论文写作与作图

毛飞跃

2014/2/28

内容

Part 1 如何写作？

Part 2 如何作图？

文章如盘子

文章只是载体，创新（贡献）才是灵魂

Before your start

What's your contribution ?

论文结构

言之有序

1. 题目(title)
2. 摘要(abstract)
3. 引言(introduction)
4. 材料和方法(materials and methods)
5. 结果与讨论(results and discussion)
6. 总结(summary)
7. 致谢(acknowledgement)
8. 参考文献(references)

题目：脸^_^

好题目是迷人但不夸张。四个技巧：

1. 把自己的**贡献**置于题目的前部；
2. 清楚且特指的**关键词；**
3. 增加**动词形式**，避免堆砌名词；
4. 用**形容词和数字**表述贡献的亮点。

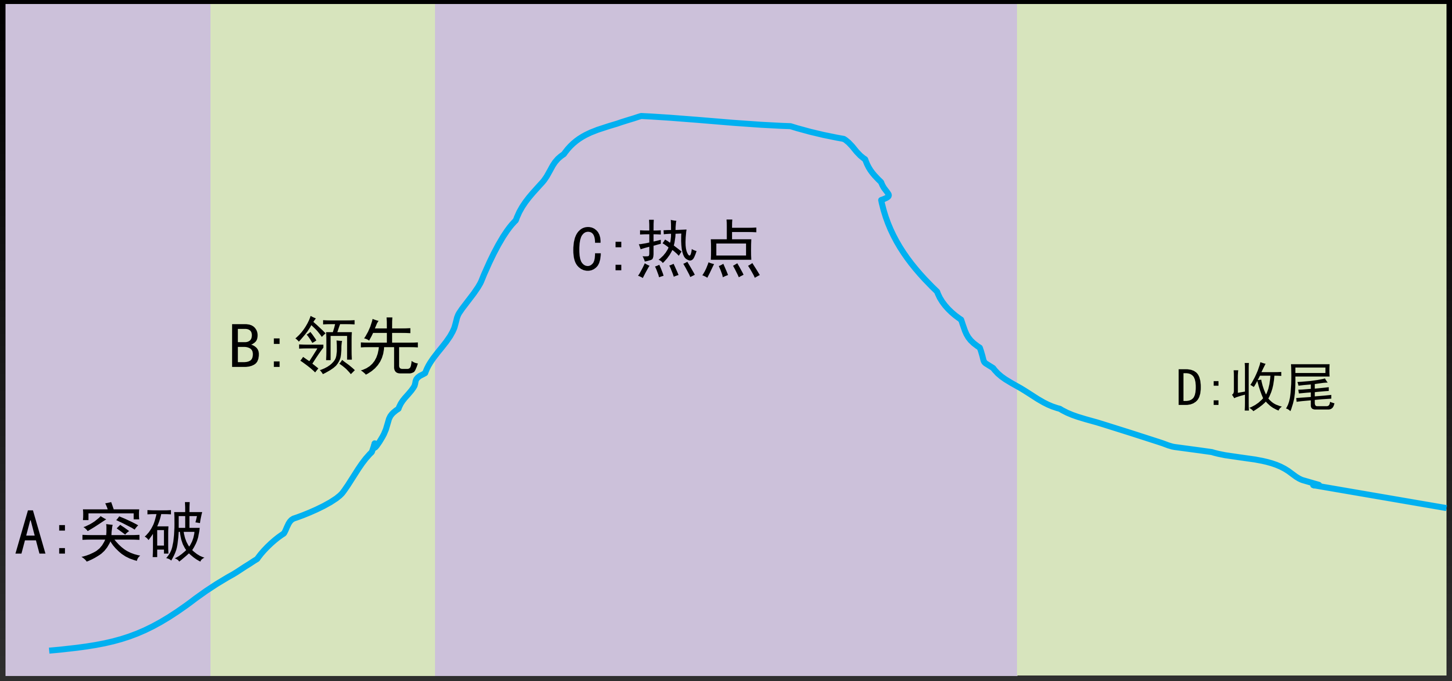
例如：Linear segmentation algorithm for detecting road with 90% accuracy

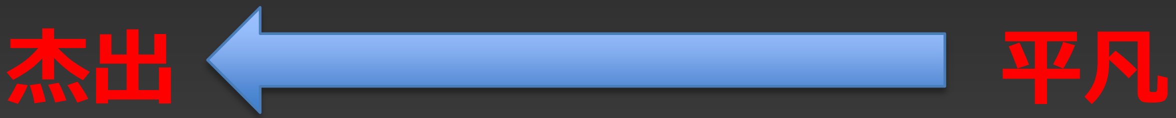
摘要：心脏❤

四元素，要体现“新”：

1. 领域和目的：新概念/新问题？
2. 技术和方法：新技术/新方法？
3. 结果和发现：新发现？
4. 结论和意义：有前景？

What is your work?





次级标题：格架

三原则

1. **突出贡献**：围绕自己的科学贡献进行设计；
2. **紧扣题名**：题名中的单词在次级标题中**重复**；
3. **清楚完整**：清楚完整地讲述了故事；

引言：张开的双手

四部分：

1.提供背景：介绍研究概况，引用经典文献。

2.文献回顾：分析经典和最新文献。

3.指出问题：指出问题或现象的研究意义。

4.突出贡献：突出新发现，避免自我评价。

原理与方法

提供足够的细节，不需要汇报结果。

1. **谈新**：重点描述新的研究或方法；
2. **顺序**：按照实验先后顺序来介绍；
3. **完整**：合理解释每一个参数和步骤；
4. **详尽**：提供足够重复你工作的细节。审稿人(读者)越容易相信再现你的工作，就越能接受你的文章。

算法/模型设计的品味

1. **形式简单**：简单得不能更简单。
2. **思想深刻**：雏形可能还不如一个已有的精雕细琢过的差方法，但是思想很深刻很有前景。
3. **体现本质**：研究过程中，对于不能处理的问题，不应该简单的打补丁，而应该找到问题的本质，这样也许会有重大发现。

结果与讨论

结果的表达的时候一定要客观真实，简明扼要，突出贡献：

1. **提炼原理**：提出分析、模型或理论；
2. **解释因果**：结果与作者的分析、模型或理论之间的联系。

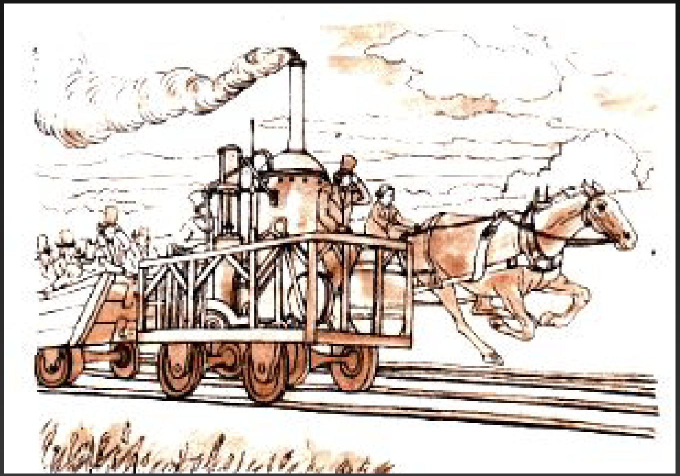
视图

视图的作用和设计原则

1. **准确**：真实准确地展示和反映数据；
2. **简约**：直观、高效地表达复杂的数据，
3. **强调**：突出贡献/观点，启发思考数据本质；
4. **紧凑**：以较小的空间承载较多的信息；
5. **自明**：即视图无需正文即可被理解；
6. **节制**：视图的设计只支持这篇论文的贡献。

结果的验证

- **实验误差100%也没有关系**：爱丁顿做验证爱因斯坦关于光在引力场偏转的实验，误差跟结果一样大，但是还是发生了，可见有时候实验误差100%也没关系。
- **新方法结果不一定优于旧方法**：例如第一辆列车跑不过马。



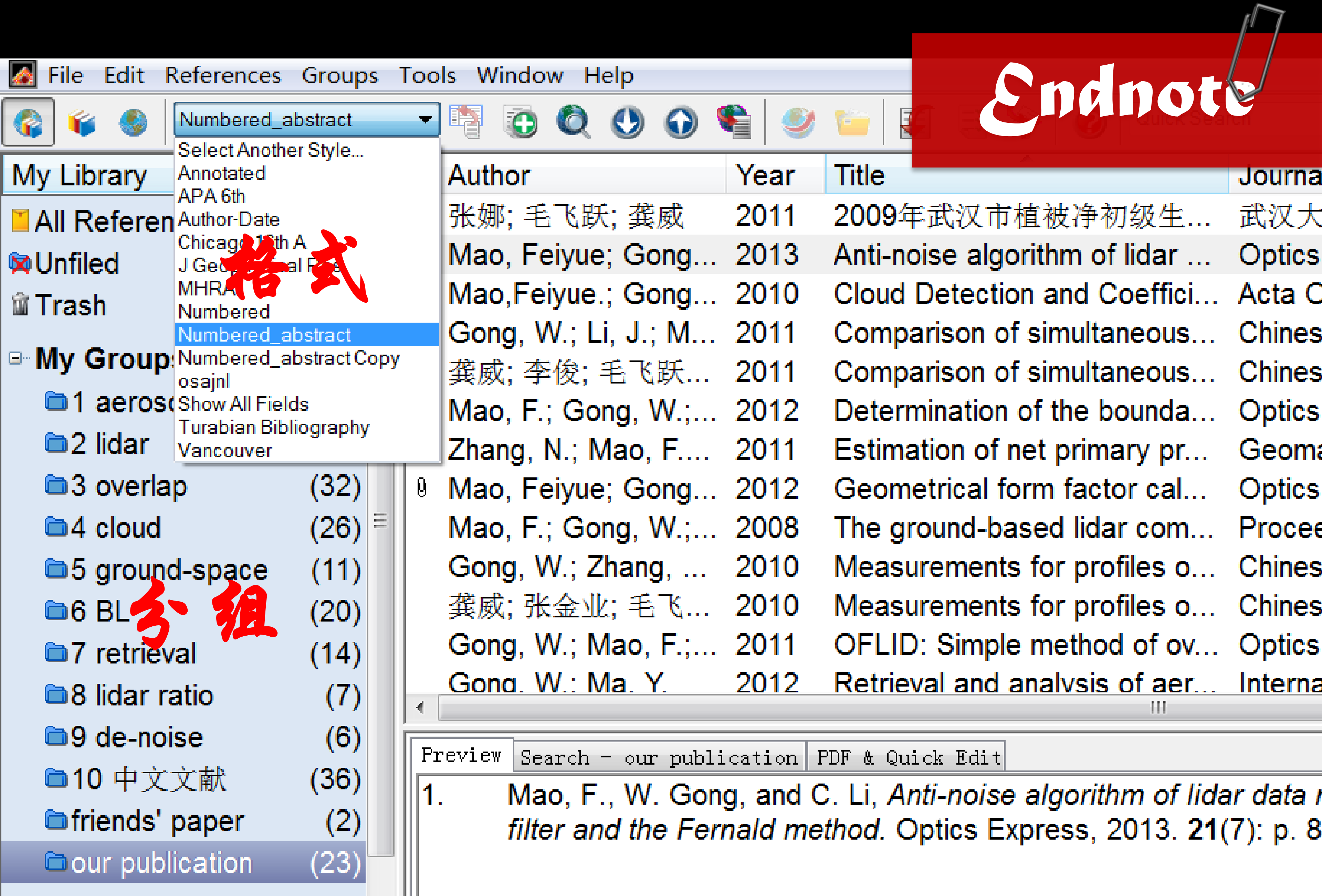
结论：微笑☺

摘要	结论（言之有情）
简要提及贡献	深化贡献，鼓舞读者
中性的	积极的
开启一扇门	关闭这扇门

参考文献

1. 经典和最新文献
2. 强烈建议使用endnote，或其他类似软件

[PDF] A combined corner and edge detector.
C Harris, M Stephens - Alvey vision conference, 1988 - courses.daiict.ac.in
Consistency of image edge filtering is of prime importance for 3D interpretation of image sequences using feature tracking algorithms. To cater for image regions containing texture and isolated features, a combined corner and edge detector based on the local auto- ...
被引用次数：9403 相关文章 所有 37 个版本 导入EndNote 保存 更多


Endnote
File Edit References Groups Tools Window Help
Numbered_abstract
Select Another Style...
Annotated
APA 6th
Author-Date
Numbered
Numbered_abstract
Numbered_abstract Copy
osajnl
Show All Fields
Turabian Bibliography
Vancouver
格式
My Library
All Referen
Unfiled
Trash
My Group
1 aeroso
2 lidar
3 overlap (32)
4 cloud (26)
5 ground-space (11)
6 BL (20)
7 retrieval (14)
8 lidar ratio (7)
9 de-noise (6)
10 中文文献 (36)
friends' paper (2)
our publication (23)
分 组
Author
Year
Title
张娜; 毛飞跃; 龚威 2011 2009年武汉市植被净初级生...
Mao, Feiyue; Gong... 2013 Anti-noise algorithm of lidar ...
Mao,Feiyue.; Gong... 2010 Cloud Detection and Coeffici...
Gong, W.; Li, J.; M... 2011 Comparison of simultaneous...
龚威; 李俊; 毛飞跃... 2011 Comparison of simultaneous...
Mao, F.; Gong, W.;... 2012 Determination of the bounda...
Zhang, N.; Mao, F.... 2011 Estimation of net primary pr...
Mao, Feiyue; Gong... 2012 Geometrical form factor cal...
Mao, F.; Gong, W.;... 2008 The ground-based lidar com...
Gong, W.; Zhang, ... 2010 Measurements for profiles o...
龚威; 张金业; 毛飞... 2010 Measurements for profiles o...
Gong, W.; Mao, F.;... 2011 OFLID: Simple method of ov...
Preview
Search - our publication
PDF & Quick Edit
1. Mao, F., W. Gong, and C. Li, Anti-noise algorithm of lidar data
filter and the Fernald method. Optics Express, 2013. 21(7): p. 8

Analysis of atmospheric lidar observations: some comments

Frederick G. Fernald

University of Denver, Physics Department, Denver, Colorado 80208.

Received 1 October 1983.
0003-6935/84/040652-02$02.00/0.

There have been many discussions of solutions to the lidar equation for elastic scattering (e.g., Fernald *et al.*,[1] Klett,[2] Davis,[3] and Collis and Russell[4]). Most of these are simply variations on Hitschfeld and Bordan's[5] solution for meteorological radars. Klett[2] recently restated this solution in a very convenient form for the analysis of lidar observations collected in very turbid atmospheres. His paper has prompted a restatement of the more general solution of Fernald *et al.*[1] which is also applicable to mildly turbid atmospheres where both aerosol and molecular scatterers must be considered in the analysis. This has led to a simple numerical scheme for the computer analysis of lidar measurements.

The lidar equation for two distinct classes of scatters (Fernald *et al.*[1]) is

$$P(Z) = ECZ^{-2}[\beta_1(Z) + \beta_2(Z)]T_1^2(Z)T_2^2(Z), \qquad (1)$$

where
- $P(Z)$ = the return signal that is proportional to the received power from a scattering volume at slant range Z,
- E = an output energy monitor pulse which is proportional to the transmitted energy,
- C = the calibration constant of the instrument which includes losses in the transmitting and receiving optics and the effective receiver aperture,
- $\beta_1(Z)$ and $\beta_2(Z)$ = respectively, the backscattering cross sections of the aerosols and molecules at slant range Z,
- $T_1(Z) = \exp[-\int_0^Z \sigma_1(z)dz]$ = the aerosol transmittance,
- $T_2(Z) = \exp[-\int_0^Z \sigma_2(z)dz]$ = the molecular atmosphere transmittance, and

where $\sigma_1(Z)$ and $\sigma_2(Z)$ = respectively, the extinction cross sections of the aerosols and molecules at range Z.

The molecular atmosphere scattering properties, $\beta_2(Z)$ and $\sigma_2(Z)$, can be determined from the best available meteorological data or approximated from appropriate standard atmospheres; so that only the aerosol scattering properties, $\beta_1(Z)$ and $\sigma_1(Z)$, remain to be determined. One further simplifying assumption is that the extinction-to-backscattering ratio for aerosols, $S_1 = \sigma_1(Z)/\beta_1(Z)$, remains constant with range. It essentially states that the size distribution and composition of the aerosol scatterers are not changing with range from the lidar, and that variations in backscattering from aerosols are due to changes in their number density. This is not exceedingly restrictive. In the numerical analysis of lidar data, the atmosphere can be divided into layers, with S_1 allowed to vary among the layers. Collis and Russell,[4] Pinnick *et al.*,[6] and Russell *et al.*[7] can be referenced for values for this ratio. The corresponding ratio for the molecular scatterers is the constant $S_2 = \sigma_2(Z)/\beta_2(Z) = 8\pi/3$.

The solution to Eq. (1) for the aerosol backscattering cross sections (Fernald *et al.*[1]) then becomes

$$\beta_1(Z) = \frac{P(Z)Z^2\exp[-2(S_1 - S_2)\int_0^Z \beta_2(z)dz]}{CE - 2S_1\int_0^Z P(z)z^2\exp[-2(S_1 - S_2)\int_0^z \beta_2(z')dz']dz} - \beta_2(Z). \qquad (2)$$

If *a priori* information can be used to specify the value of the aerosol and molecular scattering cross sections at a specific range Z_c, the lidar can be calibrated by solving Eq. (2) for CE in terms of these scattering properties and

$$\beta_1(Z) + \beta_2(Z) = \frac{X(Z)\exp[-2(S_1 - S_2)\int_{Z_c}^Z \beta_2(z)dz]}{\dfrac{X(Z_c)}{\beta_1(Z_c) + \beta_2(Z_c)} - 2S_1\int_{Z_c}^Z X(z)\exp[-2(S_1 - S_2)\int_{Z_c}^z \beta_2(z')dz']dz}, \qquad (3)$$

where $X(Z)$ is the range normalized signal $P(Z)Z^2$. The total backscattering cross section at range Z is now expressed as a function of the scattering properties at the calibration range and those of the intervening atmosphere between the ranges Z_c and Z.

Equation (3) leads to a simple numerical integration scheme. If

$$A(I,I+1) = (S_1 - S_2)[\beta_2(I) + \beta_2(I+1)]\Delta Z \qquad (4)$$

is used to replace the exponential terms that incorporate the effects of aerosol extinction between adjacent data points range ΔZ apart, the total backscattering cross section at range $Z(I+1)$, one data step beyond the calibration range $Z(I)$, becomes

$$\beta_1(I+1) + \beta_2(I+1) = \frac{X(I+1)\exp[-A(I,I+1)]}{\dfrac{X(I)}{\beta_1(I) + \beta_2(I)} - S_1\{X(I) + X(I+1)\exp[-A(I,I+1)]\}\Delta Z}. \qquad (5)$$

Similarly, the total backscattering cross section at $Z(I-1)$, one step before the calibration range $Z(I)$, becomes

$$\beta_1(I-1) + \beta_2(I-1) = \frac{X(I-1)\exp[+A(I-1,I)]}{\dfrac{X(I)}{\beta_1(I) + \beta_2(I)} + S_1\{X(I) + X(I-1)\exp[+A(I-1,I)]\}\Delta Z}. \qquad (6)$$

Solutions in terms of aerosol extinction are correspondingly

$$\sigma_1(I+1) + \frac{S_1}{S_2}\sigma_2(I+1) = \frac{X(I+1)\exp[-A(I,I+1)]}{\dfrac{X(I)}{\sigma_1(I) + (S_1/S_2)\sigma_2(I)} - \{X(I) + X(I+1)\exp[-A(I,I+1)]\}\Delta Z}, \qquad (7)$$

$$\sigma_1(I-1) + \frac{S_1}{S_2}\sigma_2(I-1) = \frac{X(I-1)\exp[+A(I-1,I)]}{\dfrac{X(I)}{\sigma_1(I) + (S_1/S_2)\sigma_2(I)} + \{X(I) + X(I-1)\exp[+A(I-1,I)]\}\Delta Z}. \qquad (8)$$

The lidar data can, therefore, be analyzed in successive steps that can move either out or in from the assigned calibration range.

Some general comments can now be made concerning the application of Eqs. (5)–(8) to different atmospheric conditions. They are dependent on the laser wavelength, the extent to which multiple scattering can be ignored, and the data sampling interval ΔZ of the specific lidar system being used. The conclusions concerning highly turbid atmospheres are basically a reiteration of those of Klett.[2]

For highly turbid atmospheres ($\sigma_1 \gg \sigma_2$), the molecular scatterers can be ignored and Eqs. (6) and (8) reduce to Klett's.[2] In these atmospheric conditions the two terms in the denominators will be of comparable magnitude so that outward stepwise integration, Eqs. (5) and (7), can become very unstable. On the other hand, inward stepwise integration is very stable and rapidly loses its dependence on the initial guess of the scattering cross sections attributed to the calibration range. In this sense, uncalibrated lidars can yield the extinction properties of highly turbid atmospheres. Equations (6) and (8) for highly turbid atmospheres become

$$\beta_1(I-1) = \frac{X(I-1)}{\dfrac{X(I)}{\beta_1(I)} + S_1[X(I) + X(I-1)]\Delta Z}, \qquad (9)$$

$$\sigma_1(I-1) = \frac{X(I-1)}{\dfrac{X(I)}{\sigma_1(I)} + [X(I) + X(I-1)]\Delta Z}. \qquad (10)$$

When the aerosol and molecular scattering cross sections are of a comparable magnitude (during light to moderate air pollution events or in stratospheric studies), the second terms in the denominators of Eqs. (5)–(8) will be considerably smaller than the first terms. Numerically stable solutions are, therefore, possible when stepping in either direction from the calibration level. In these atmospheric conditions, the analyses will be dependent on the aerosol and molecular backscattering cross sections assigned to the calibration level. Net aerosol extinction will be small. It will be tied to the values selected for S_1, the aerosol extinction-to-backscattering ratio which can vary over a relatively wide range without greatly affecting the backscattering cross sections computed for Eqs. (5) and (6).

The analyses developed above lend themselves readily to qualitative statements collected in highly turbid, moderately turbid, and relatively clean atmospheres. The precise definition of these atmospheres will vary among lidar systems, primarily with the laser wavelength and data sampling interval.

In highly turbid atmospheres, aerosols dominate the scattering process to the extent that molecular scattering can be ignored. From Eq. (10) it can be demonstrated that an uncalibrated lidar can readily yield aerosol extinction profiles. On the other hand, backscattering profiles, Eq. (9), are directly dependent on an accurate knowledge of the extinction-to-backscattering ratio S_1.

In relatively clean atmospheres, the basic result of the analysis is the aerosol backscattering cross section, and the aerosol extinction now becomes dependent on an accurate knowledge of the extinction-to-backscattering ratio.

For moderately turbid atmospheres, lying in some ill-defined region between the two cases discussed above, the analyses will be sensitive to both the extinction and backscattering properties of the aerosols. The lidar system must be accurately calibrated, and the extinction-to-backscattering ratio must be reasonably well established. Equations (5)–(8) lend themselves to a very compact sequence of FORTRAN statements for the computer analysis of digitized lidar observations.

References

1. F. G. Fernald, B. M. Herman, and J. A. Reagan, J. Appl. Meteorol. 11, 482 (1972).
2. J. D. Klett, Appl. Opt. 20, 211 (1981).
3. P. A. Davis, Appl. Opt. 8, 2099 (1969).
4. R. T. H. Collis and P. B. Russell, in *Laser Monitoring of the Atmosphere*, E.D. Hinkley, Ed. (Springer, New York, 1976), p. 117.
5. W. Hitschfeld and J. Bordan, J. Meteorol. 11, 58 (1954).
6. R. G. Pinnick, J. M. Rosen, and D. J. Hofman, J. Atmos. Sci. 33, 304 (1976).
7. P. B. Russell, T. J. Swissler, M. P. McCormick, W. P. Chu, J. M. Livingston, and T. J. Pepin, J. Atmos. Sci. 38, 1279 (1981).

内容

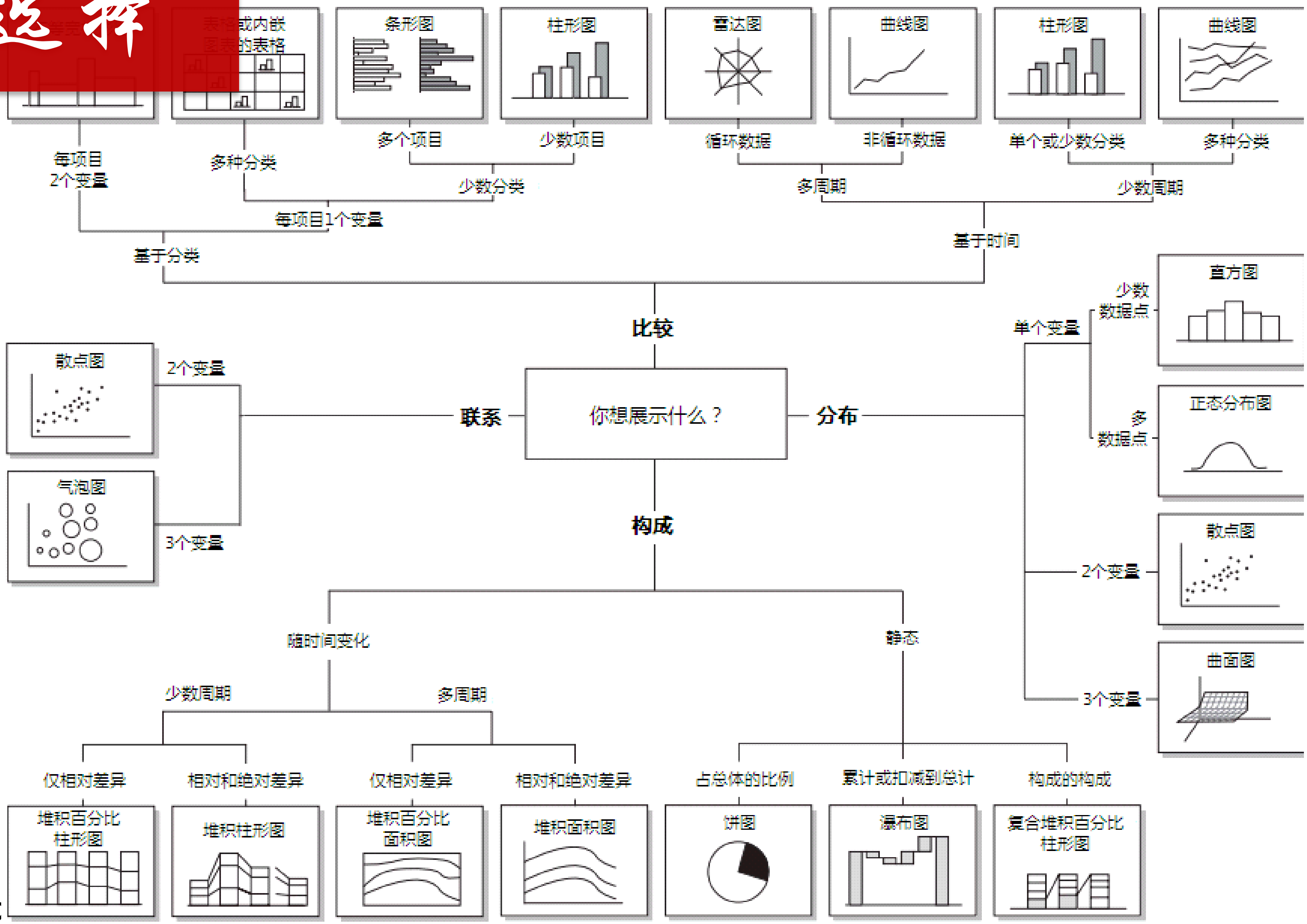
Part 1

如何写作？

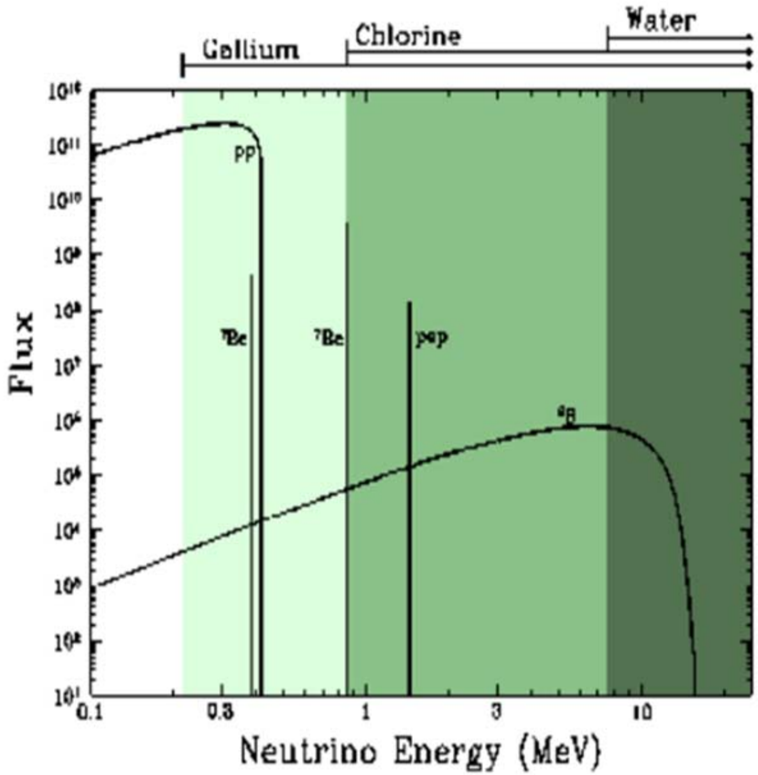
Part 2

如何作图？

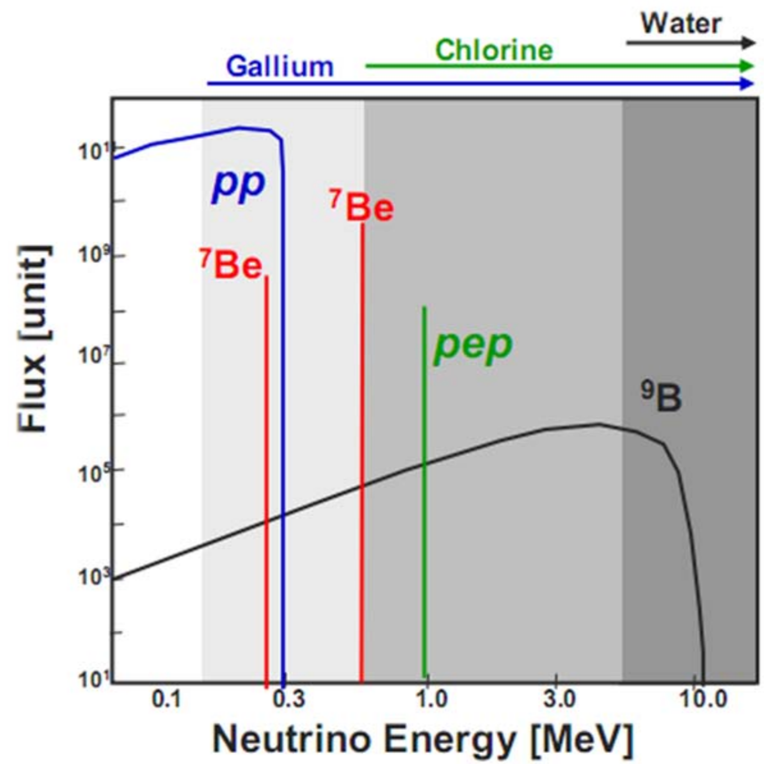
选择


表格或内嵌
图表的表格
条形图
柱形图
雷达图
曲线图
柱形图
曲线图
每项目
2个变量
多种分类
多个项目
少数项目
循环数据
非循环数据
单个或少数分类
多种分类
少数分类
多周期
少数周期
每项目1个变量
基于时间
基于分类
比较
散点图
2个变量
联系
你想展示什么？
分布
单个变量
少数
数据点
直方图
多
数据点
正态分布图
气泡图
3个变量
构成
散点图
2个变量
曲面图
3个变量
随时间变化
静态
少数周期
多周期
仅相对差异
相对和绝对差异
仅相对差异
相对和绝对差异
占总体的比例
累计或扣减到总计
构成的构成
堆积百分比
柱形图
堆积柱形图
堆积百分比
面积图
堆积面积图
饼图
瀑布图
复合堆积百分比
柱形图

清晰精确

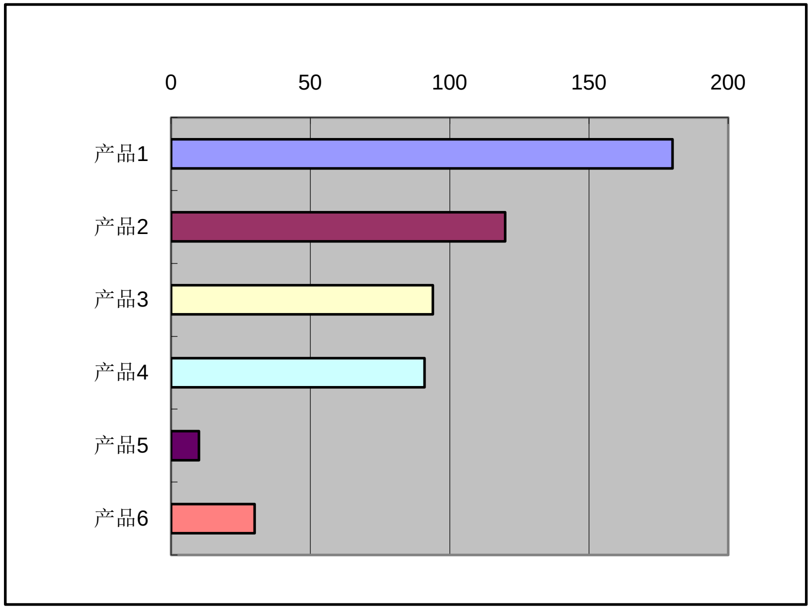


The most famous figure I know that just can’t be read, ever …

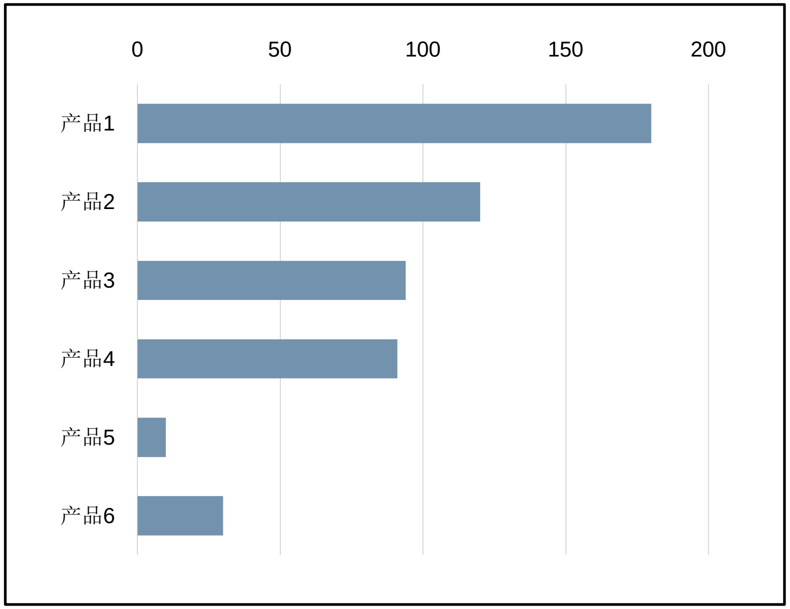


An attempt to clean this up (courtesy, Dave Hertzog)

简约



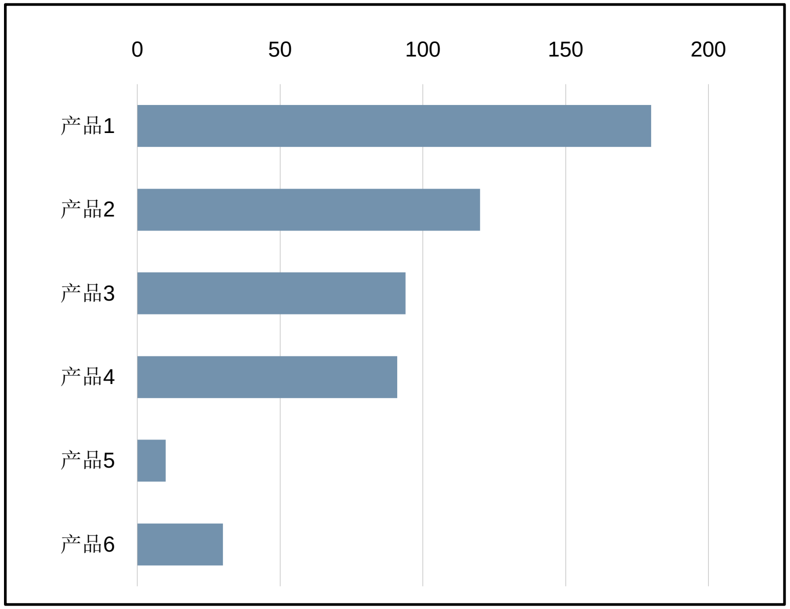
产品销量图



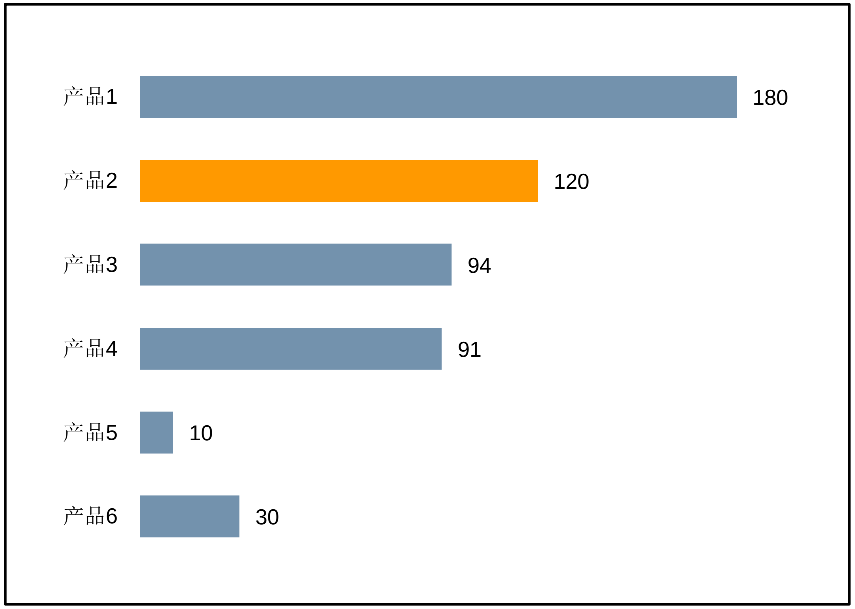
产品销量图

最大化墨水比原则

强调



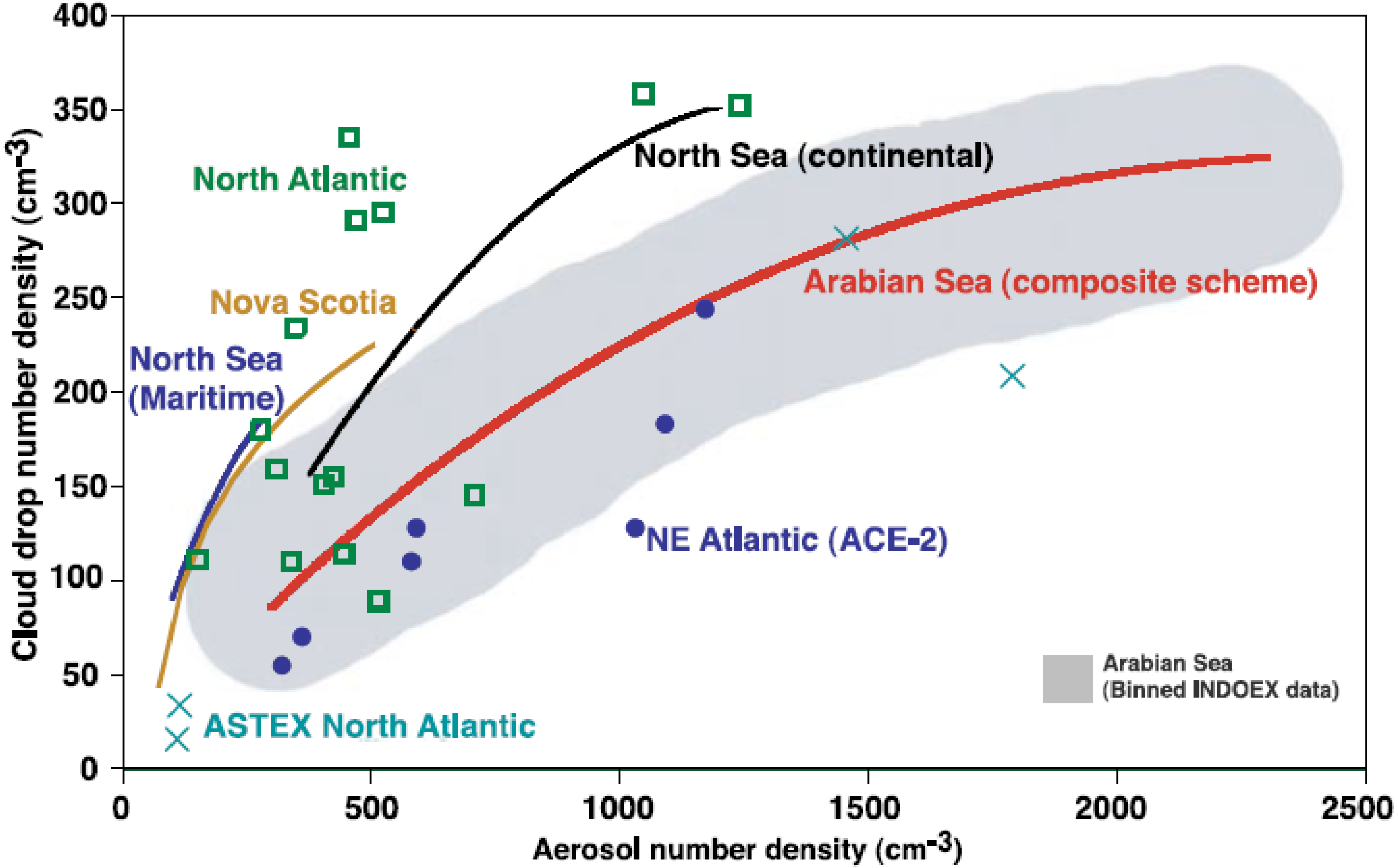
产品销量图



产品2的销量已经居于第二位

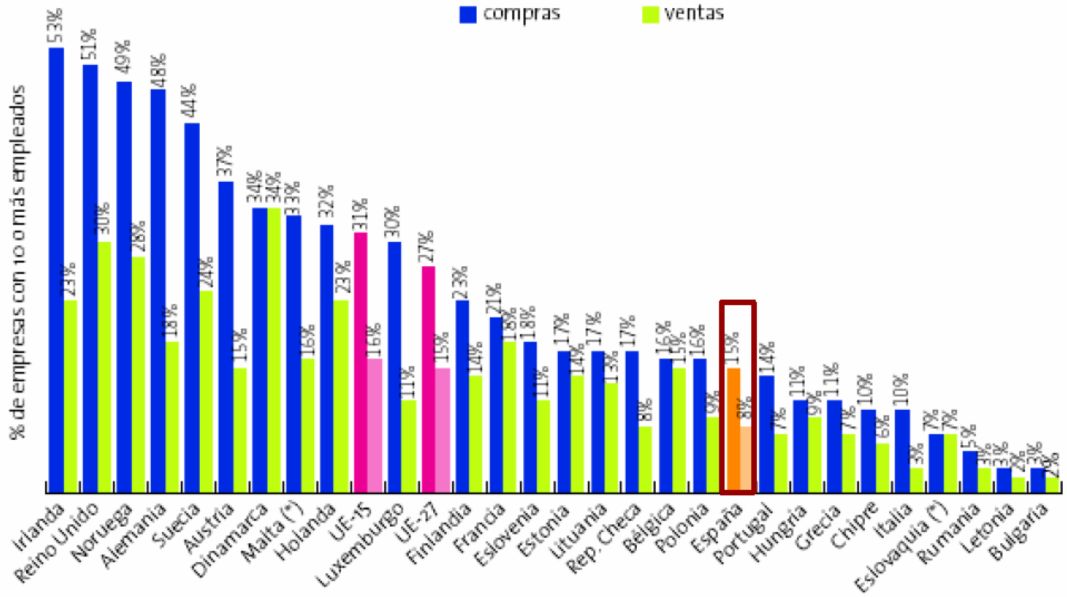
紧凑

看似复杂，实则方便理解。

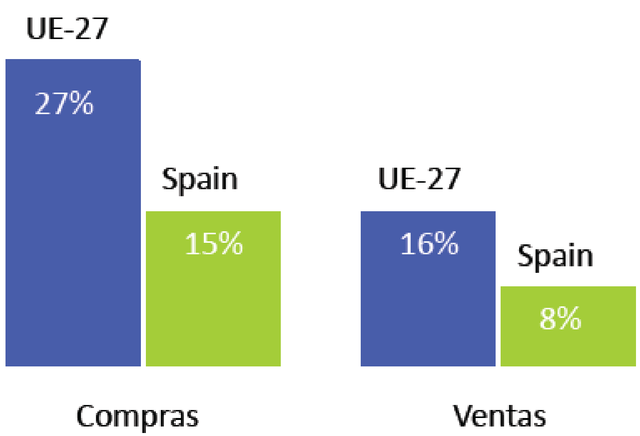


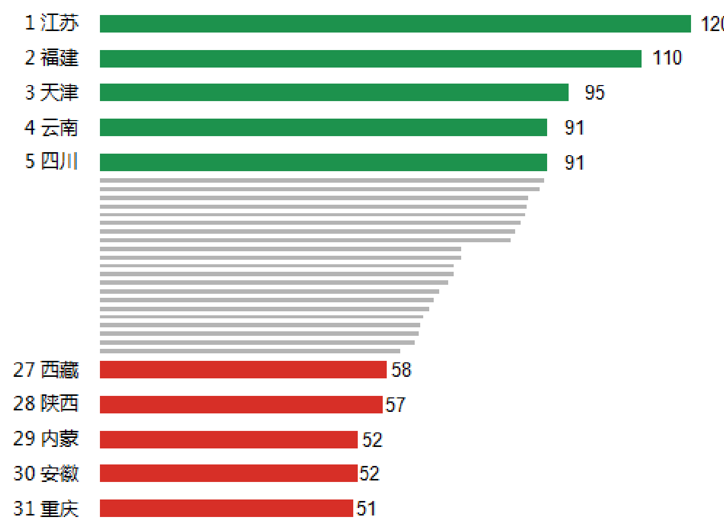
作者：V Ramanathan - 2001 - 被引用次数：1920

节制



Fuente: EUROSTAT 2006.





自明

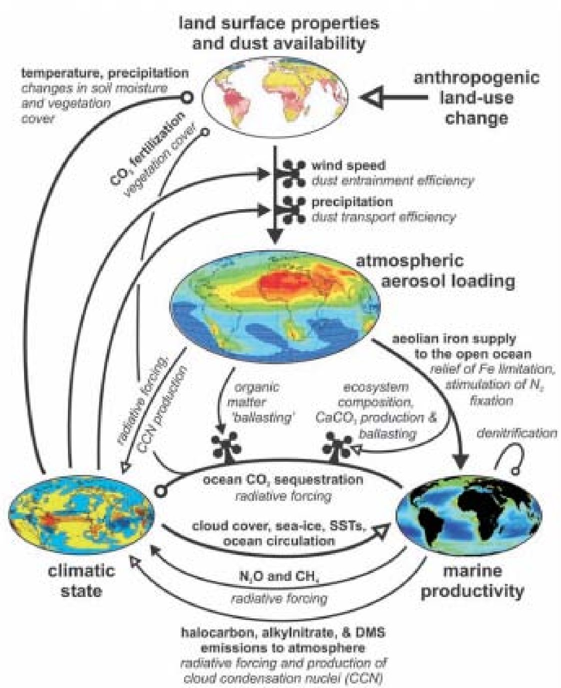
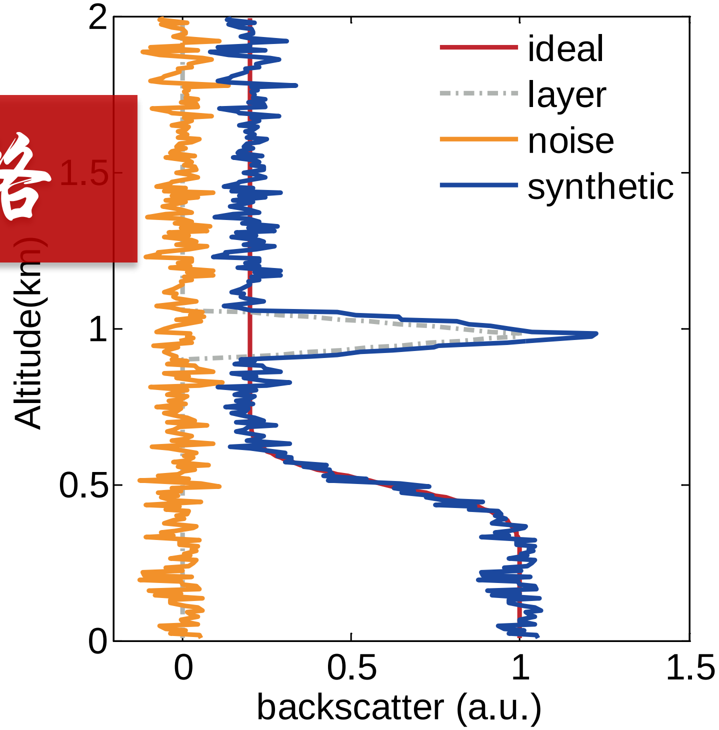


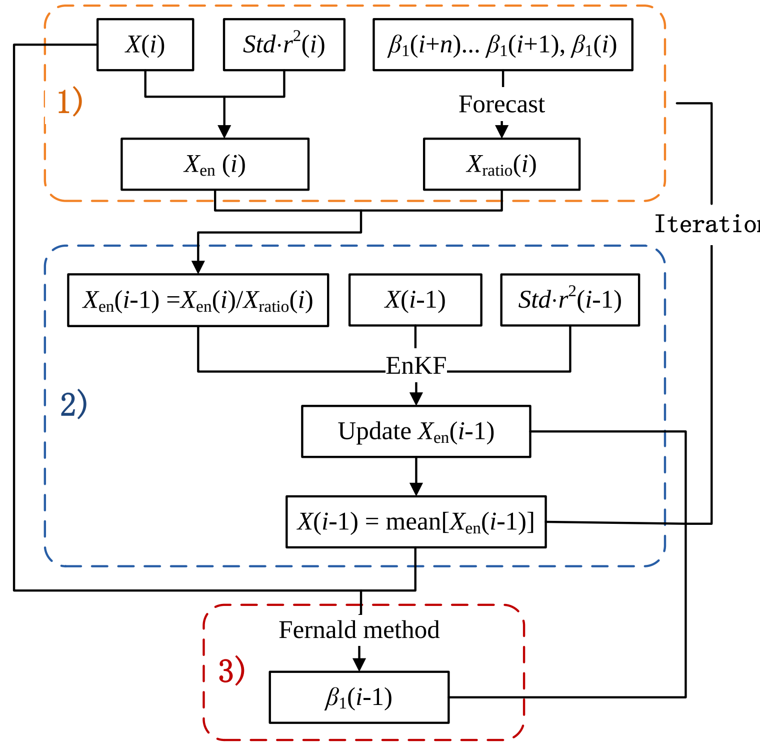
Fig. 1. Schematic view of global iron and dust connections. Highlighted are the four critical components (clockwise from top): the state of the land surface and dust availability, atmospheric aerosol loading, marine productivity, and some measure of climatic state (such as mean global surface temperature). The sign of the connections linking these varies; where the correlation is positive (for example, increased atmospheric aerosol loading → increased marine productivity), the line is terminated with a solid arrowhead. Where the correlation is negative (for example, increased marine productivity → lower CO_2 and a colder climate), the termination is an open circle. Connections with an uncertain sign are terminated with an open arrowhead. The mechanism by which the link acts (for example, the impact of a change in atmospheric CO_2 is via the radiative forcing of climate) is displayed in italics. Finally, the "water tap" symbols represent a secondary mechanism modulating the effect of a primary mechanism; for instance, a change in global precipitation strength and distribution will alter the efficiency with which entrained dust is transported to the open ocean. If a path of successive connections can be traced from any given component back to itself, a closed or feedback loop is formed. An even number (including zero) of negatively correlated connections counted around the loop gives a positive feedback, which will act to amplify a perturbation and tend to destabilize the system. Conversely, an odd number of negative correlations gives a negative feedback, dampening any perturbation and thus stabilizing the system. For instance, atmospheric aerosol loading → marine productivity → climatic state → dust availability → atmospheric aerosol loading contains two negative and two positive correlations and thus is positive overall. In contrast, marine productivity looping back onto itself contains a single negative correlation and thus represents a negative feedback.

来自：Science (print ISSN 0036-8075; online ISSN 1095-9203)

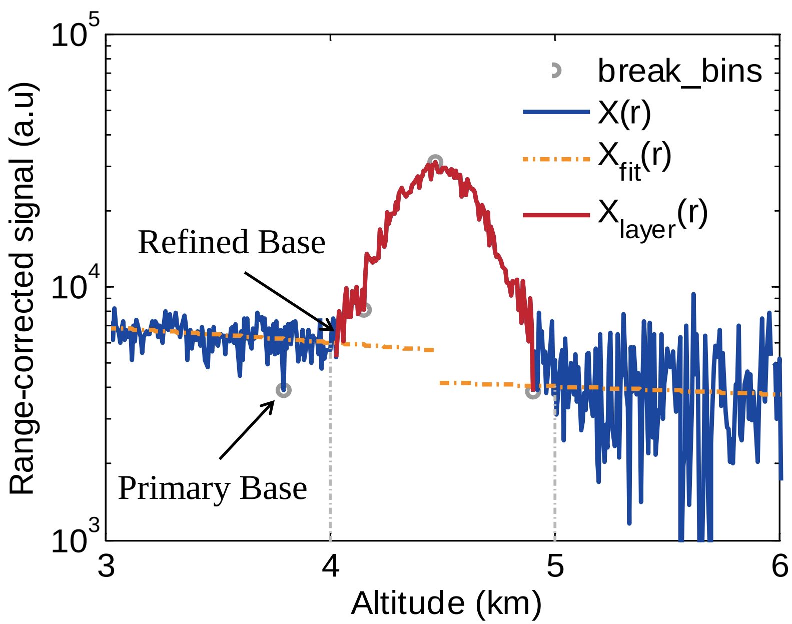
风格



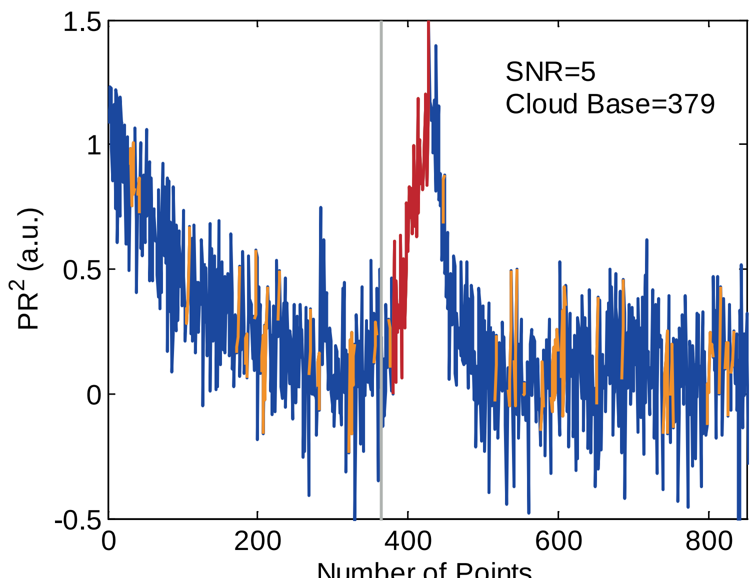
ideal
layer
noise
synthetic
Altitude(km)
backscatter (a.u.)
0
0.5
1
1.5
2



1)
$X(i)$
$Std{\cdot}r^2(i)$
$\beta_1(i+n)\ldots\ \beta_1(i+1),\ \beta_1(i)$
Forecast
$X_{en}\ (i)$
$X_{ratio}(i)$
Iteration
2)
$X_{en}(i\text{-}1) = X_{en}(i)/X_{ratio}(i)$
$X(i\text{-}1)$
$Std{\cdot}r^2(i\text{-}1)$
EnKF
Update $X_{en}(i\text{-}1)$
$X(i\text{-}1) = \text{mean}[X_{en}(i\text{-}1)]$
3)
Fernald method
$\beta_1(i\text{-}1)$

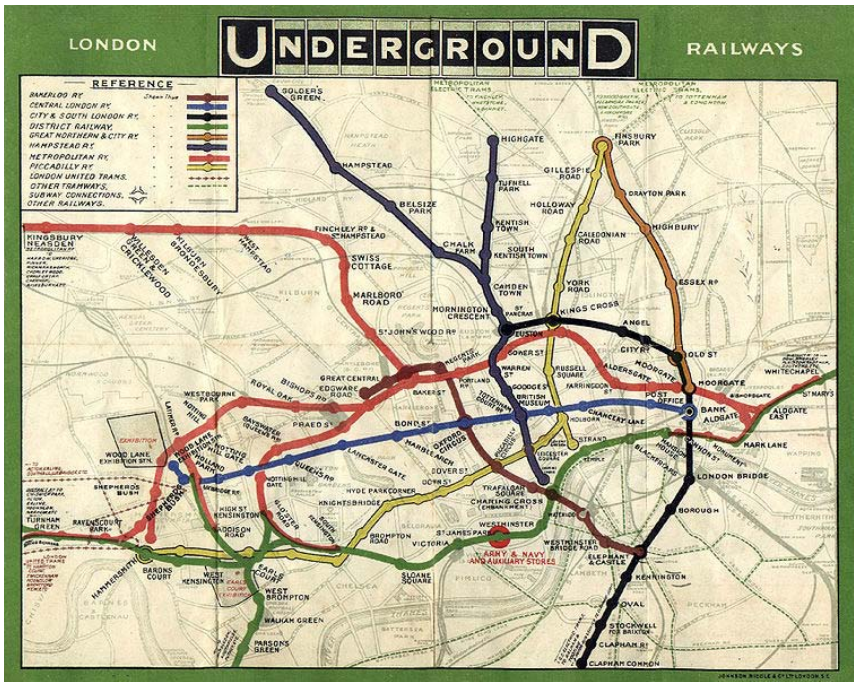


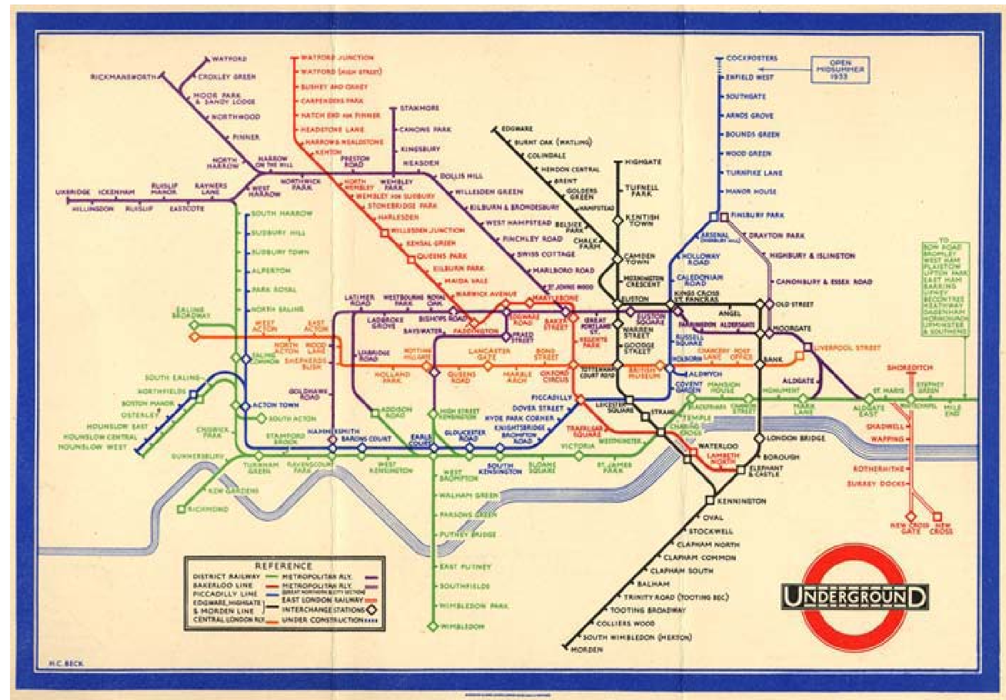
break_bins
X(r)
$X_{fit}(r)$
$X_{layer}(r)$
Refined Base
Primary Base
Range-corrected signal (a.u)
Altitude (km)
10^5
10^4
10^3



SNR=5
Cloud Base=379
PR^2 (a.u.)
Number of Points

创意





Tube map of the London Underground, 1908

Harry Beck’s map of the London Underground, 1933. 革命性的贡献

summary

1.创新，言之有物；

2.写新，言之有理；

3.秀新，言之有据。

参考文献

- 英语科技论文撰写与投稿，任胜利
- 如何撰写英文科技论文，佚名
- 写好英语科技论文的诀窍，周耀旗
- 如何在顶级科学杂志上发表论文，鲁白
- 图表制作与结果分析，malan
- 科技英语写作进阶，J. L. 利伯恩(法)
- 科学之游戏规则，刘春明
- Excel图表之道，刘万祥著

- 还有很多参考文献因为原始出处不明而没有标出，一并致谢。

LIESMARS GeoScience Café

The end