



## 浅谈《省界详图集》的编制技术特点

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摘要: 《省界详图集》是一套大型的、系统的、规范化的省级行政区域界线专题图集, 具有权威性、准确性和实用性。结合该图集的生产实际, 概述了图集的编制意义和内容, 详细阐述了图集编制技术方案的关键环节和技术特点。

关键词: 详图集; 技术方案; 技术特点

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### 1 编制意义

行政区域界线是相邻行政区域之间的分界线, 是国家依法实施行政管理的基础和依据<sup>[1]</sup>。为从根本上划定行政区域界线, 解决困扰各级政府的边界争议问题, 国务院部署了“九五”期间的勘界工作重要任务。2001年底, 经过全国各级政府和有关部门20多万勘界人的辛勤工作, 全国所有的省、县两级行政区域界线全部划定, 42个三省交会点和18个省界边界线起止点的争议全部解决, 32 300根界桩永久性地树立在行政区域边界的关键部位, 成为国家依法进行行政区域界线管理的重要依据。全面勘界完成后, 如何巩固和保存勘界成果, 维护法定行政区域界线的严肃性、稳定性显得尤为迫切和重要。为此, 国务院《行政区域界线管理条例》规定: “行政区域界线勘定后, 应当以通告和行政区域界线详图予以公布。”民政部全国勘界办公室通知要求“编制出版法定的行政区域界线详图集, 向社会公布法定行政区域界线。”

《中华人民共和国省级行政区域界线详图集》(以下简称“《省界详图集》”)是全面勘界法定行政区域界线的文件形式, 为省级行政区域界线勘界和界线管理工作提供科学手段, 为政府有关部门有效实施行政管理提供基本依据, 是实现勘界成果资源共享, 加强各项行政管理工作的基础, 对科学合理开发利用边界地区资源、维护边界地区社会稳定、促进社会和谐稳定具有重要意义。

### 2 《省界详图集》简介

《省界详图集》是根据国务院批准的省、自治区、直辖市人民政府联合勘定的行政区域界线协议书及其附图、勘界有关成果编制的专题系列图集, 详图比例尺与协议书附图的比例尺保持一致, 共涉及1 10 000、

1 50 000、1 100 000 3种比例尺。

《省界详图集》涉及68条省级界线(不含港、澳特别行政区), 30个省、自治区、直辖市。全长约62400多km, 涉及1 100 000地形图395幅, 1 50 000地形图1958幅, 1 10 000地形图1648幅。详图分界线装订成册, 每本图集包括封面、内封、编制说明、详图接图表、图例和详图(主体部分)。

### 3 编制技术方案

《省界详图集》利用计算机制图技术, 以省级界线数字线划地图数据(原数据)为准, 采用自由经纬度分幅、沿界线带状制图的方法编制, 制图范围: 1 10 000、1 50 000比例尺图上的带状范围宽度为界线两侧各10cm, 1 100 000比例尺图上的带状范围宽度为界线两侧各5cm; 形成境界、水系、道路、居民地、地貌、注记、图廓等分层的矢量图形数据。根据地形图图式、规范的要求, 对详图的各要素进行编辑及符号化处理、协调地理要素相互间的关系, 完成图内外整饰<sup>[2]</sup>。经过各级审验、修改, 经发排、打样、印刷及装订等过程, 最终完成《省界详图集》的编制印刷。详图的编制流程见图1。

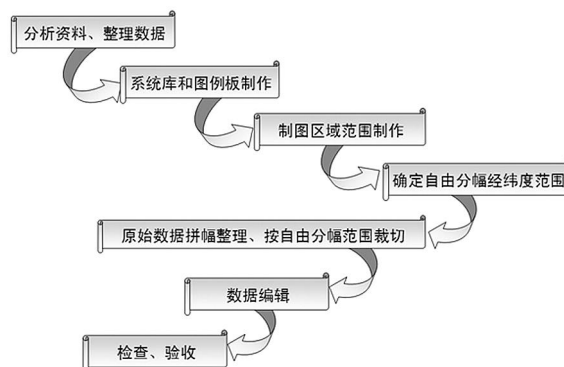


图1 详图的编制流程

《省界详图集》编制过程中的关键技术有:

收稿日期: 2011-05-25

### 3.1 软件选择

鉴于原数据是利用 MapGIS 软件建立的数据库,在《省界详图集》编制过程中选用 MapGIS 软件。采用同一软件可以避免因数据格式转换引起的数据丢失,且 MapGIS 软件平台提供了制作系统库、图例板的功能,保证文件管理、符号、线型等数据的一致性,MapGIS 数据也可直接转换出菲林,满足出版印刷的需要。

### 3.2 自由经纬度分幅

基本资料协议书附图均为标准分幅,省级界线带状制图范围只占很小幅面,造成整条界线涉及图幅多、省界表达零碎、缺少整体感,影响直观阅读<sup>[3]</sup>。采用自由经纬度分幅的方式,充分利用纸张幅面,使省级界线带状范围尽可能位于图幅中央,界线走向更加直观,且最大限度缩减了图幅数量,利于装订和保存。

### 3.3 制作系统库

常规制图是先制作系统库,然后用系统库来控制相应的数据表达内容。由于该项目原数据没有提供系统库,也没有数据编码与地图要素的对应表,从原数据上无法判别地物,给地图的编制带来很大的困难。为了解决这个难题,首先从地形图上判断原数据的地物,并记录数据编码、数据参数与地形图上地物的对应表;其次,根据数据参数与地物的对应表来制作相应的系统库,用系统库来一一对应数据的内容,保证了图面符号化的准确性和一致性。

### 3.4 印前数据处理

详图中地貌要素采用专色印刷;详图的编制使用 MapGIS 软件,而序图在 CorelDRAW 软件中编制。我们对专色印刷印前数据处理、不同数据格式印前数据处理进行了摸索,解决了数据处理的难题,保证了色彩的协调和一致性<sup>[4]</sup>。

### 3.5 电子图集软件开发

针对电子图集要求的放大、缩小、浏览和打印等功能,自主开发了《省界详图集》电子光盘软件,解决了该项目数据量大、浏览速度慢的难题;设置了数据加密功能,防止了数据失密。

## 4 技术特点

《省界详图集》也是我国有史以来第一次法定界线编制的规范化省级行政区域界线专题地图,具有权威性、准确性和实用性,达到同类产品的国内领先水平。

### 4.1 权威性

《省界详图集》基础资料为经国务院、各省人民政府批复的有界线双方人民政府共同起草,双方政府代表签字、签订的行政区域界线协议书;协议书附图和

界桩成果表等法定勘界成果。这些基础资料是省级行政区域界线管理、依法治界、依法治国的重要基础信息资源。《省界详图集》以科学的技术手段,实现了省级行政区域界线勘界成果的数据集成,是以地图形式表现的省级行政区域界线法规性基础文件,是国家区域界线管理的基础工程,具有绝对的法定权威性<sup>[5-6]</sup>。

### 4.2 准确性

《省界详图集》通过编制技术指标、严谨科学的技术方案和质量控制,保证了《省界详图集》中省级行政区域勘界基础信息资源的准确性,结束了以往地图上省级行政区域界线“权宜画法”的历史。

首先编写了专业技术设计书,将专业技术设计书和试生产的印刷成果经专家评审后报民政部区划地名司审批,从技术方案与生产流程上保证了勘界基础信息资源的准确性。编制过程中成功解决了数据跨带处理<sup>[7]</sup>、专色印刷印前数据处理等难点,尤其对界线、界桩精确度有严格要求,保证了地图的量测精度。

其次,加强了编制过程的质量控制,保证专题的精准度:一是严格按坐标值准确录入界桩数据,确定界桩位置;二是严格按协议书资料的界线走向绘制,对资料中与标准画法不一致的界线要素,及时提出由各省、市、自治区民政部门解决;三是加强各级检查,经过编制单位的三级检查、湖北省质量监督检验站的验收、民政部区划地名司组织的专题要素审定,民政部区划地名司组织专家组和验收组对《省界详图集》印刷成果进行了验收。

### 4.3 标准性

勘界工作结束后,经国务院批准,民政部和国家测绘局公布了 1:1 000 000 和 1:4 000 000 比例尺的省界标准画法,但只能满足比例尺小于或等于 1:1 000 000 地图上的省界画法的需要,大于此比例尺的地图上省界画法还没有统一的标准,《省界详图集》是与协议书附图同比例尺的带状地形图,完善了各种地图上省界画法的标准,是审定各种地图上省界画法的依据。

### 4.4 科学性

《省界详图集》以科学的技术设计方案,成为现代地图理论与现代地图编制技术的完美结合。

1) 遵从图形视觉是地图形式设计的重要依据的理念,研究地图图形适应人的视觉感受机能的最大效率,充分运用地图感受论及地图传输论,从地图应用的角度,对省级区域界线范围采用自由经纬度分幅成图,突破了传统地形图的标准分幅方法,达到界线直观全貌展示,界线成果应用和分析更加方便、快捷,缩短了查询时间。  
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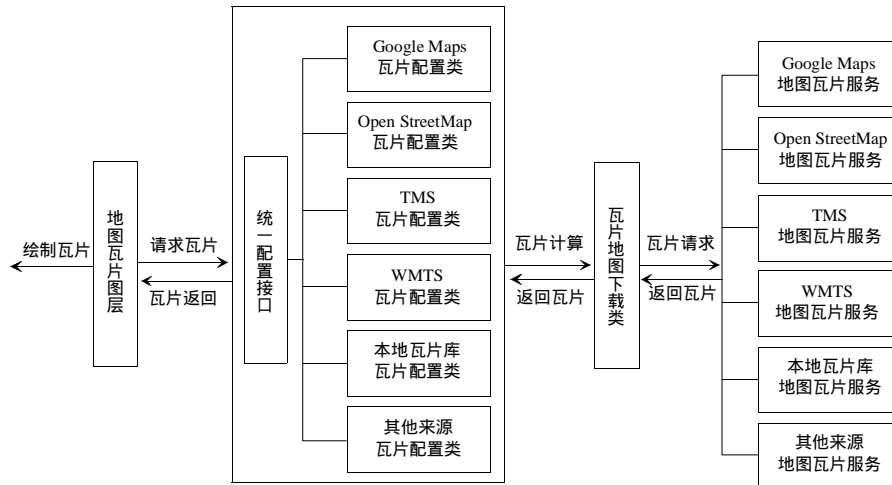


图2 瓦片配置类设计

#### 4 结 语

随着电子地图的大众化普及，地图瓦片技术得到越来越广泛的应用，将瓦片地图技术运用到桌面 GIS 中，可以集成多源瓦片地图数据，同时利用桌面 GIS 强大的数据处理和分析能力，满足用户的专业需求，具有较好的应用前景。

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2) 在如何利用已有的系统数据对应制作系统库和图例板,实现可供出版需要的专题地图数据方面做了有效的探索,解决资料与成图之间数据的标准、格式、表现形式、转换方法等问题,最终建立了对应的地图符号系统库,为批量生产相关地图产品,提高工作效率,拓宽《省界详图集》的社会服务面和深度开发打下了坚实的基础。

3) 自主开发的《省界详图集》电子光盘软件功能特点为:保证了电子地图的逻辑编排与纸质地图完全一致;在栅格数据容量大的情况下,保持了较快的浏览速度;鉴于图集基础底图为1:10000、1:50000、1:100000地形图,专门设置了数据加密功能,只能阅读、浏览,不能进行数据的复制,防止了数据失密。

#### 5 结 语

在全国范围内的省、县两级勘界普查工作已基本结束背景下,湖北、福建、浙江、山西、新疆等省、市、自治区陆续开始了县级行政区域界线详图集的编制工作,而省级行政区域界线详图集的编制工作还是空白,《省界详图集》正确反映了各省(自治区、直辖

市)联合勘定的行政区域界线的精准位置及走向,在内容全面性、结构完整性、技术先进性、编制质量、使用价值等诸方面,达到国内领先水平,是省级行政区域界线管理和标准画法的基础资料 and 重要依据,并荣获2010年度国家测绘局科技进步二等奖。在图集编制的过程中还存在一些不足,在提高进度方面、地理要素更新等方面,有待今后进一步改进。

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were studied. From the analysis, Qinghai-Tibet region had the lowest, but the eastern China CH<sub>4</sub> column density. In eastern China CH<sub>4</sub> column density decreased with increasing of latitude. Overall, there was significant seasonal variation, that was CH<sub>4</sub> column density high in summer and low in summer.

Key words CH<sub>4</sub> volume mixing ratio, SCIAMACHY, natural region  
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#### Loosely Coupled of Data and System Interface Design Base on Net Reflection Technology by WU Fei

Abstract Process in the development of the management information system, the business logic started around the data. In general, first of all analysis of data entities and the general design of system interface process in the analysis and design of software projects. These processes depend on the stability of the data entities, when the entity data changes, such as modify the data structure, system design and interface design changes at same time, so this is bound to improve software development costs, while the system's operation and maintenance more difficult. This paper presented a use. Net technology system and the data reflecting the loosely coupled approach. The method could meet real-time based on changes in physical structure of data system interface requirements, improved the efficiency of system development.

Key words Net reflection technology, XML comments, loosely coupled  
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#### Design of the Drainpipe Networks GIS based on ArcGIS by TAO Deming

Abstract The development of city brings along the construction of city basic facilities, and high construction speed and big scale of the drainpipe networks system. The traditional labour management method already can not satisfy the need of actual work, so the constitute of modern capacity drainpipe networks management information system is sorely needed. In the case of the drainpipe networks management and application of Fuzhou, design and application of the Drainpipe Networks GIS were elaborated in this paper.

Key words ArcGIS, GIS, the Drainpipe Networks  
(Page:120)

#### Simulation and Assessment of Flood Disasters by JING Fengwei

Abstract Aim at characteristics of flood hazard assessment, combined with the GIS and RS technology, according to three-dimensional data provided by DEM and data from remote sensing image, using spatial analysis of GIS to predict, simulation and showed flood scene of Hongshui River, then integrated rainfall data, population density data of townships and other ancillary data to evaluate disaster induced by flood.

Key words flood disasters, GIS, RS, classify, simulation  
(Page:122)

#### Study on the Spatial and Temporal Variation of Land Use Changes in Yantai Coastland by MA Jinwei

Abstract Followed by large-scale development and utilization activities of coastline resources, land use / land cover changes in coastal zone show remarkable dynamics and significant difference with distance from coastline. Taking Yantai coastal area as an example, the spatio-temporal variation resulting from different coastal location were analyzed in this paper by Remote Sensing and Geographic Information System methods. The results showed that the process of land use change was more active in coastal zone of Yantai during last 20 years, with rapid expansion of urban land and other construction land. Coastal location had a profound impact on land use change rate and transformation between different land use types. And, main factors of the spatial and temporal variation included the natural geographical conditions and coastline development closely related with the coastal location, utilization activities, population growth, economic growth, policy and management of coastal zone.

Key words Yantai, coastal location, spatio-temporal variation, impact factors  
(Page:125)

#### Study of Digital Campus Modeling Based on SuperMap Deskpro by YANG Dequan

Abstract In recent years, many colleges have begun to establish their own "digital campus", facilitate management and improve human and material resources use efficiency. As the foundation and an important part of a "digital campus", 3D landscape modeling made management to more intuitive and effective. In this article, a 3D landscape model of the center campus of Xianning University was set up through the steps of the data pre-processing, the 3D model constructing and the texture projecting by using the China-made software SuperMap Deskpro.

Key Words digital campus, 3D landscape modeling, Xianning university, SuperMap Deskpro  
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#### Shanxi Province with Land Use / Cover Change Monitoring Based on MODIS Data by FAN Yanwei

Abstract This article was based on MODIS data for land use / land cover dynamic monitoring of the classification study. The main content was about making use of maximum likelihood supervised classification using MODIS images in Shanxi Province and other auxiliary data such as ETM+ to capture various land-use types of study area, and then compared with statistical data for land use / land cover dynamic monitoring and analysis.

Key words MODIS, land use/land cover, supervised classification, ETM+  
(Page:136)

#### Land Surface Temperature Retrieval Based on Landsat ETM+ Data in Wuhan City by YAN An

Abstract In this article, the land surface temperature (LST) of Wuhan in summer 2002 was accurately retrieved by mono-window algorithm method, based mainly on Landsat ETM+ data, supplemented by meteorological data. The fractional vegetation cover was calculated by NDVI (normalized difference vegetation index), and estimation for Land Surface Emissivity was measured. The results indicated that urban heat island from Wuhan Wuchang, Hankou and Hanyang constitute the three major urban heat island, there were small heat islands even more serious inside large ones. Moreover, distribution of heat islands of Wuhan is closely related to their underlying surface environment.

Key words land surface temperature retrieval, Landsat ETM+, heat island effect, mono-window algorithm method  
(Page:140)

#### Application of Handheld GPS to Land-use Database Updating by REN Dongfeng

Abstract At present, the second national land survey is a great mission for the homeland department. Field survey in the recovering the land is a very important step. The traditional survey methods took too much time and energy, and were difficult to measure the area or length and record results implementation program rapidly and accurately. This paper discussed the advantages and development prospects of the handheld GPS in field data acquisition and land updating. We put forward a simple and new method planting the result of handheld GPS absolute orientation in a topographic map, and it greatly enhanced the practicality in the land used database updates.

Key words handheld GPS, coordinate transformation, differential technique, GIS  
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#### Discussion on Characteristic of Technique about the Thematic Atlas of PRC's Provincial Administrative Bounds by ZHANG Hanmei

Abstract The thematic atlas of PRC's provincial administrative bounds is a major, systemic, normalized thematic atlas about provincial administrative bounds. It has authority, veracity and practicability. In this paper, we mentioned about the significance of editing the thematic atlas and the content of it. We also expounded the key link and technique characteristic of thematic atlas editing technical scheme.

Key words thematic atlas, technical scheme, technique characteristic  
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#### Study on the Application of Tile Map Technology in Desktop GIS by HUANG Menglong

Abstract This paper introduced tile map technology and its relevant stan-