the United States.

Increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise

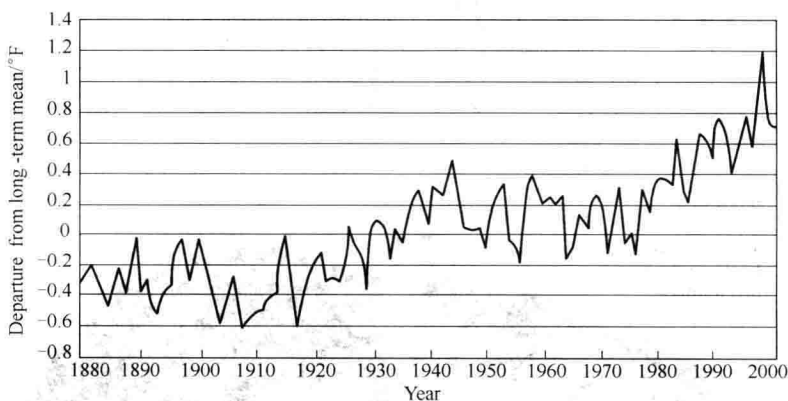


Figure 1-2 Global temperature changes (1880~2000)

0.6~2.5°C in the next fifty years, and 1.4~5.8°C in the next century, with significant regional variation. Evaporation will increase as the climate warms, which will increase average global precipitation. Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Sea level is likely to rise two feet along most of the U. S. coasts.

Calculations of climate change for specific areas are much less reliable than global ones, and it is unclear whether regional climate will become more variable.

Selected from “*Report to Congress: The Potential Effects of Global Climate Change on the United States*, 1989, U. S. Environmental Protection Agency (EPA 230-05-89-050)”

Part 2

Water Pollution & Wastewater Treatment

Unit 2

Text: Water Pollution

Water pollution occurs when a body of water is adversely affected due to the addition of large amounts of materials to the water.¹ The sources of water pollution are categorized as being a point source or a non-source point of pollution. Point sources of pollution occur when the polluting substance is emitted directly into the waterway. A pipe spewing toxic chemicals directly into a river is an example. A non-point source occurs when there is runoff of pollutants into a waterway, for instance, when fertilizer from a field is carried into a stream by surface runoff.

Types of Water Pollution

Toxic Substance. A toxic substance is a chemical pollutant that is not a naturally occurring substance in aquatic ecosystems. The greatest contributors to toxic pollution are herbicides, pesticides and industrial compounds.

Organic Substance. Organic pollution occurs when an excess of organic matter, such as manure or sewage, enters the water. When organic matter increases in a pond, the number of decomposers will increase. These decomposers grow rapidly and use a great deal of oxygen during their growth. This leads to a depletion of oxygen as the decomposition process occurs. A lack of oxygen can kill aquatic organisms. As the aquatic organisms die, they are broken down by decomposers, which lead to further depletion of the oxygen levels.

A type of organic pollution can occur when inorganic pollutants such as nitrogen and phosphate accumulate in aquatic ecosystems. High levels of these nutrients cause an overgrowth of plants and algae. As the plants and algae die, they become organic material in the water. The enormous decay of this plant matter, in turn, lowers the oxygen level. The process of rapid plant growth followed by increased activities by decomposers and a depletion of the oxygen level is called eutrophication.

Thermal Pollution. Thermal pollution can occur when water is used as a coolant near a power or industrial plant and then is returned to the aquatic environment at a higher temperature than it was originally.² Thermal pollution can lead to a decrease in the dissolved oxygen level in the water while also increasing the biological demand of aquatic

organisms for oxygen.

Ecological Pollution. Ecological pollution takes place when chemical pollution, organic pollution or thermal pollution is caused by nature rather than by human activities. An example of ecological pollution would be an increased rate of siltation of a waterway after a landslide, which would increase the amount of sediments in runoff water.³ Another example would be when a large animal, such as a deer, drowns in a flood and a large amount of organic material is added to the water as a result. Major geological events such as a volcano eruption might also be sources of ecological pollution.

Specific Sources of Water Pollution

Farming

Farms often use large amounts of herbicides and pesticides, both of which are toxic pollutants. These substances are particularly dangerous to life in rivers, streams and lakes, where toxic substances can build up over a period of time.

Farms also frequently use large amounts of chemical fertilizers that are washed into the waterways and damage the water supply and the life within it. Fertilizers can increase the amounts of nitrates and phosphates in the water, which can lead to the process of eutrophication.

Allowing livestock to graze near water sources often results in organic waste products being washed into the waterways.⁴ This sudden introduction of organic material increases the amount of nitrogen in the water, and can also lead to eutrophication.

Four hundred million tons of soils are carried by the Mississippi River to the Gulf of Mexico each year. A great deal of this siltation is due to runoff from the exposed soil of agricultural fields. Excessive amounts of sediment in waterways can block sunlight, prevent aquatic plants from photosynthesizing, and can suffocate fish by clogging their gills.

Business

Clearing of land can lead to erosion of soil into the river. Waste and sewage generated by industry can get into the water supply, introducing large organic pollutants into the ecosystem.

Many industrial and power plants use rivers, streams and lakes to dispose of waste heat. The resulting hot water can cause thermal pollution. Thermal pollution can have a disastrous effect on life in an aquatic ecosystem as temperature increases decrease the amount of oxygen in the water, thereby reducing the number of animals that can survive there. Water can become contaminated with toxic or radioactive materials from industry, mine sites and abandoned waste sites.

Acid precipitation is caused when the burning of fossil fuels emits sulfur dioxide into the atmosphere. The sulfur dioxide reacts with the water in the atmosphere, creating acid rain. As acid precipitation falls into lakes, streams and ponds it can lower the overall pH of the waterway, killing vital plant life, thereby affecting the whole food