

第9章

数据显示与地图编制



王江浩

wangjh@lreis.ac.cn

中国科学院地理科学与资源研究所
资源与环境信息系统国家重点实验室

2018-10-31 @ UCAS

giser.me

主要内容



数据显示与地图编制简介

- 数据显示
- 地图的符号表达
- 定量地图的编制
- 地图的注记
- 地图设计与生产

上机实践

- 练习1：制作一幅等值区域图
- 练习2：地图的符号表达
- 练习3：河流注记

数据显示（数据可视化）

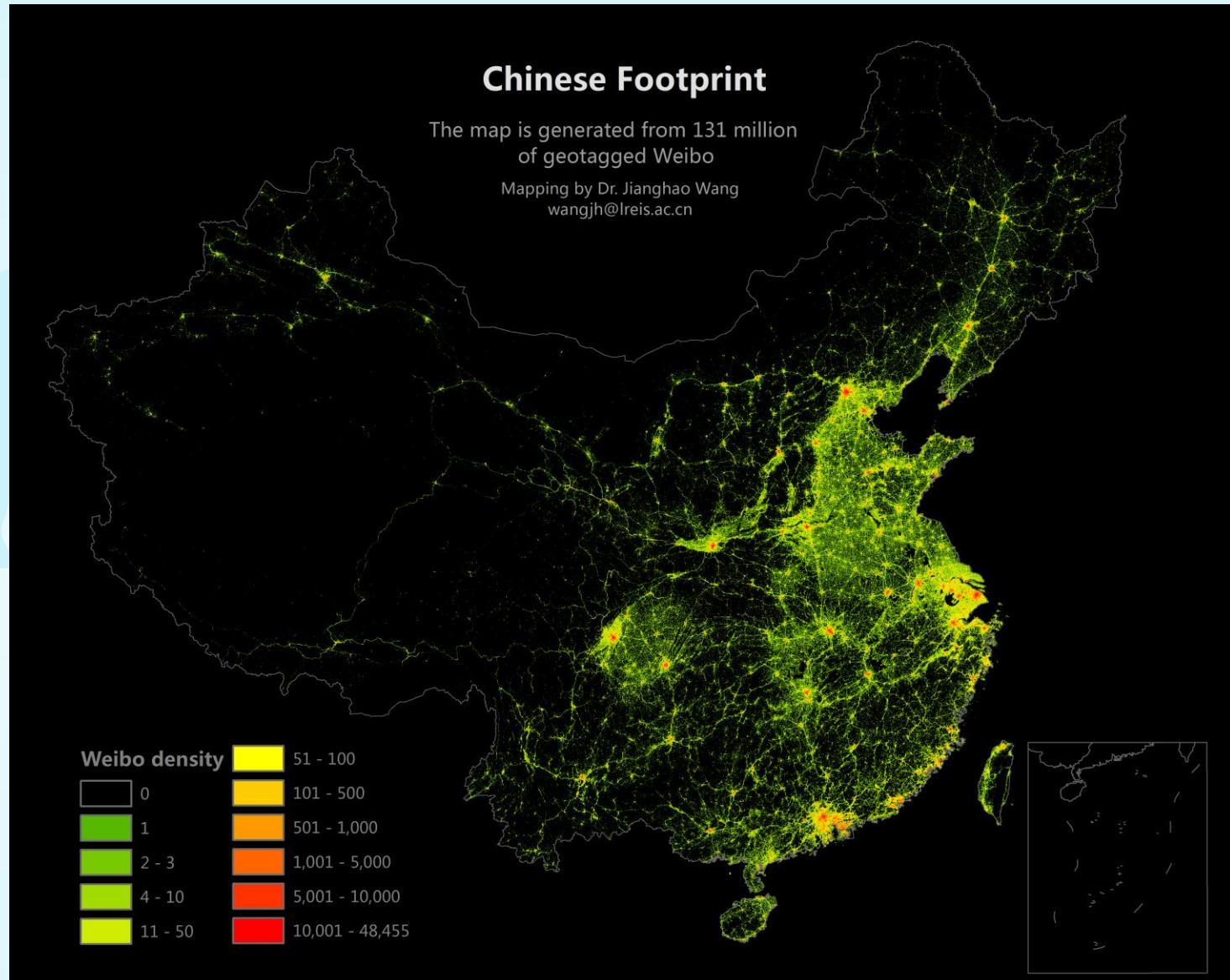


- (时) 空数据可视化



<https://www.facebook.com/notes/facebook-engineering/visualizing-friendships/469716398919>

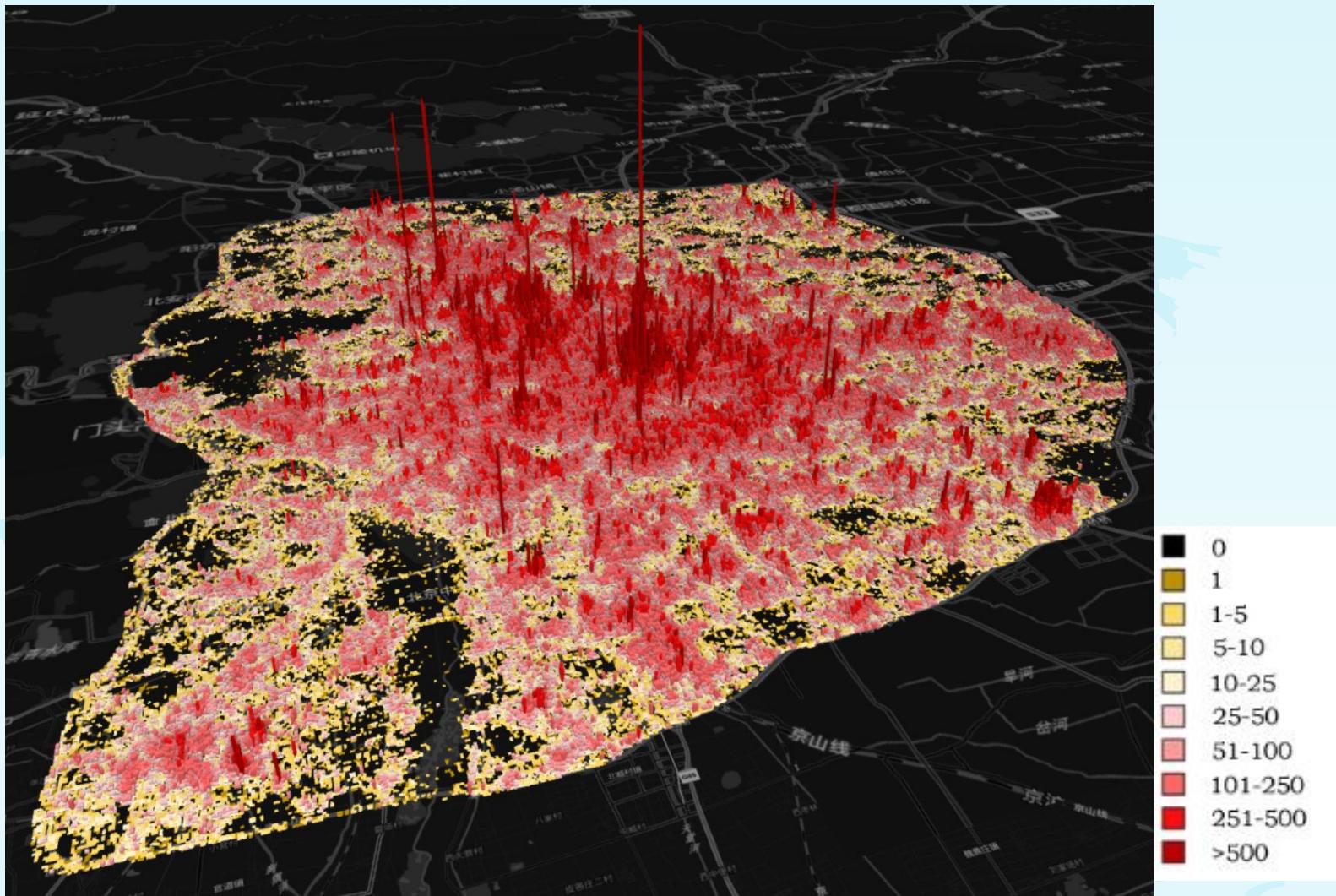
数据显示



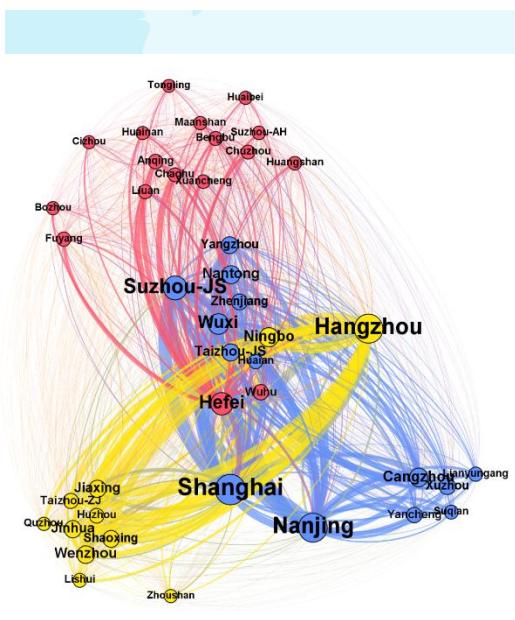
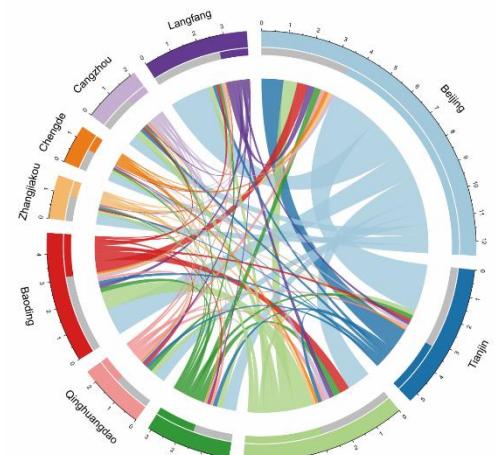
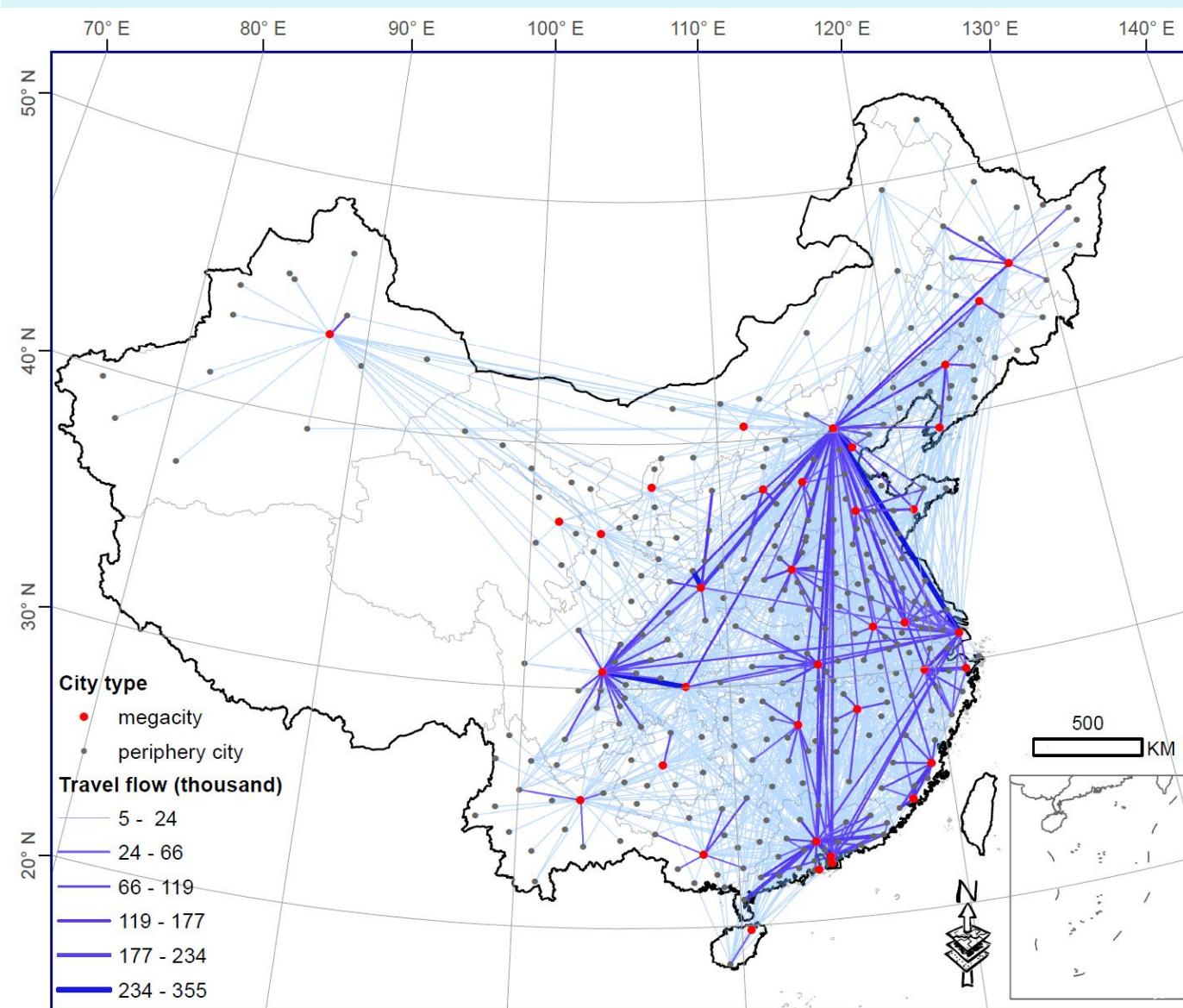
数据可视化(轨迹数据)



数据可视化(三维显示)



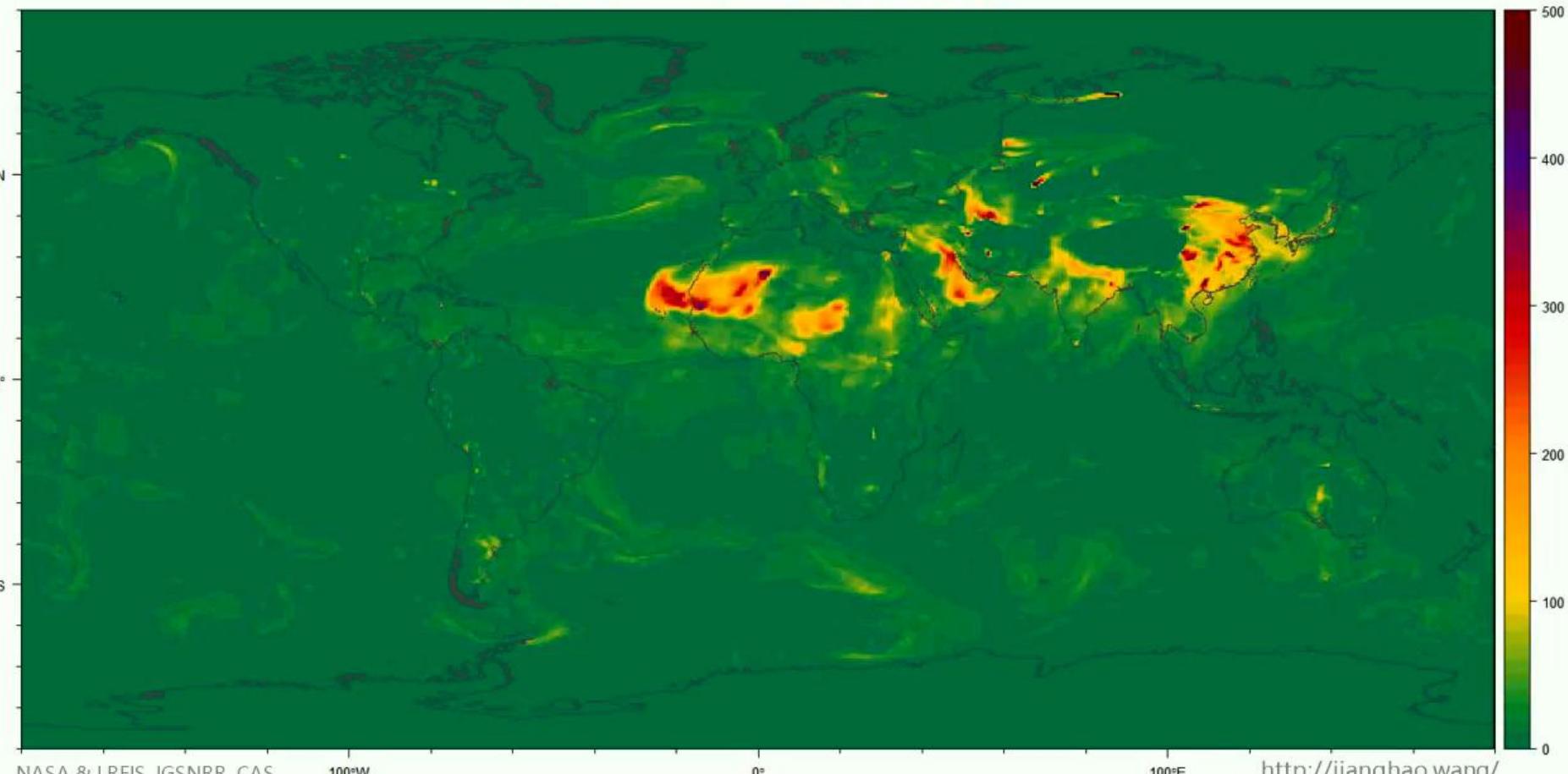
数据可视化(空间交互)



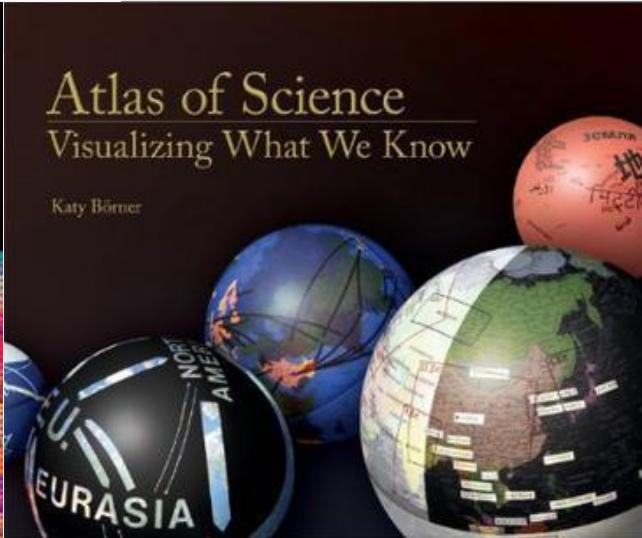
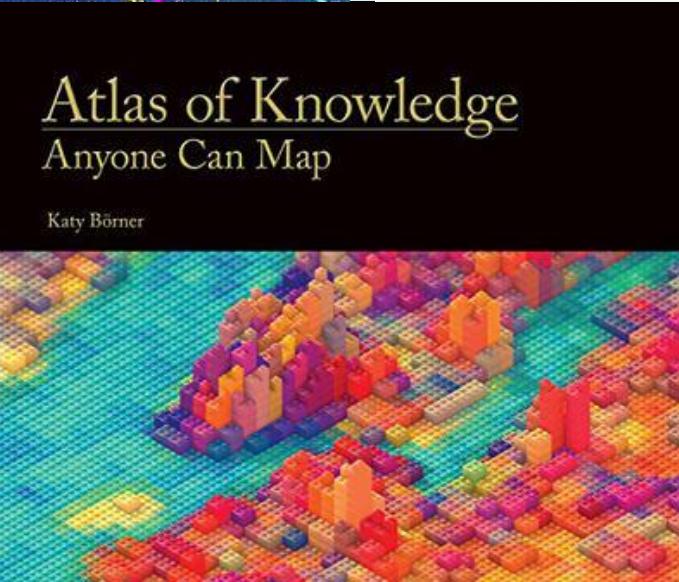
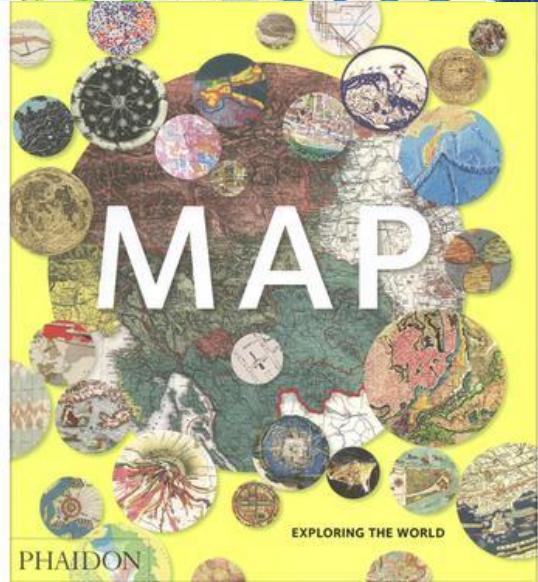
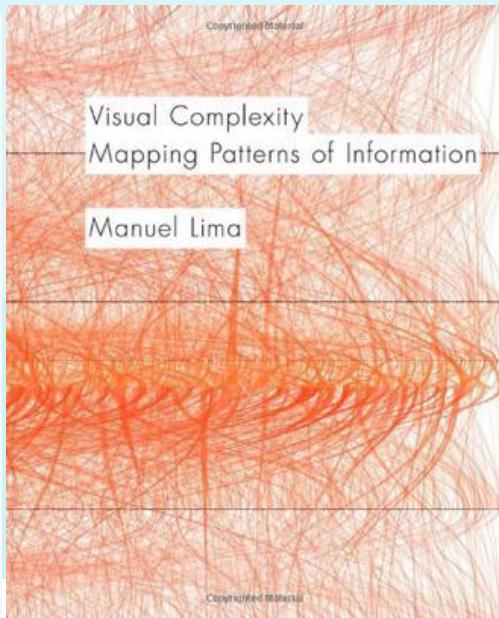
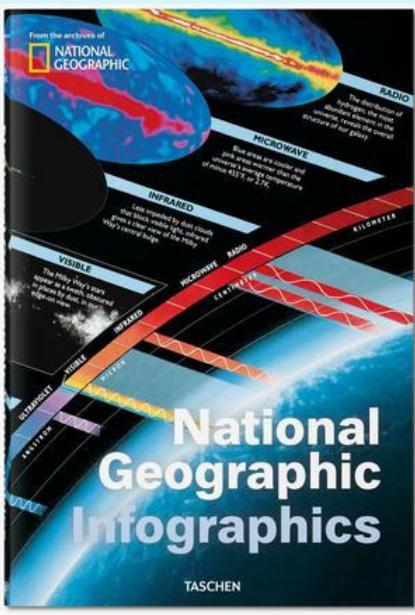
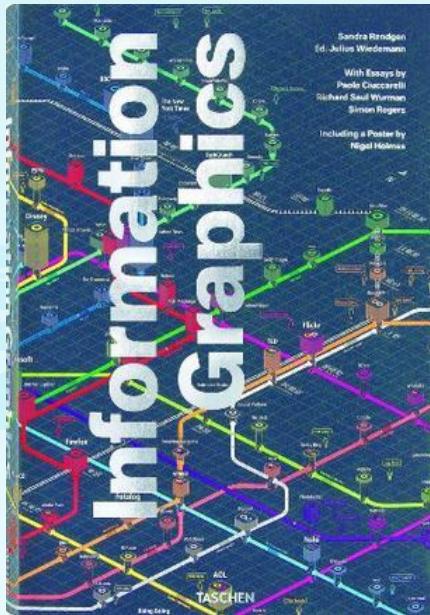
数据可视化（动画）



20140101_0000z : Surface.PM2.5.Mass.Concentration



Books



Website



<http://www.informationisbeautiful.net/>

<https://github.com/d3/d3/wiki/Gallery>

<https://www.mapbox.com/gallery/>

<https://www.mapbox.com/map-design/>

<https://carto.com/gallery/>

<https://uber.github.io/react-map-gl/>

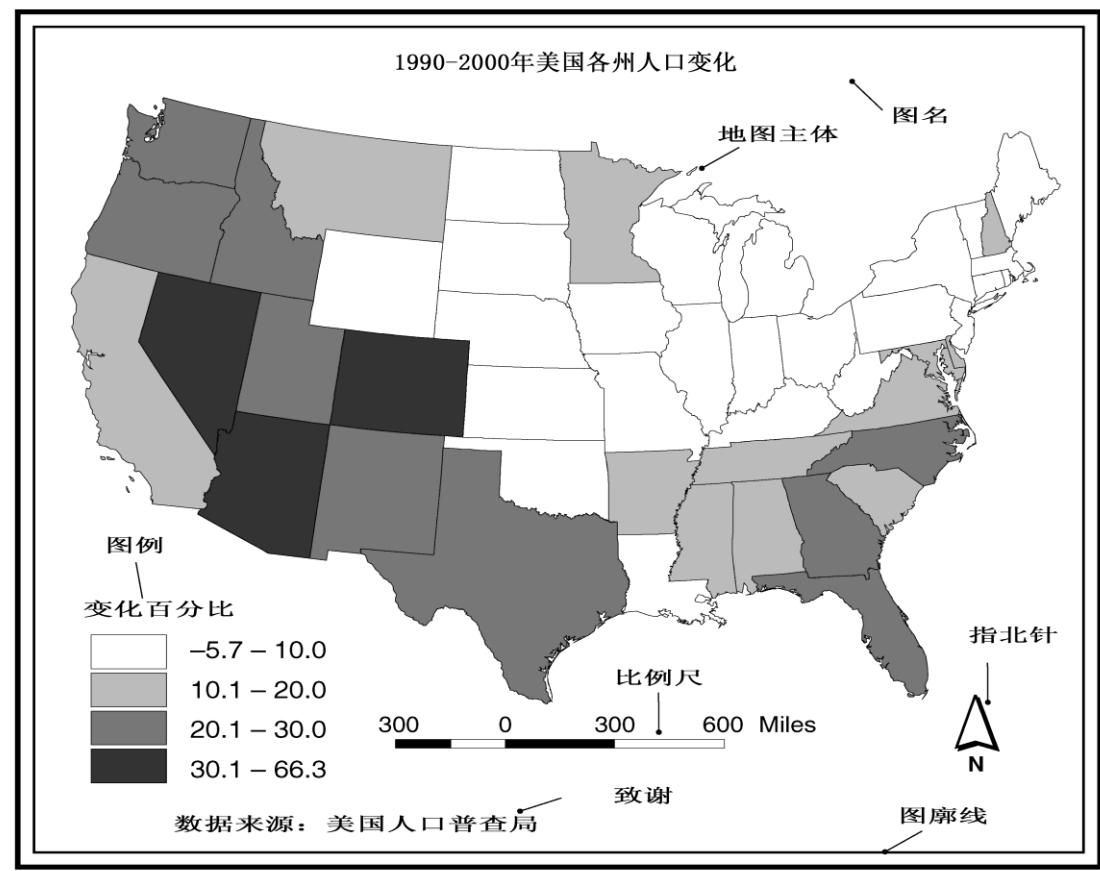
<http://datavizproject.com/>



从数据可视化到地图设计



- 普通的地图元素包括图名、地图主体、图例、指北针、比例尺、文字说明和图廓。
- 其他元素包括格子线或格网、地图投影名称、插图或位置图，以及数据质量信息。



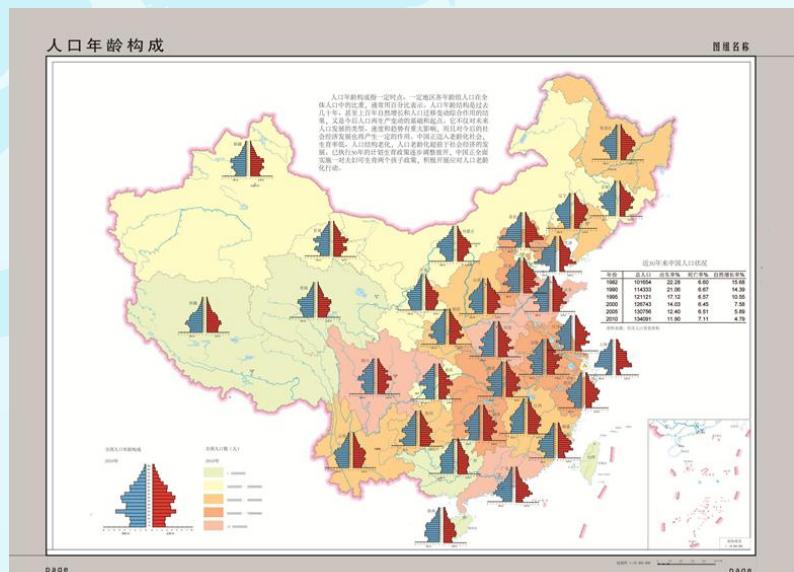
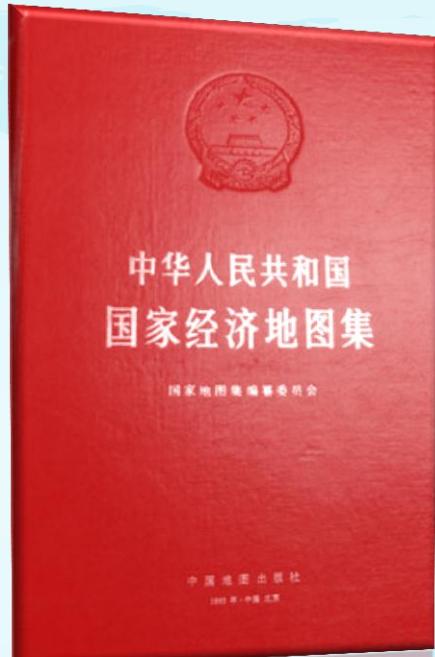
■ 地图学涉及制作和研究地图的所有方面。

■ 地图制图学家把地图分为普通地图或专题地图，定性的地图或定量的地图。

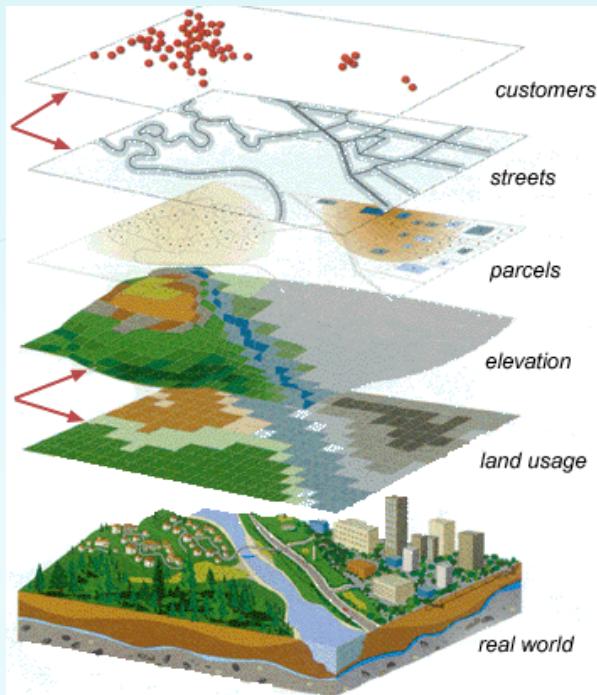
地图(集)的设计与生产



- ❖ 内容的选取和图组设计
- ❖ 幅面和分幅的设计
- ❖ 比例尺的设计
- ❖ 图幅编排次序设计
- ❖ 图面配置设计
- ❖ 表达方法设计
- ❖ 地图投影设计
- ❖ 图式图例设计
- ❖ 地图整饰设计
- ❖ 装帧设计等
- ❖ 图组专题设计书和图幅设计书
- ❖ 图组设计



空间要素与地图符号



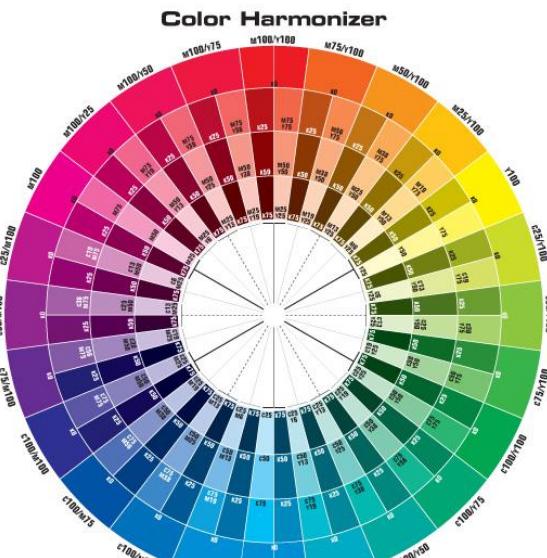
		大小
		明度
红1 1	红2 2	彩度
		纹理
		形状
红	蓝	色调
		图案

色彩的运用



- 色调是一种色彩与另一种色彩区别的性质；
- 明度是一种色彩的亮度或暗度；
- 彩度又称为饱和度或强度。

<http://colorbrewer2.org/>



FIND PLEASING COLOR COMBINATIONS

- 1) Choose two colors within two or three sectors.
(Make sure colors have enough contrast to avoid blending with each other) [e.g. c100 & c100/m50]
- 2) Choose two colors opposite of each other on the circle. These are the color's opposing hues.
(e.g. m100 & c100/y100)
- 3) Choose a color's related hue by moving either six spaces clockwise or six spaces anti-clockwise.
(e.g. c50/m100 & c100)
- 4) Choose a 3-color combination: Start on any color and move around the circle, landing on every eighth color:
(e.g. c50/m100, m100/y100 & c100/y50)



Instructions

1. Find your main color on either the left or right column, (the emotions below the color might help).
 2. Decide on color value (blank tones speak loudly, midtones whisper, dark tones are silent).
 3. Choose a scheme below for complement and accent colors.
- | | | | |
|--------------------------|---------------------------|--------------------------|---------------------------|
| one-color variation | two-color opposite | two-color complement low | two-color complement high |
| two-color complement low | two-color complement high | three-color low | four-color combination |

Type-on-Tint Chart

		Black type	Avoid background colors with black.
		White type	Avoid fine-detailed type.
C	10%	20%	30%
M	10%	20%	30%
Y	10%	20%	30%
K	10%	20%	30%
MY	10%	20%	30%
CY	10%	20%	30%
CM	10%	20%	30%

Paper Tints

Uncoated and coated stocks have slight to strong color tints. Use this chart to determine paper tint, if necessary, adjust for paper tint in photos and art.



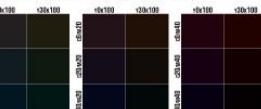
Neutrals

Preview standard grey and two CMYK grey schemes.



Rich Blacks

Large areas of black print best when mixed with other inks. Preview various multi-ink blacks and their tints.



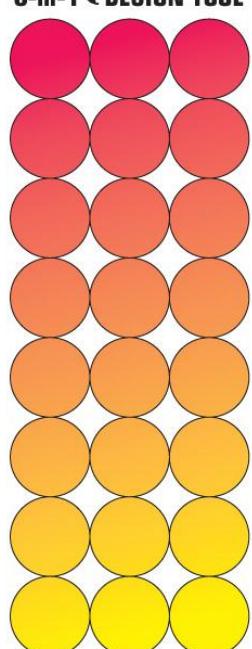
Color Directory

When choosing colors, dark colors are typically serious, light colors fun. Blues and greens are cool and calming, reds and yellows are bright and invigorating.

Amber	Apple
Avocado	Avocado
Banana	Blueberry
Blueberry	Brown
Brown	Cantaloupe
Cantaloupe	Carmine
Carmine	Carnation
Carnation	Charcoal Grey
Charcoal Grey	Cherry Red
Cherry Red	Cobalt
Cobalt	Corporate Blue
Corporate Blue	Coral
Coral	Cream
Cream	Desert Sand
Desert Sand	Emerald
Emerald	Foam Green
Foam Green	Grapefruit
Grapefruit	Grass Green
Grass Green	Green Apple
Green Apple	Hibiscus
Hibiscus	Jade
Jade	Kelly Green
Kelly Green	Limeade
Limeade	Magenta
Magenta	Mauve
Mauve	Midnight Blue
Midnight Blue	Moss
Moss	Natural
Natural	Navy Blue
Navy Blue	Ocean Blue
Ocean Blue	Ocean Green
Ocean Green	Orange Blue
Orange Blue	Orange
Orange	Orange Red
Orange Red	Orange Yellow
Orange Yellow	Orchid
Orchid	Peach
Peach	Perfect Sky
Perfect Sky	Pine
Pine	Pistachio
Pistachio	Purple
Purple	Putty
Putty	Red Orange
Red Orange	Red Rose
Red Rose	Rhubarb
Rhubarb	Royal Blue
Royal Blue	Ruby
Ruby	Rustic Brown
Rustic Brown	Saffron
Saffron	Sapphire
Sapphire	Scarlet
Scarlet	Simple Green
Simple Green	Soviet Red
Soviet Red	Strawberry
Strawberry	Tangerine
Tangerine	Teal
Teal	Timber
Timber	Twigs
Twigs	Ultramarine
Ultramarine	Vegetable Green
Vegetable Green	Vermilion
Vermilion	Violet
Violet	Violet Blue
Violet Blue	Violet Red
Violet Red	Viridian
Viridian	Yellow
Yellow	Yellow Green

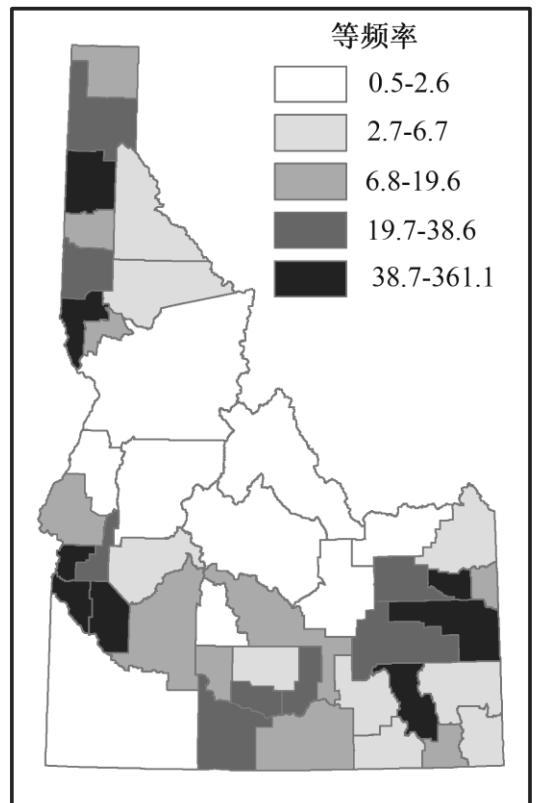
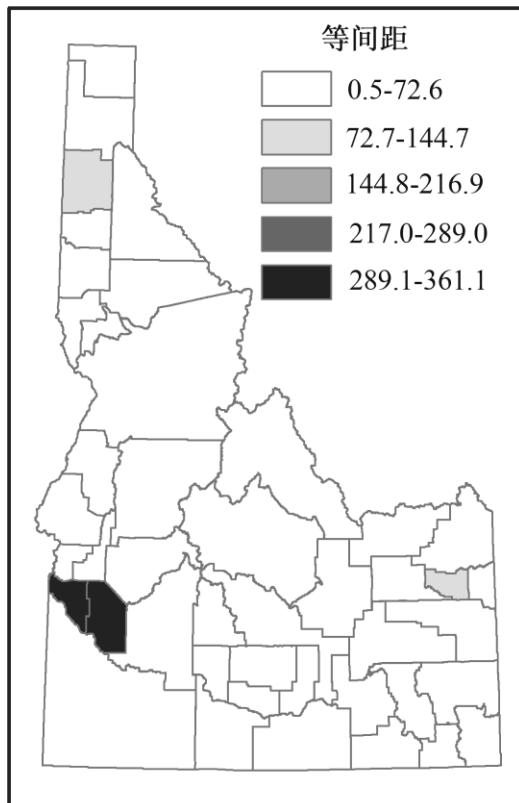
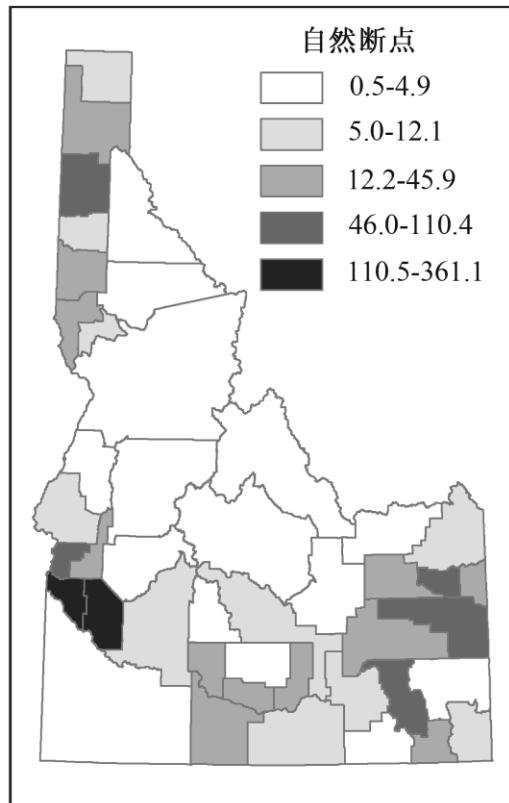
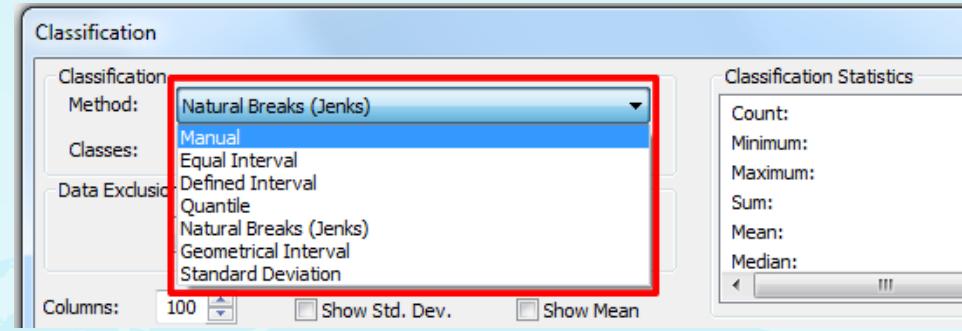
GALAXY GAUGE™

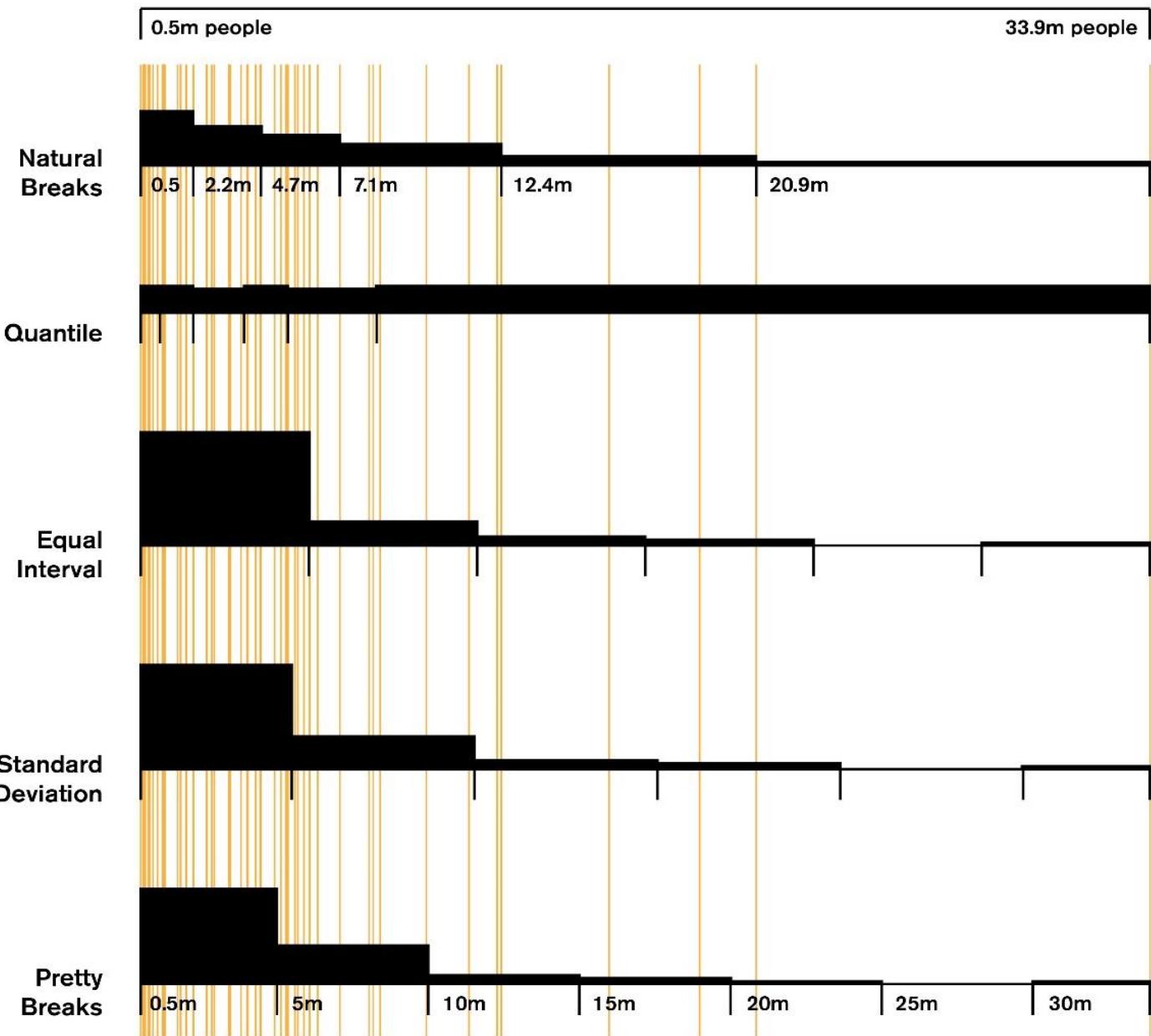
ColorMap™ Pro
8-in-1 DESIGN TOOL



数据的分类

6种常用的分类方法：
等间隔、几何间隔、等频率、
标准离差、自然断点和用户自定义





Population in
US-American states

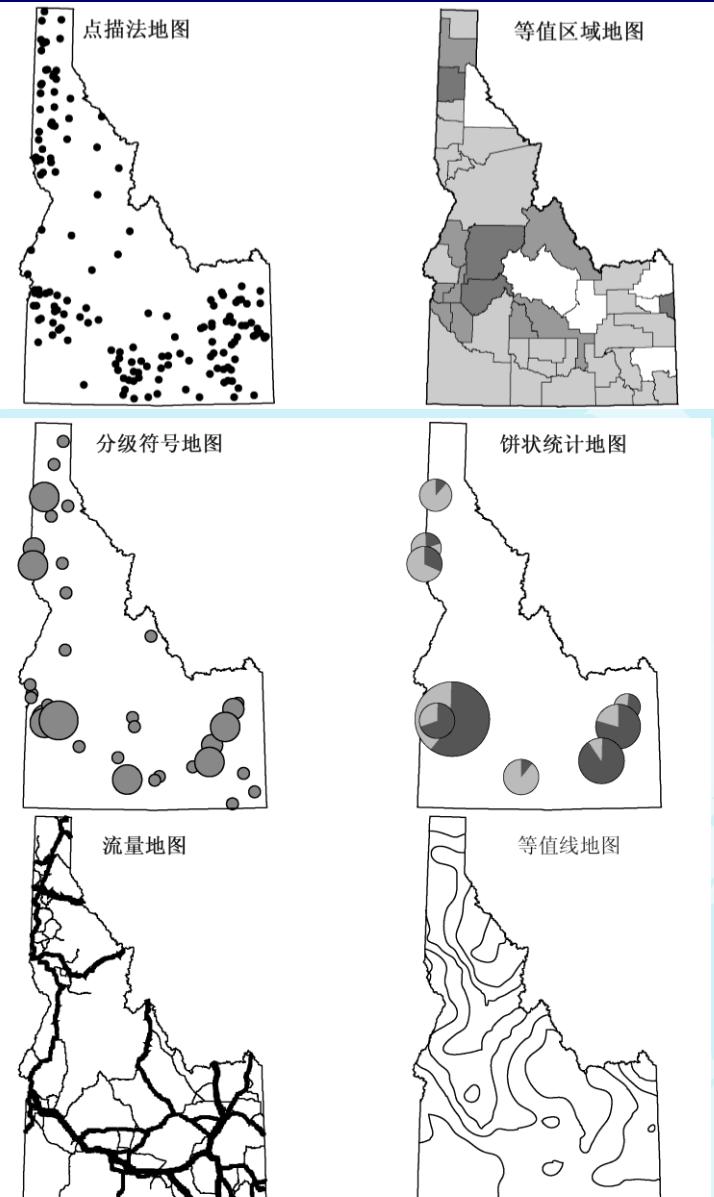


制图综合



定量地图的制作

- ❖ 点描法地图
- ❖ 等值区域地图
- ❖ 分级符号地图
- ❖ 饼状统计地图
- ❖ 流量地图
- ❖ 等值线地图
- ❖



地图的注记



- ❖ 几乎每一种地图要素都需要有注记。制图者把文字当作一种地图符号，因为与点状、线状、面状符号一样，文字也有多种变化类型。

Helvetica Normal

Helvetica Italic

Helvetica Bold

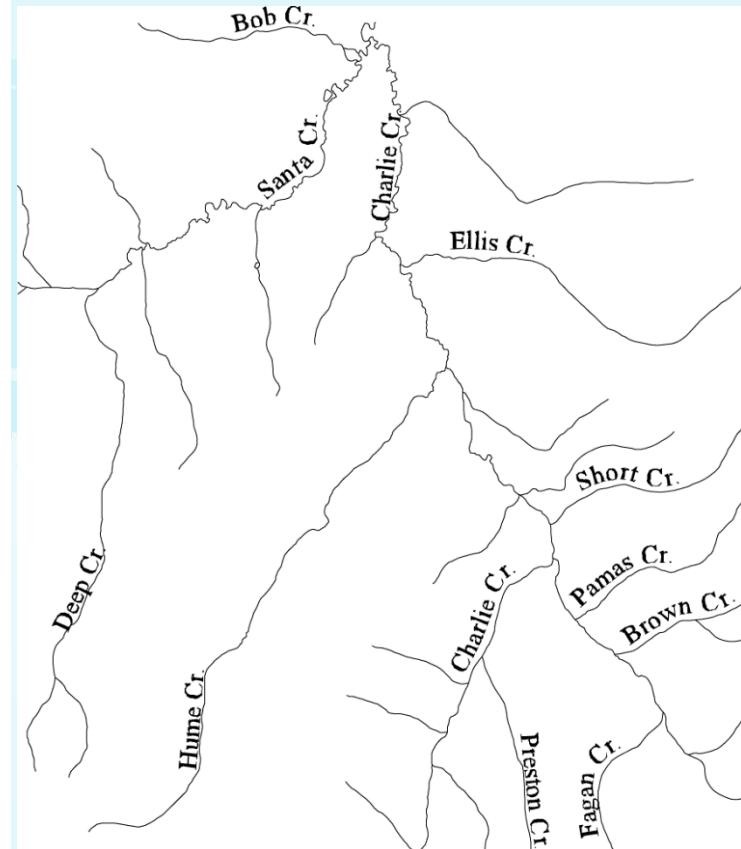
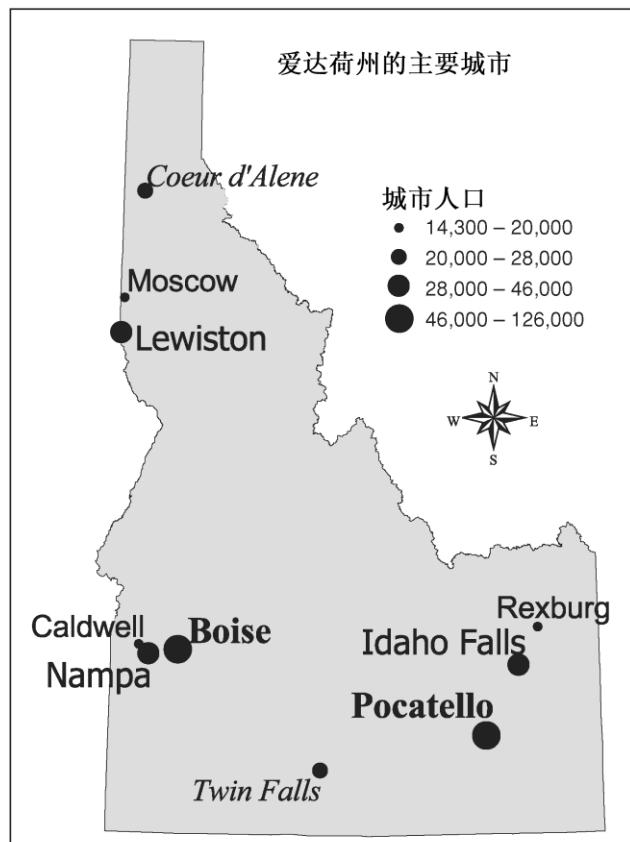
Helvetica Bold-Italic

Times Roman Normal

Times Roman Italic

Times Roman Bold

Times Roman Bold-Italic



地图设计



- 地图设计是一种为达一定目标而进行的视觉设计。

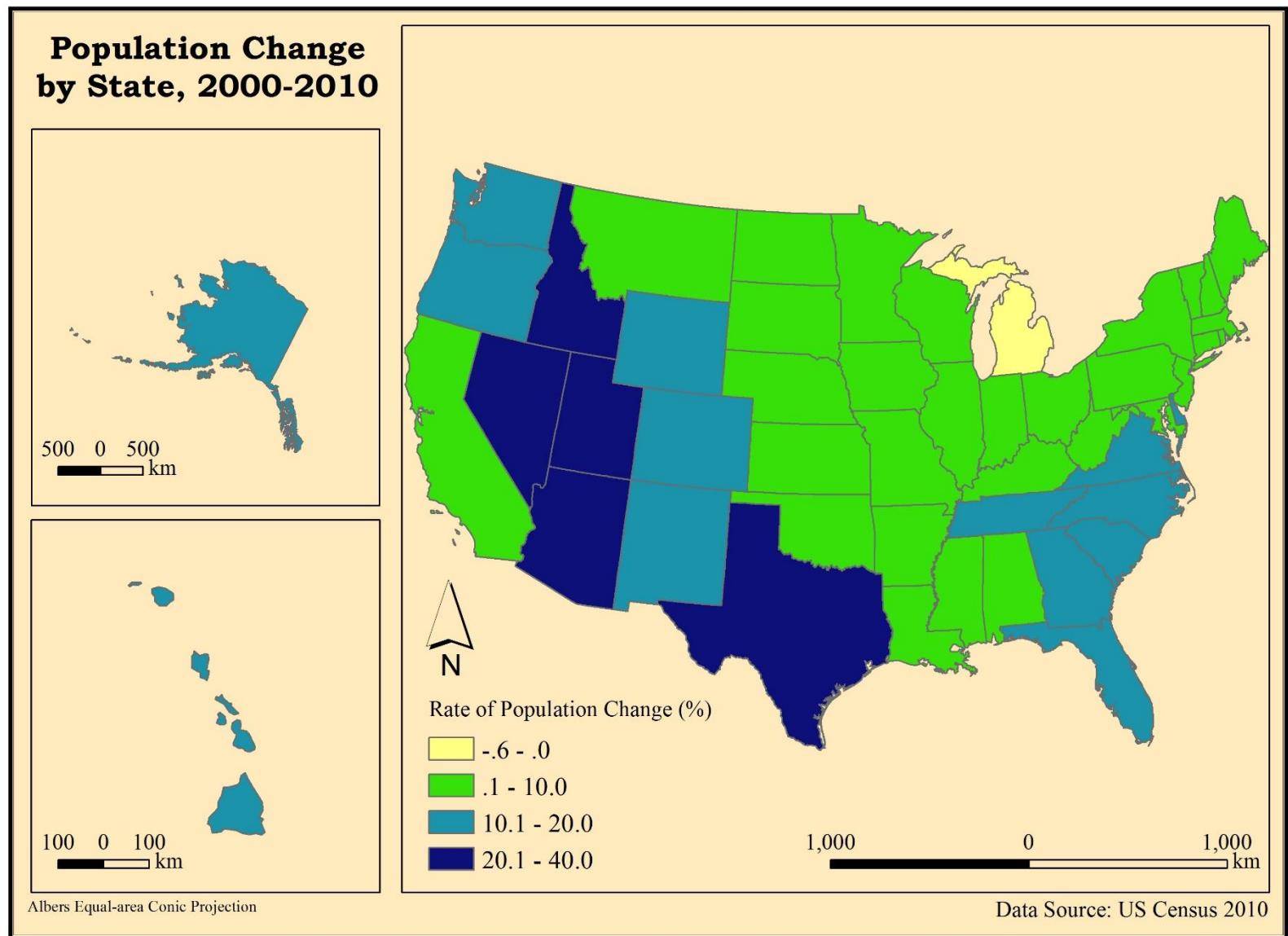
设计良好的地图看起来应该是平衡的、协调的、有序的和悦目的，而设计拙劣的地图则只会令人迷惑和产生误导。

地图设计既是科学，也是艺术。

- 制图者通常从**排版**和**视觉层次**的角度来研究地图设计。

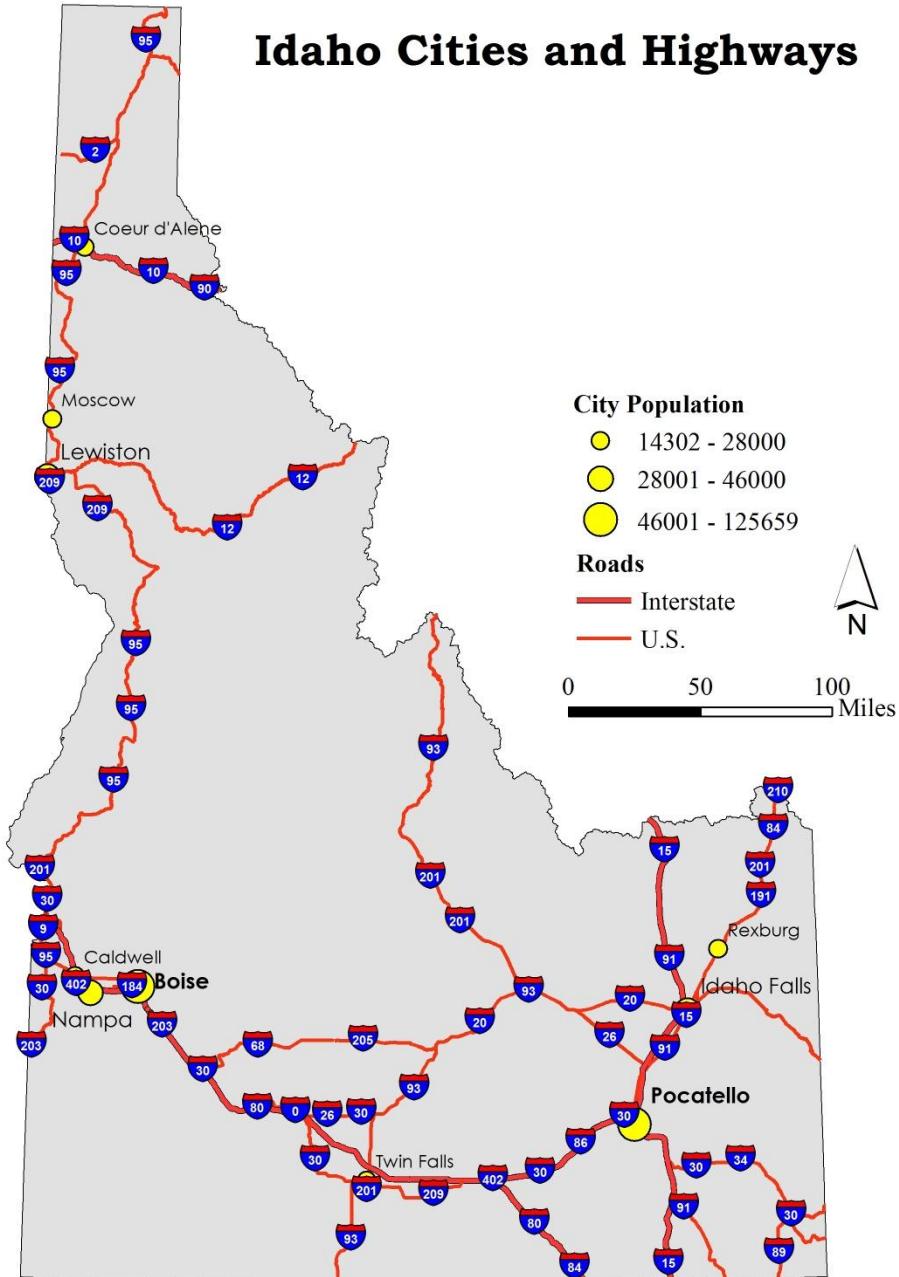
- 排版是对地图的不同要素进行排列与组合。排版关注的主要方面包括焦点、顺序和平衡问题。
- 视觉层次（Visual hierarchy）是指将三维效果或深度引入可视平面的开发过程。

练习1：制作一幅等值区域图



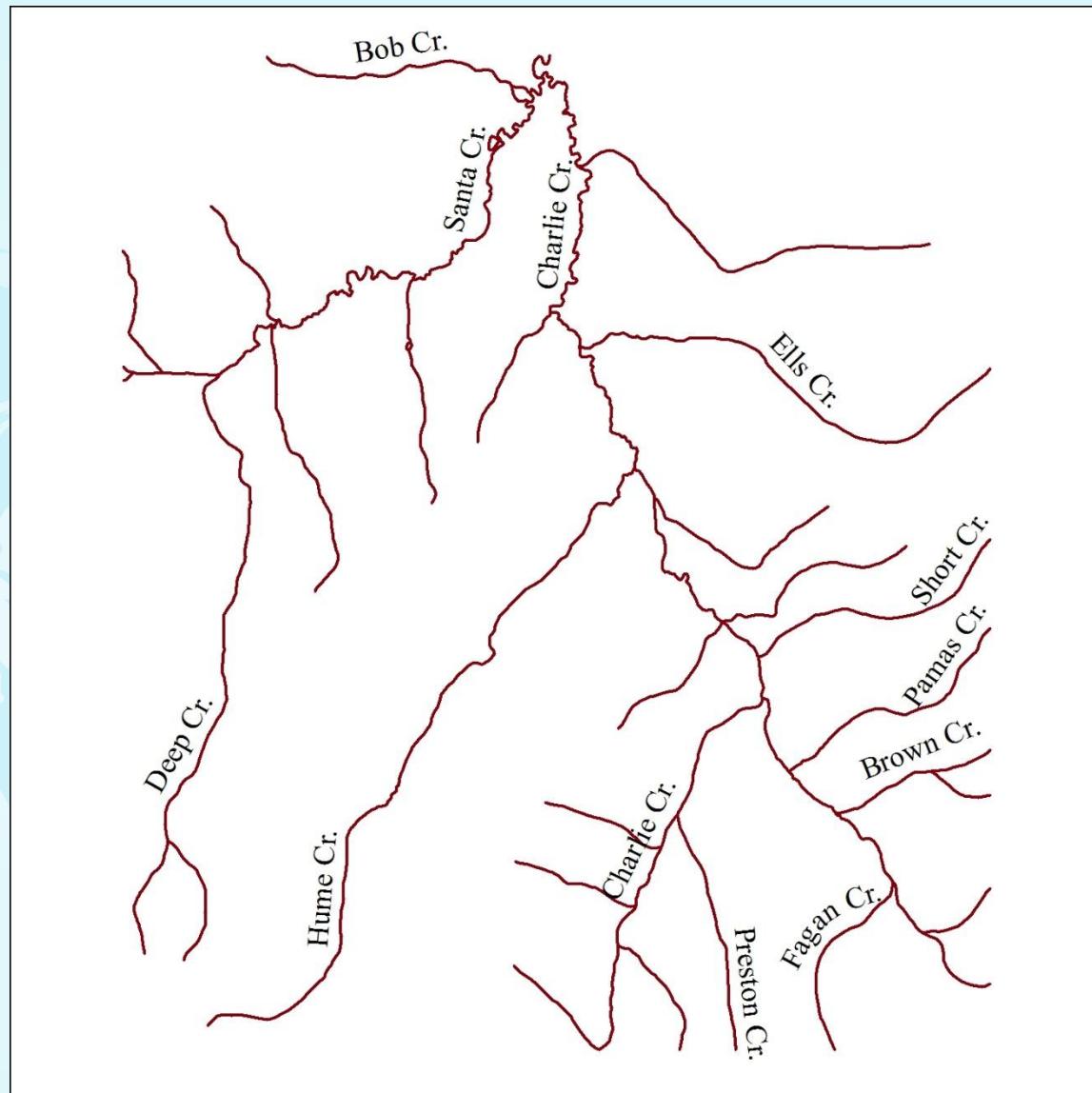
练习2：使用符号

Idaho Cities and Highways



符号和文

练习3：河流注记



Thanks !

Q & A



王江浩CAS

<http://jianghao.wang>
<http://giser.me>