

# 中国土壤剖面图谱

ATLAS OF SOIL PROFILES IN CHINA

郭景唐 欧国菁 编著

中国科学技术出版社



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## 内 容 简 介

《中国土壤剖面图谱》一书对我国主要土壤类型的自然环境、地理分布以及成土过程进行了扼要的陈述,并列有土壤剖面特征的详细说明和较系统的理化分析资料。书中汇集了38种土壤剖面及其景观的彩色图片共76幅,尚列有部分土壤表层粘粒矿物X射线衍射图谱20幅。

本书可供科技人员和有关农、林院校师生参考。

本图谱含中、英文对照。

## **Synopsis**

Atlas of Soil Profiles in China describes briefly the natural environment, geographical distribution, and genesis process of main soil groups in China. It sets out the full and clear descriptions of soil profiles characteristics and the systematic physical and chemical analytic data. It collects 76 colourful pictures of 38 soil groups and their landscapes, and displays 20 patterns of X-ray diffraction of partial soil surface horizons.

This atlas provides reference to scientist or teachers and students at agricultural and forestry universities or related colleges. It is an English-Chinese bilingual book.

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## 序

我国幅员广阔,自然条件复杂,耕作历史悠久,在九百六十万平方公里的土地上,分布着多种多样的土壤类别,我国是世界上土壤类型最丰富的国家之一。编纂一本土壤种类比较齐全,分析资料翔实,剖面形态清晰而富有质感的中国土壤剖面图谱,无论对于土壤学研究或是实际工作实属非常必要。

由北京林业大学组织编写的《中国土壤剖面图谱》一书展示了我国绝大部分的土壤类型。对各个土类的地理分布、环境条件和成土过程均作了简要叙述。汇集了我国境内的38种土壤剖面及其景观的彩图76幅,对各土壤剖面都有详明的描述和较系统的理化分析资料,并且对地带性土类进行了粘粒的全量化学组成分析,编绘了部分土壤表层的X射线衍射图谱。书中的材料比较系统,数据规律明显,图片直观性强,可给人们以一目了然的效果。这种汇土壤剖面、景观和分析资料于一体的构思是难能可贵的,材料搜集工作之艰巨也是可以想像的,这本图谱在国内同类著作中尚无前例。

该图谱的出版是一件值得庆幸的事,它不但填补了我国在这方面的空白,而且对科学研究和有关院校的教学都会有所裨益,对我国的土地规划和利用以及指导农林业生产也有一定的参考价值。

我们衷心希望这本新的出版物将对土壤科学的发展和国际交流作出贡献。

中国林学会  
中国土壤学会  
森林土壤专业委员会主任

王万信

一九九一年二月

## Foreword

China is a country with a vast territory, complicated natural conditions and long farming history. She is one of the countries in the world with the most varieties of soil groups. Manifold of soils are distributed over the territory of nearly 9,600,000 square kilometre. It is highly necessary in fact, no matter for scientific study or practice on soils, to compile an atlas of soil profiles in China with rather complete soil groups, full and accurate analytic data, clear profile features and rich in nature feeling.

《Atlas of Soil Profiles in China》 was organized and compiled by Beijing Forestry University. It shows most of soil groups in our country, and describes briefly geographical distribution and environmental conditions and genesis process of each soil group, and collects 76 colourful pictures of 38 soil profiles and their landscapes, and enumerates full and clear descriptions and rather systematic physical and chemical analytic data of each profile as well as total chemical composition of clay and X-ray diffraction patterns of partial soils. This atlas is clear at a glance for you for its systematic materials and regular data and objective pictures. To compile such a book is unprecedented in our country. The conception that to collect the soil profile and landscape and analytic data somewhere in one is estimable, and the difficulty in collecting materials is imaginable.

The publication of this atlas is a matter for rejoicing. It not only fills in the gap in the field in our country, but also is of great benefit for scientific studying and teaching in related colleges and universities, and has reference value for land programme and utilization and for directing agriculture and forestry production.

We heartily hope that this new publication will be used for the international correlation of soils and contribute to the development of soil science.

February, 1991

**Zhang Wanru**  
**Chairman of Professional**  
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**Chinese Society of Forestry**  
**and Soil Science Society of China**



## 前 言

我国疆土地域辽阔,纬度纵贯49度以上,经度横跨约62度。地质地貌复杂,历经各地史时期的地质运动,形成了我国陆地的基本地质构造单元:西北海西褶皱带、东北海西褶皱带、阿尔卑斯褶皱带、台湾褶皱带以及扬子陆台、华夏陆台和华北陆台。全境地形总趋势由西向东逐渐降低分为三级:青藏高原为一级阶梯,海拔高在4000米以上;越过昆仑山、祁连山、横断山脉下跌为二级阶梯,海拔高在4000—1000米之间;沿雪峰山、太行山、大兴安岭东坡一线以东至滨海为三级阶梯,海拔高在1000米以下。

南北热量悬殊温差显著,地跨热带、亚热带、暖温带、温带和寒温带等气候带,年平均气温相差约30℃,≥10℃的积温相差达8000℃左右。东西湿度剧变干湿分明,可划分为湿润、半湿润、半干旱和干旱地区,湿润地区干燥度小于1;干旱地区可大于8。年降水量在砖红壤区可高达1500毫米;而荒漠地区一般均在100毫米以下。

成土母质按其风化类型包括:含盐风化壳、碳酸盐风化壳、硅铝风化壳、铁铝风化壳以及碎屑风化壳等。

自然植被类型有:森林、灌丛、草甸、沼泽、草原和荒漠等类型。在森林类型中包括雨林、季雨林、常绿阔叶林、落叶阔叶林、针叶林以及针阔叶混交林。

在复杂的地理背景下,构成了我国土壤分布的地理特点。我国土壤资源丰富,类别众多,既有各种地带性(“显域性”)土壤,又有许多非地带性(“隐域性”)土壤。对于如此繁多的土壤类型,在过去多年的教学工作中,迫切需要一部较为全面、系统的,而且直观、简明的参考资料。为此,我们编纂了这册包括自然环境概述、土壤剖面形态描述、土壤性状系统分析数据,以及大量自然景观和土壤剖面彩色图片的图谱。

《中国土壤剖面图谱》的问世,使我国丰富多彩的土壤风貌得以形象的荟萃。尽管它还不十分全面或存在某些欠缺,但确可给人以一目了然的直观效果,对教学、科研和生产工作都有一定的理论和实用价值。

参加本图谱中土壤整段剖面和分析样品采集以及景观拍摄(以上工作是在同时、同地、同点进行的)的单位有:北京林业大学、东北林业大学、吉林林学院、浙江林学院、西北林学院、内蒙古林科院、浙江林科所、山东林校、陕西农林学校、南京林校、四川林校、福建林校、广州林校、浙江林校、洛阳林校、辽宁林校、吉林林校、湖南林校和山西林校。后经北京林业大学又进行了大量的补充采集、剖面拍摄、样品理化分析、资料汇集整理和编著工作。

在图谱的编撰工作中,始终得到林业部教育司的热心关注和大力支持;部分土壤分析和粘粒X射线衍射测试,分别由中国科学院综合考察委员会和中国地质科学院矿床地质研究所协助完成,在此一并致谢!限于编者水平,难免有错误和不足,欢迎大家予以指正。

## Introduction

China is a country with vast territory. She covers more than 49 degrees in latitude and about 62 degrees in longitude. Complicated geological structures and geomorphological characteristics were formed undergoing the movement of the crust of the earth in each geological period. The basic geological structure units of land in China are: the northwest Hercynian fold zone, the northeast Hercynian fold zone, the Alps fold zone, the Taiwan fold zone, the Yangtze continental platform, the Huaxia continental platform, and the north of China continental platform. The trend of topography in whole declines in elevation from west to east. It can be explained in three grades: The Qingzang plateau is the first grade with elevation of above 4000m; Crossing Kunlun, Qilian and Hengduan mountains, we come down to the second grade with elevation of 4000–1000m; That along Xuefeng, Taihang, and east slope Da Xinganling mountains, stretching east to seashore is defined as the third grade with elevation lower than 1000m.

From south to north of China, it extends across the tropical, subtropical, warm temperate, temperate, and cool temperate zones, and there is distinct difference in heat and temperature—the difference of  $\geq 10^{\circ}\text{C}$  accumulated temperature is about  $8000^{\circ}\text{C}$ , and that of annual mean temperature is about  $30^{\circ}\text{C}$ . The humidity changes sharply from east to west, which can be expressed in humid, semihumid, semiarid, and arid regions. The dryness rate is  $<1$  in humid regions, but  $>8$  in arid regions. The rainfall is  $>1500\text{mm}$  in red earth area and  $<100\text{mm}$  in desert area.

Base on the weathering pattern, the parent materials that soils developed from can be divided into: salic weathering crust, carbonated weathering crust, siallitic weathering crust, ferrallitic weathering crust, clastic weathering crust etc.

The natural vegetation in China includes: forest, shrubbery, meadow, swamp, steppe, and desert, etc. Among which, the forest vegetation involves rain forest, seasonal rain forest, evergreen broad-leaved forest, deciduous broad-leaved forest, coniferous forest, and coniferous broad-leaved mixed forest.

Upon these complicated background, great varieties of soil are developed in China. They are not only zonal but also intrazonal soils. Facing such multitudinous types of soils, we urgently need a comprehensive, systematical, audio-visual, and concise reference book.

For this reason, we edit this book—Atlas of Soil Profiles in China. It includes outline of natural environment, descriptions of soil profiles, systematic analytic data of soil properties, and a lot of colorous pictures of natural landscapes and soil profiles.

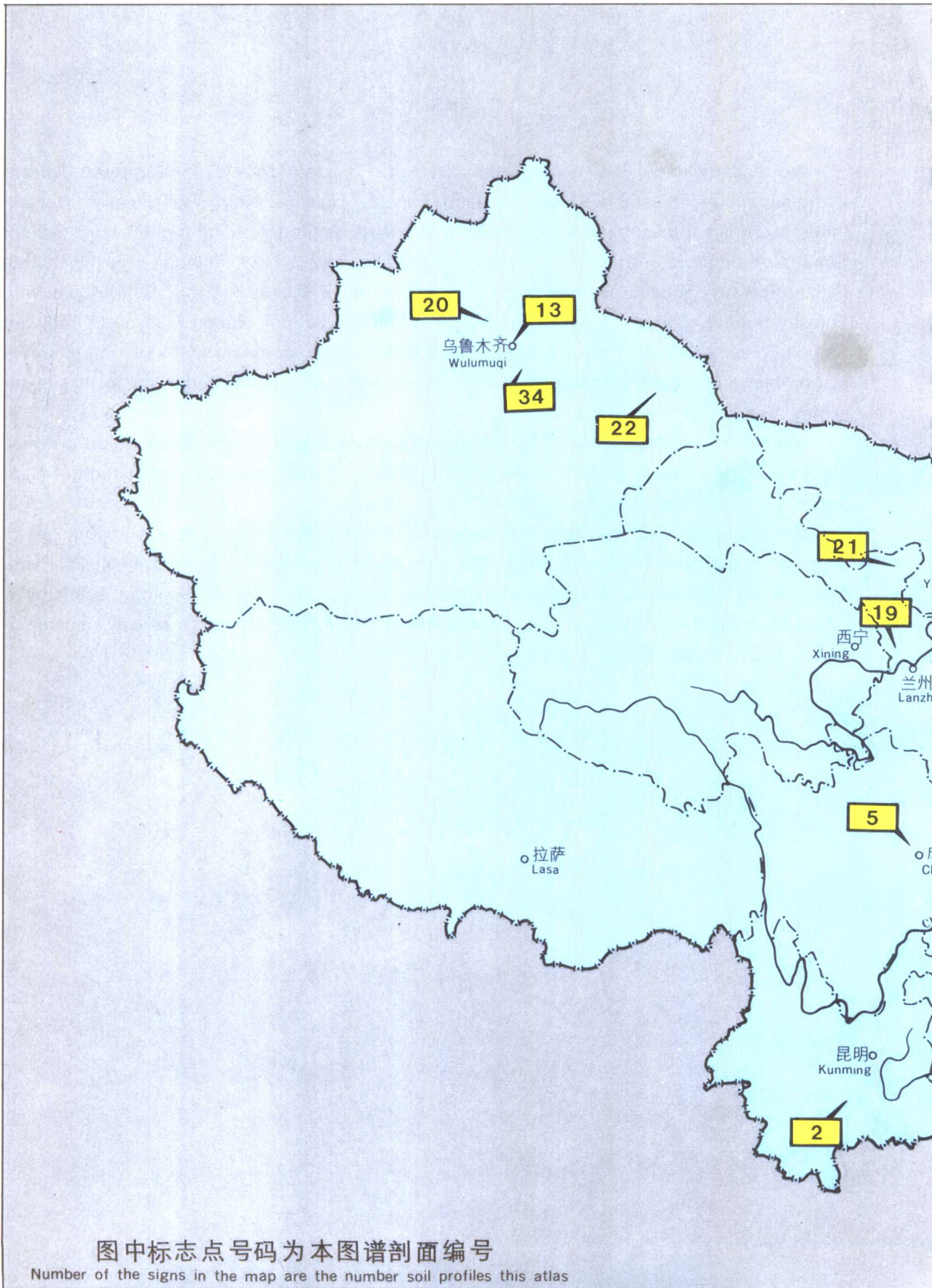
The publication of this book will make various soil features and characteristics gather together. Despite it is not perfect in every way, this book is still theoretically and practically valuable to teaching, scientific researching, and manufacturing. It will provide us a clear and audiovisual aids.

We acknowledge the contributors: Beijing Forestry University, Northeast Forestry University, Jilin Forestry College, Zhejiang Forestry College, Northwest Forestry College, Inner Mongolia Forestry College, Zhejiang Forestry Institute, Shandong Forestry School, Shanxi Agriculture and Forestry School, Nanjing Forestry School, Sichuan Forestry School, Fujian Forestry School, Guangzhou Forestry School, Zhejiang Forestry School, Luoyang Forestry School, Liaoning Forestry School, Jilin Forestry School, Hunan Forestry School, and Shanxi Forestry School. They are responsible for sampling, describing and taking pictures of soil profiles and natural landscape (all these of the work were completed at the same site and same time).

Much of the complement of sampling and picturing, and all the physical and chemical analysis of soil samples, and the collection and edition of materials were completed in Beijing Forestry University afterwards.

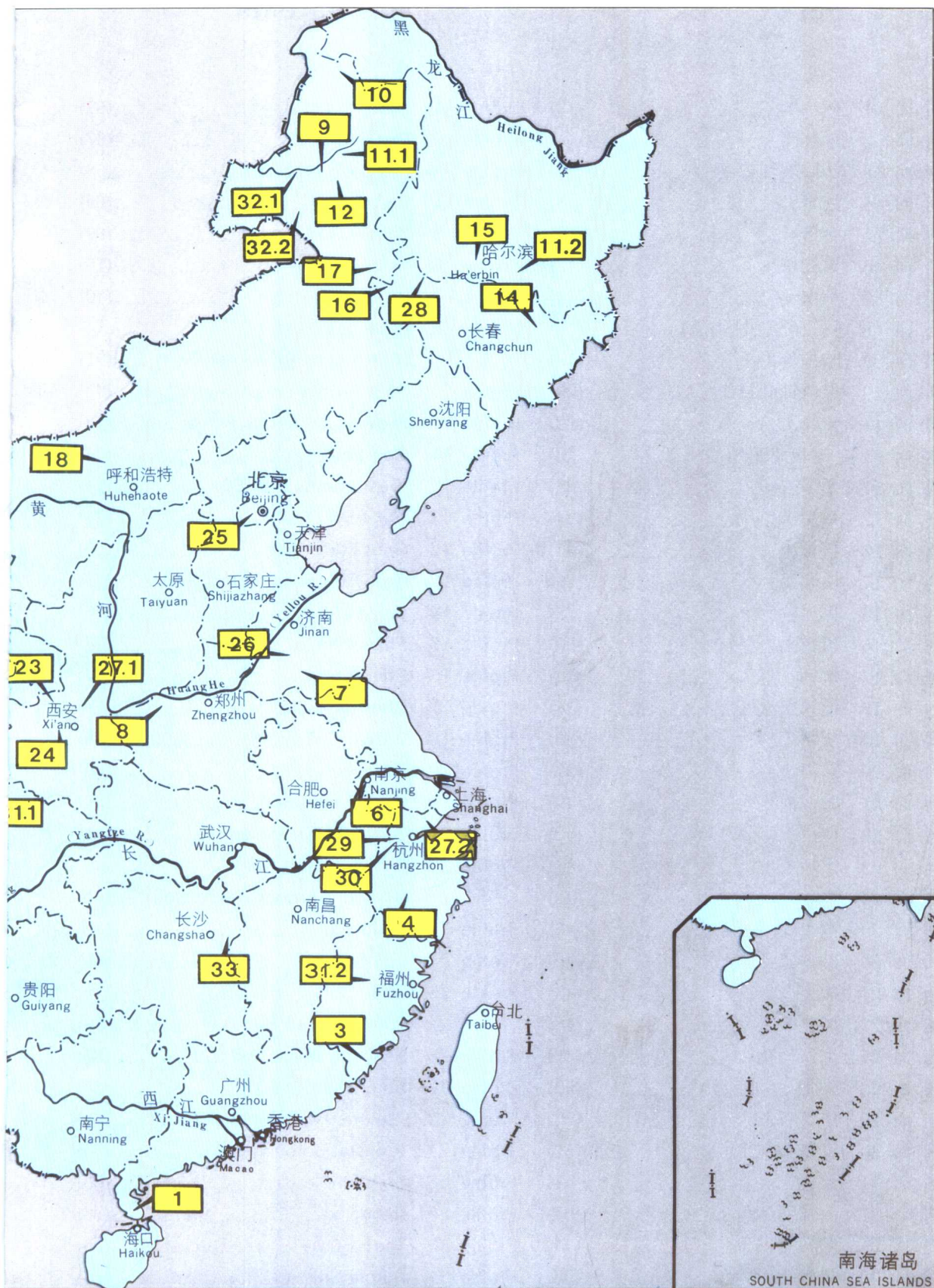
We appreciate the Education Department of Ministry of Forestry who gave enthusiastic support in the edition of this book. We also appreciate the Comprehensive Investigation Commission of Chinese Academy and the Ore Deposit Institute of Geology Academy of China for their cooperation in analysis and measuring X-ray diffraction of clay minerals of partial soil samples.

# 土壤剖面采集点分布图





# THE DISTRIBUTION MAP OF SAPLING SITES



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# 中国土壤剖面图谱

策 划 胡汉斌 黄小文  
编 著 郭景唐 欧国菁  
审 校 张万儒

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## 剖面 1 砖 红 壤

### Profile 1 Latosol

砖红壤为热带地区代表性土壤类型。主要分布在海南岛、雷州半岛、云南河口附近、景洪以南和台湾南部。所在地区具有高温多雨和干湿季节明显的特点,气候属于热带季风气候,  $\geq 10^{\circ}\text{C}$  积温  $7500\sim 9300^{\circ}\text{C}$ , 年平均气温  $21\sim 28^{\circ}\text{C}$ , 全年无霜雪, 年降水量  $1500\sim 1900$  毫米, 地形多为低丘台地, 母质多为各种岩浆岩风化产物或浅海沉积物, 地带性植被为热带雨林、季雨林, 如今已大部分垦为农田、胶园, 或为疏林和灌丛草地。

砖红壤的成土过程主要是强烈的富铝化作用和迅速的生物物质循环。



剖面采集地点: 广东省徐闻县南华垦殖场

海拔高度: 120米

地 形: 台地缓斜面

母 质: 玄武岩风化坡积物

植 被: 常绿阔叶疏林

剖面特征:

0~9厘米: 红棕(2.5YR4/6)\*, 中粘土, 碎块及碎屑状结构, 较疏松, 根量较多, 偶见炭屑, 层次过渡较明显。

9~30厘米: 暗红棕(2.5YR3/6), 中粘土, 块状结构, 较紧实, 根量少, 层次过渡不明显。

30~100厘米: 红棕~暗红棕(2.5YR 3.5/6), 重粘土, 块状结构, 紧实, 根量极少。

\* 干态颜色, 下同。

图1.1 砖红壤剖面

Fig.1.1 Latosol profile.