9. Acknowledgements

Acknowledgements

- Thank the people who
  - Contributed in some way to the study
  - Who commented on the manuscript
  - The referees (if they were helpful)
  - Provided the free software (e.g. python modules)
  - And always thank your **funding agencies** (mandatory !)
- Be very factual.
  - Avoid : *“and I thank Lizz and Jim for making coffee…”*
- Mention people explicitly when known

Acknowledgements

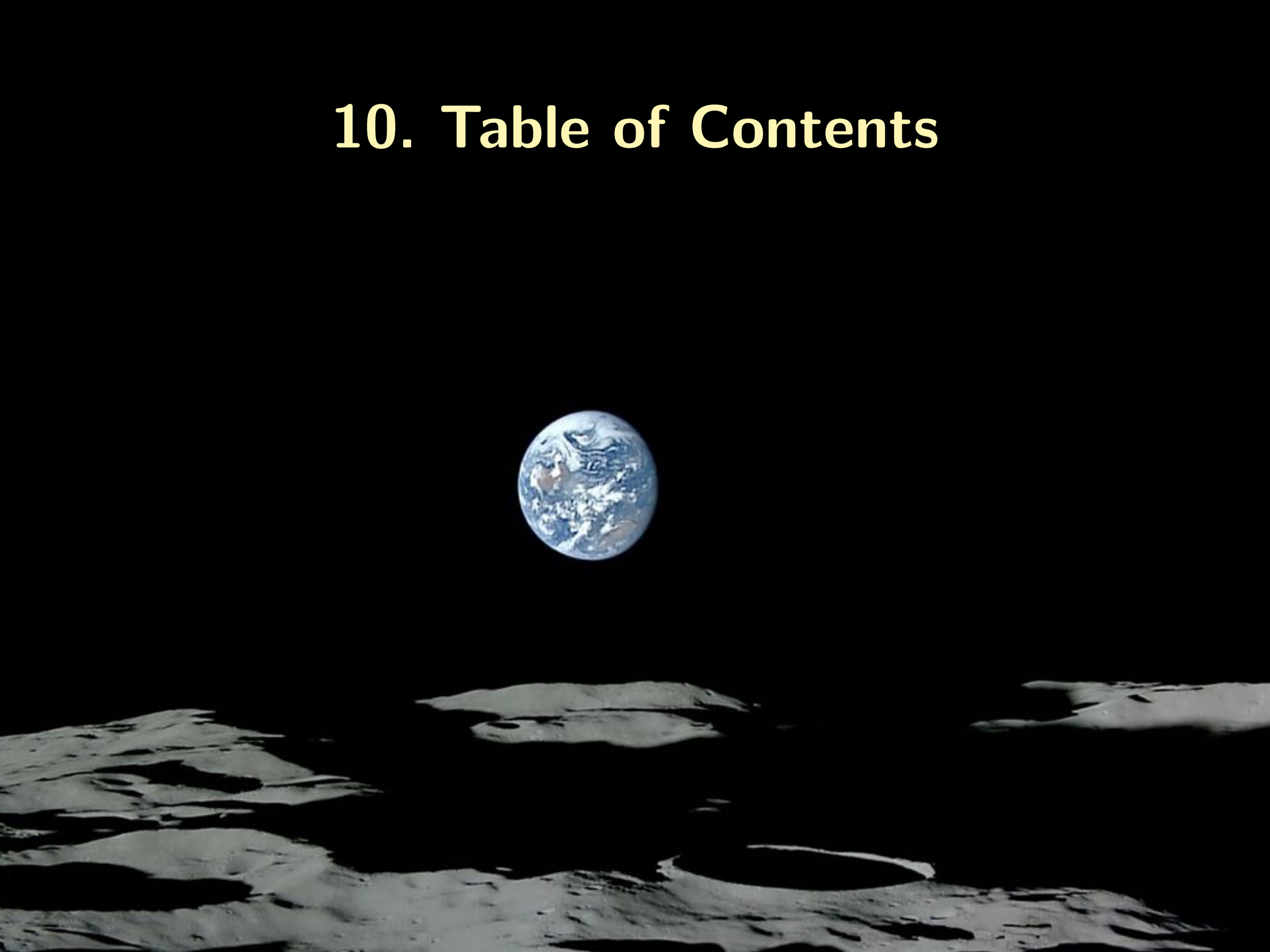
Failing to acknowledge your sponsors or funding agencies may cause your funding to be suspended.

This is critical for EU-funded projects.

Acknowledgements

- Check what are the rules for thanking your funding agency
- Example:
  "P. M. and M. K. gratefully acknowledge the International Space Science Institute (ISSI, Bern) for hospitality. This study received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under the grant agreement number 218816 (SOTERIA project) and from the Programme National Soleil-Terre (PNST). We also thank Thomas Benseghir and Nolwenn Marchand for their assistance in the data analysis. The AIA data are courtesy of SDO (NASA) and the AIA consortium."

10. Table of Contents



- When is a table of contents needed / useful ?

Table of Contents

- TOCs are not required, except for long reviews and theses
- **Tip**: build the table of contents even if not needed and check whether the titles/subtitles are consistent

This is easy with LaTeX : just add `\tableofcontents`

What to change in this Table of contents ?

11. Supplementary material

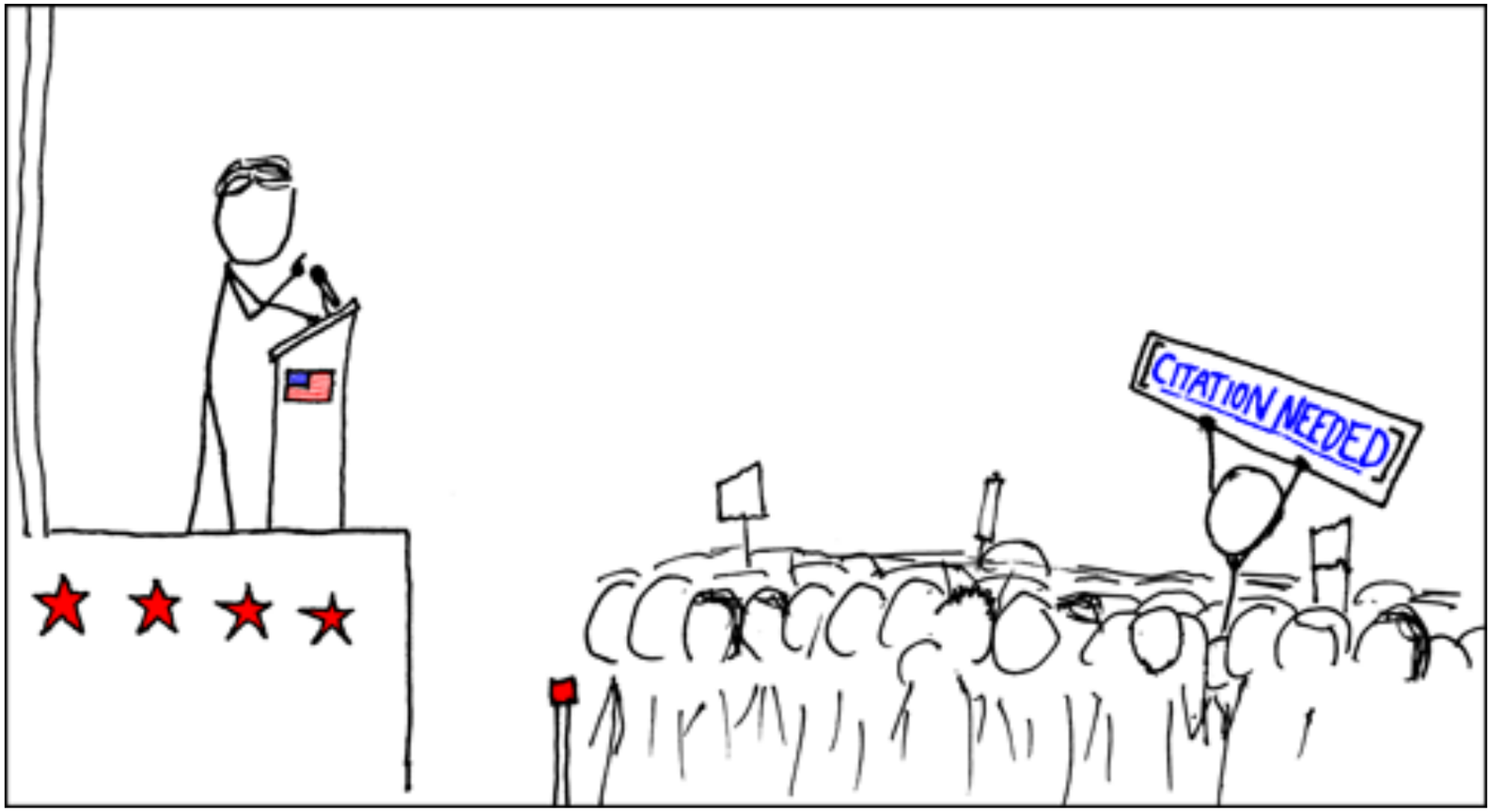
Supplementary material

- Supplementary material = everything that may be useful to some but would distract the reader from the main message if put in the core of the article
- Use with moderation

References

References

- Your sources of information must be cited
- …but these citations must be reliable
  - Perennial
  - Easy to find



https://xkcd.com/285/

What is eligible for a citation in a scientific article ?

book with ISBN
book without ISBN
website with date of last visit
website
article in peer-reviewed journal
idem, but in another language
article in mainstream newspaper
oral recording
technical report
PhD thesis
submitted (but not yet accepted) article
article in preparation (not yet submitted)
preprint in archive (e.g. ArXiV)

How to cite ?

- Each journal has its own rules
- Examples
  - Recent studies [2] and...
  - Recent studies [MacKay et al., 2018] and...
  - Recent studies (MacKay et al., 2018) and...
  - Recent studies by MacKay et al. (2018), and…
- See for example the Chicago Manual of Style : https://www.chicagomanualofstyle.org/home.html

Degtyarev, V. I., Kharchenko, I. P., Potapov, A. S., Tsegmed, B., and Chudnenko, S. E.: Qualitative estimation of magnetic storm efficiency in producing relativistic electron flux in the Earth's outer radiation belt using geomagnetic pulsations data, Adv. Space Res., V. 43 (5), 829–836, doi:10.1016/j.asr.2008.07.004, 2009.

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Dow J.M., R. E.Neilan and C.Rizos, The International GNSS Service in a changing landscape of Global Navigation Satellite Systems, Journal of Geodesy, 83:191–198, DOI: 10.1007/s00190-008-0300-3, 2009.

Egorova, T., Rozanov, E., Ozolin, Y., Shapiro, A., Calisto, M., Peter, T., and Schmutz, W.: The atmospheric effects of October 2003 solar proton event simulated with the chemistry-climate model SOCOL using complete and parameterized ion chemistry, J. Atmos. Sol.-Terr. Phys., 10 73(2–3), 356–365, doi:10.1016/j.jastp.2010.01.009, 2011.

Feltens, J., M. Angling, N. Jackson-Booth, N. Jakowski, M. Hoque, M. Hernández-Pajares, A. Aragón-Àngel, R. Orús, and R. Zandbergen (2011), Comparative testing of four ionospheric models driven with GPS measurements, Radio Sci., 46, RS0D12, doi:10.1029/2010RS004584.

Fuller-Rowell, T., E. A. Araujo-Pradere, C. Minter, M. Codrescu, P. Spencer, D. Robertson, and A. R. Jacobson, US-TEC: A new data assimilation product from the Space Environment Center characterizing the ionospheric total electron content using real-time GPS data, Radio Sci., 41, RS6003, doi:10.1029/2005RS003393, 2006.

Gulyaeva, T.L., Jakowski N., Validation of Consistency of GPS/NTCM2 and SMI-96 Derived Maps of Total Electron Content Through the Ionosphere and Plasmasphere, Proc. 3rd COST251 Workshop, (Eds. R. Hanbaba and B.A. de la Morena), September, 1998, 109-118, 1999

Degtyarev, V. I., Kharchenko, I. P., Potapov, A. S., Tsegmed, B., and Chudnenko, S. E.: Qualitative estimation of magnetic storm efficiency in producing relativistic electron flux in the Earth's outer radiation belt using geomagnetic pulsations data, Adv. Space Res., V. 43 (5), 829–836, doi:10.1016/j.asr.2008.07.004, 2009.

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How to cite ?

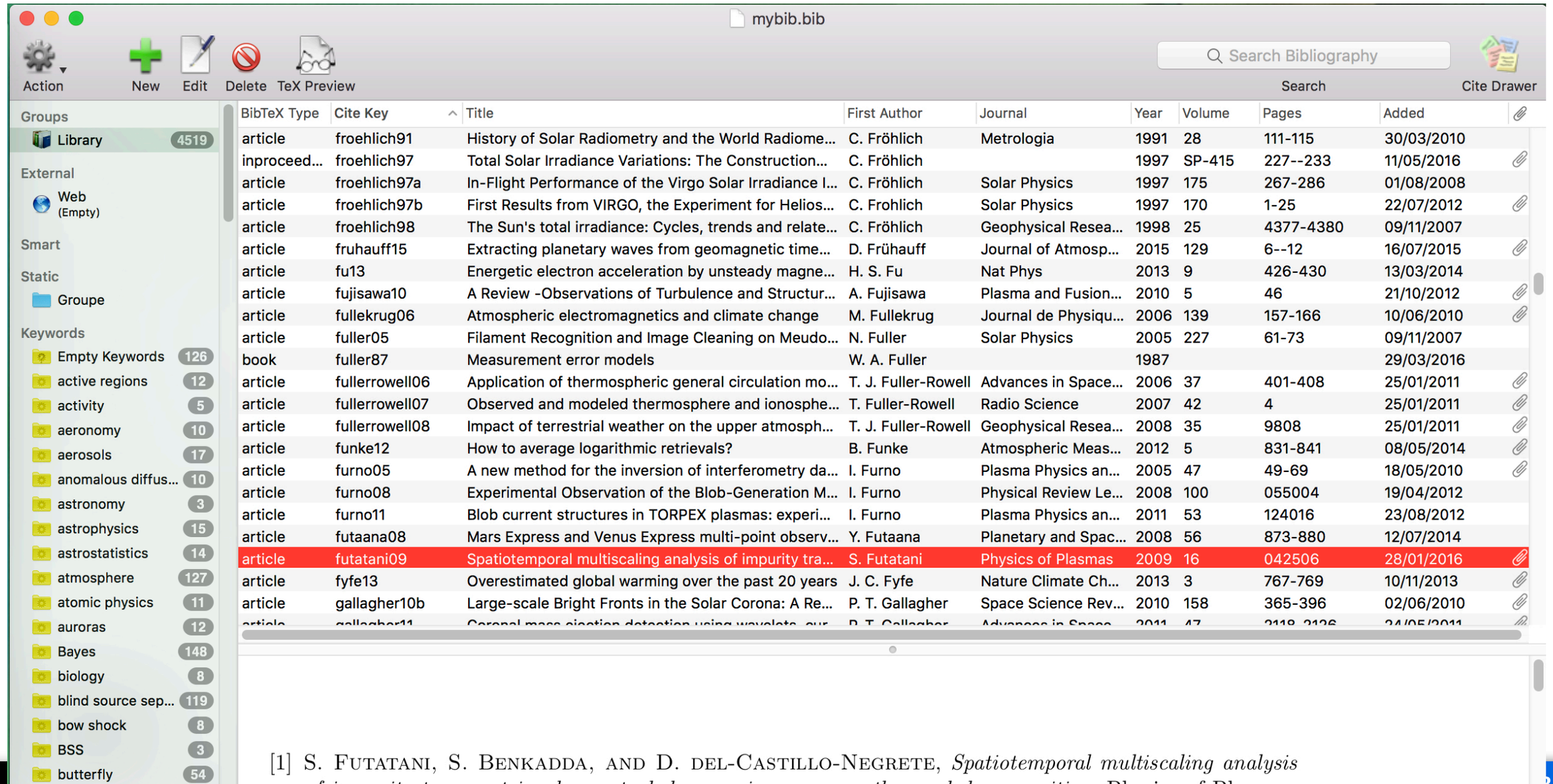
- Lists of references are often full of errors

  “Sloppy citations = sloppy writing = sloppy work”

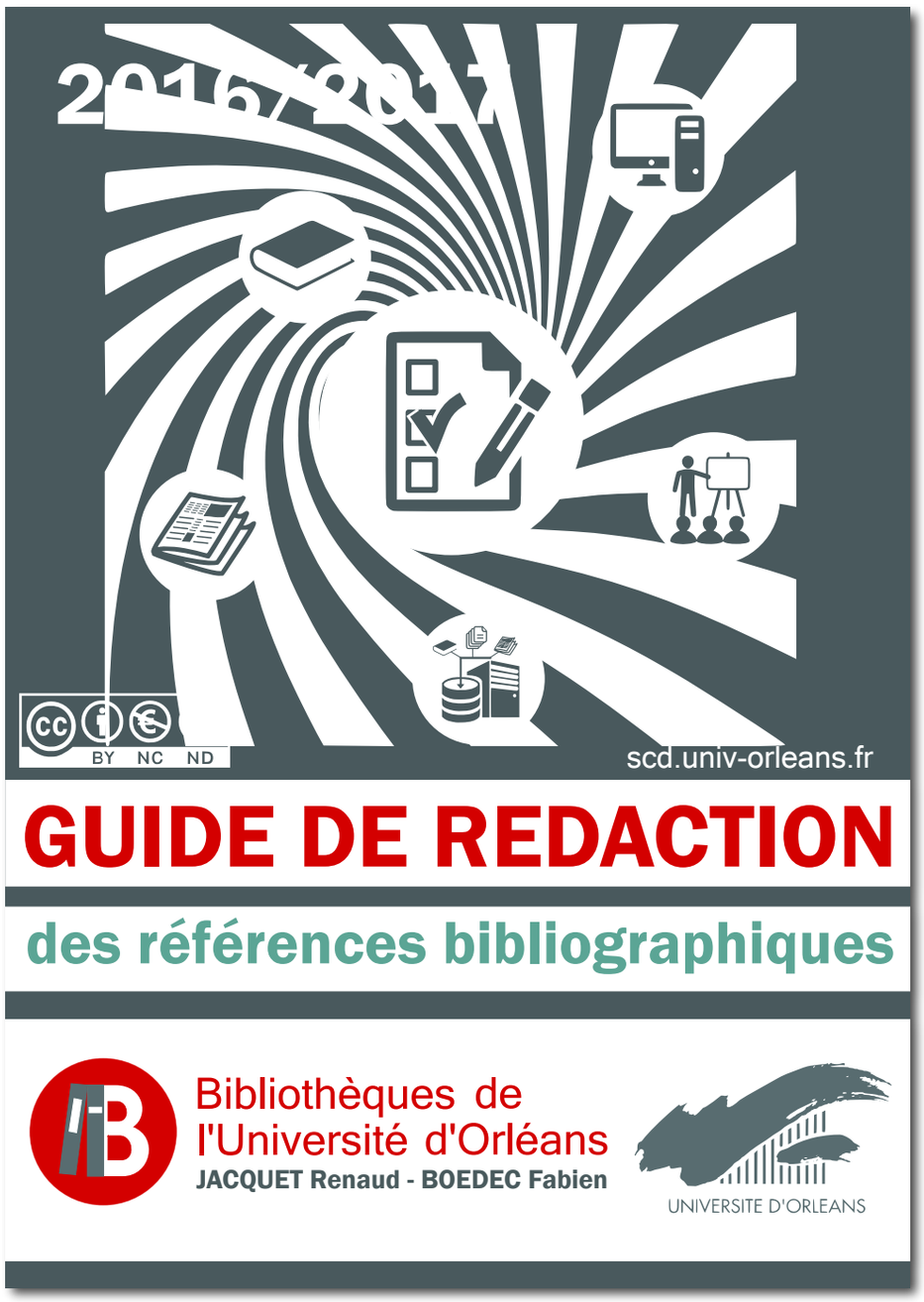
Use as much as possible automated tools for collecting (ZOTERO...) and displaying (BiBTeX...) references.
But even these are not devoid of errors

How to cite ?

- There are excellent tools around (EndNote, JabRef, Mendeley, BiBDesk…) for collecting and handling references



How to cite ?

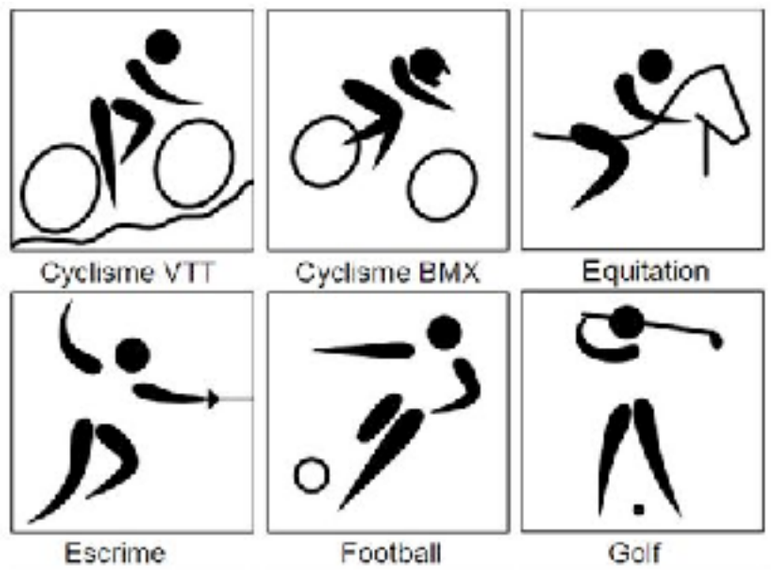


Available on Celene and on https://scd.univ-orleans.fr/sites/default/files/contributeurs/guide-biblio-orle.pdf

Graphics

Graphics

- A good graph provides
  - The greatest number of ideas / information
  - With the smallest possible investment from the reader
  - With the least ink
  - And in the smallest space



International olympic committee

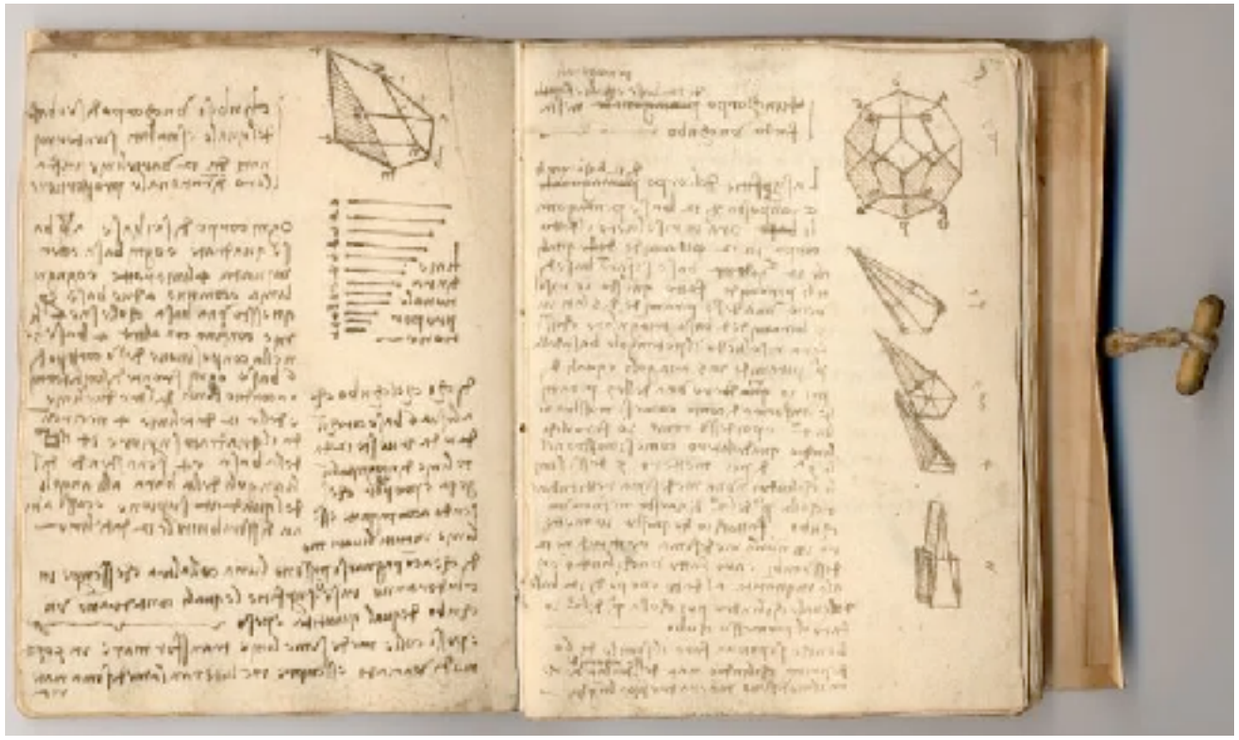
Graphics

“Show me your graph and I shall tell you how well you understand the problem”

Graphics

- A good graph **complements** you message
  + reinforces it
  + introduces a touch of creativity
  + is properly integrated in it

Leonardo da Vinci



- BEWARE : part of your audience will mainly focus on graphs

Graphics

Figure captions

- Should
  - Describe what is shown, e.g.
    “displacement versus age for a sample of xxx”
  - Provide all important experimental details
  - Identify multiple curves or traces

- Should NOT
  - discuss or interpret the results
  - be vague, e.g. “plot of the data”

What is wrong here ?

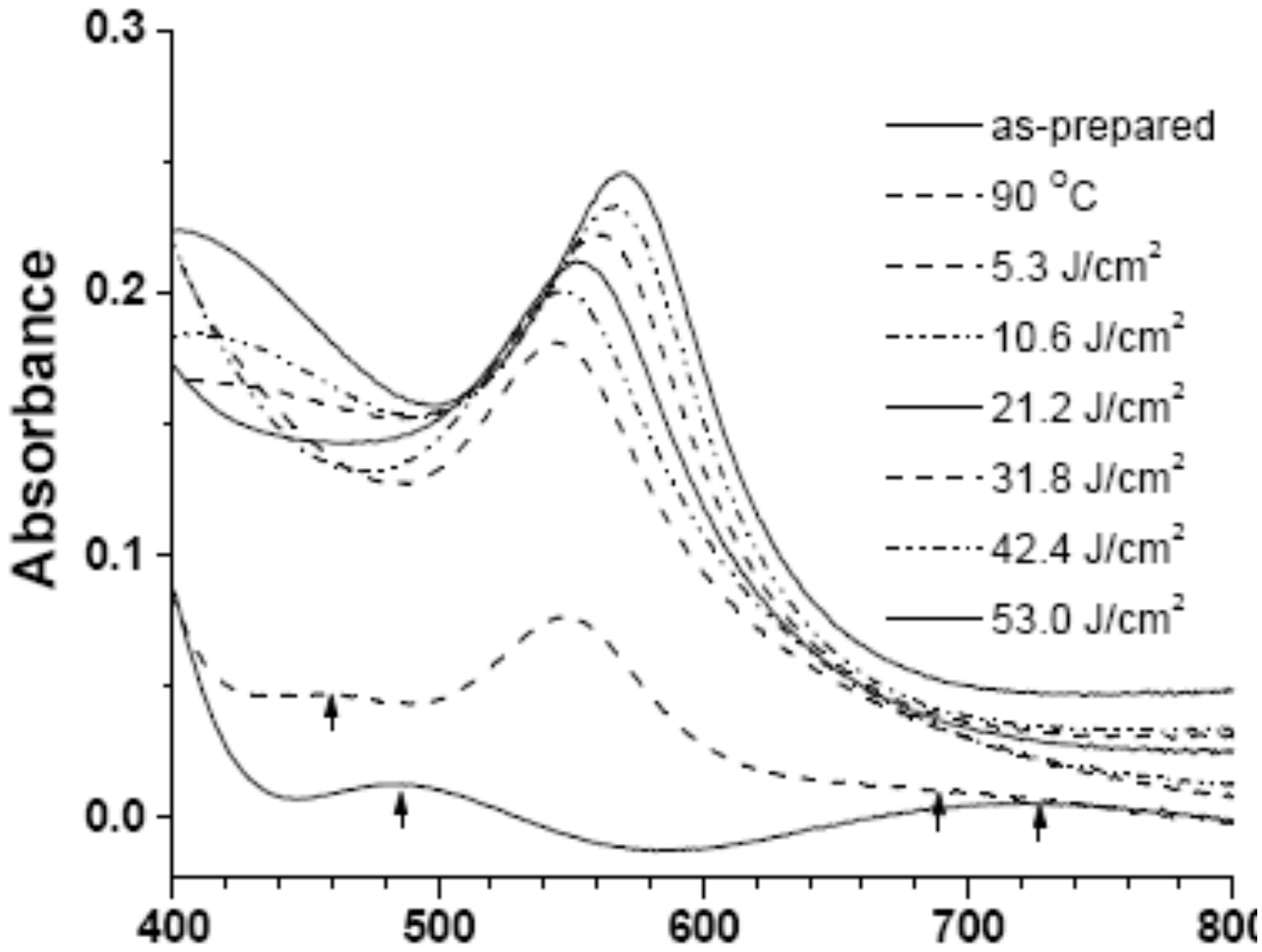
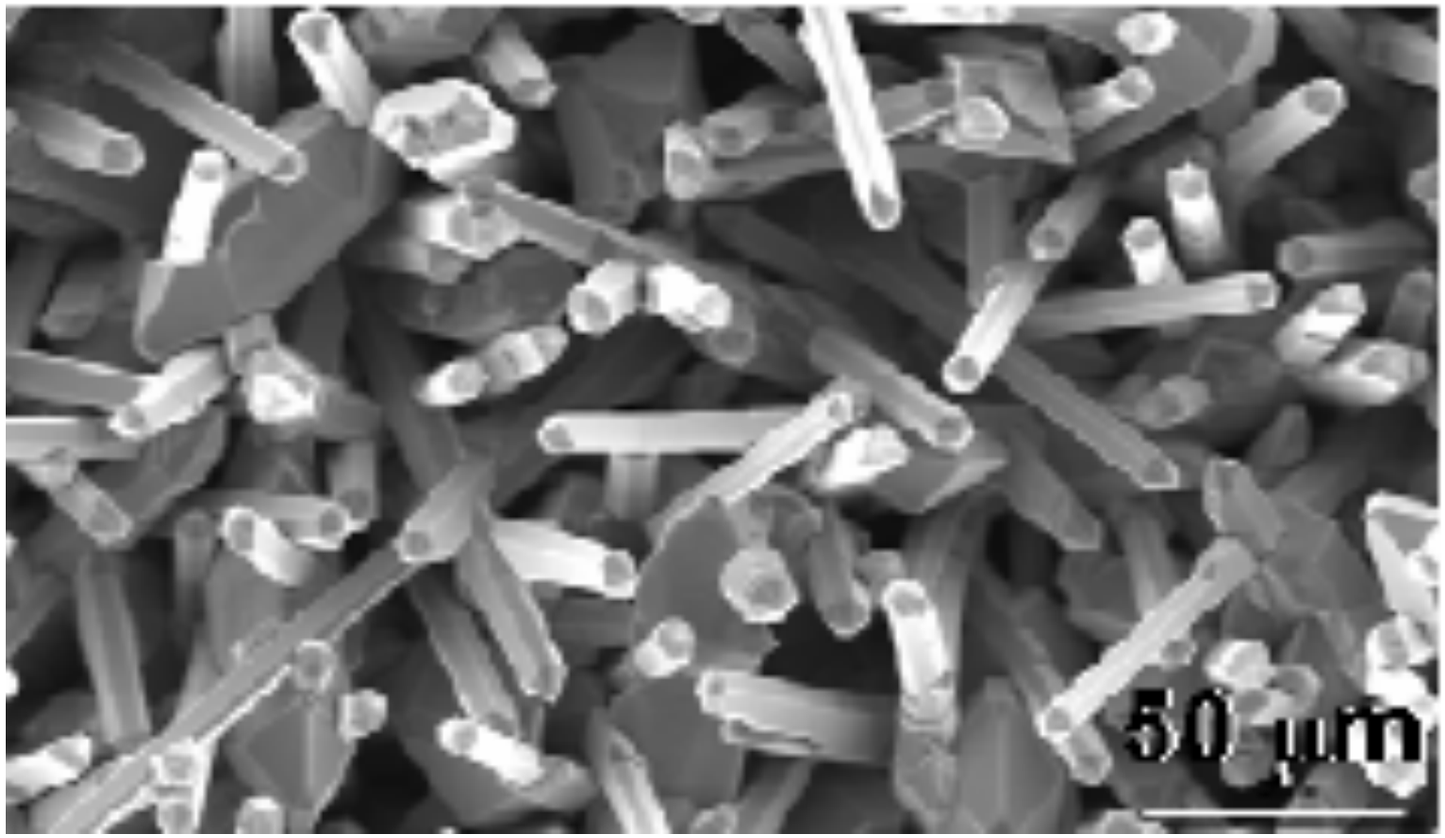


Figure 3 Optical absorption spectral evolutions of in-situ generated A
inside the hybrid (SiO_2-TiO_2–PEO) film matrix with respect to the th
treatment energies.

What is wrong here ?



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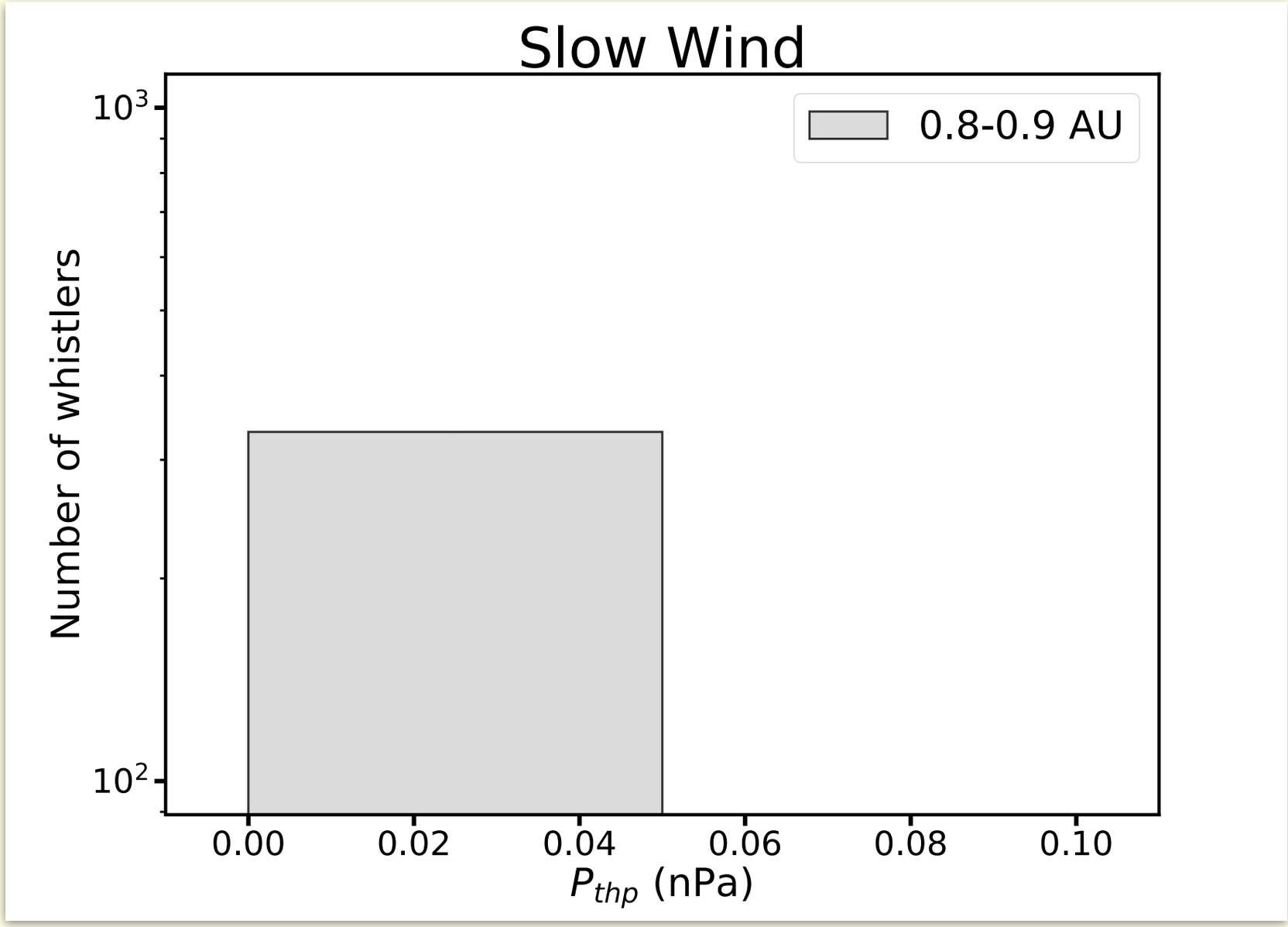


FIGURE 5.17: Proton thermal pressure of whistler waves observed between 0.8 to 0.9 AU (a) fast wind and (b) slow wind.

What is wrong here ?

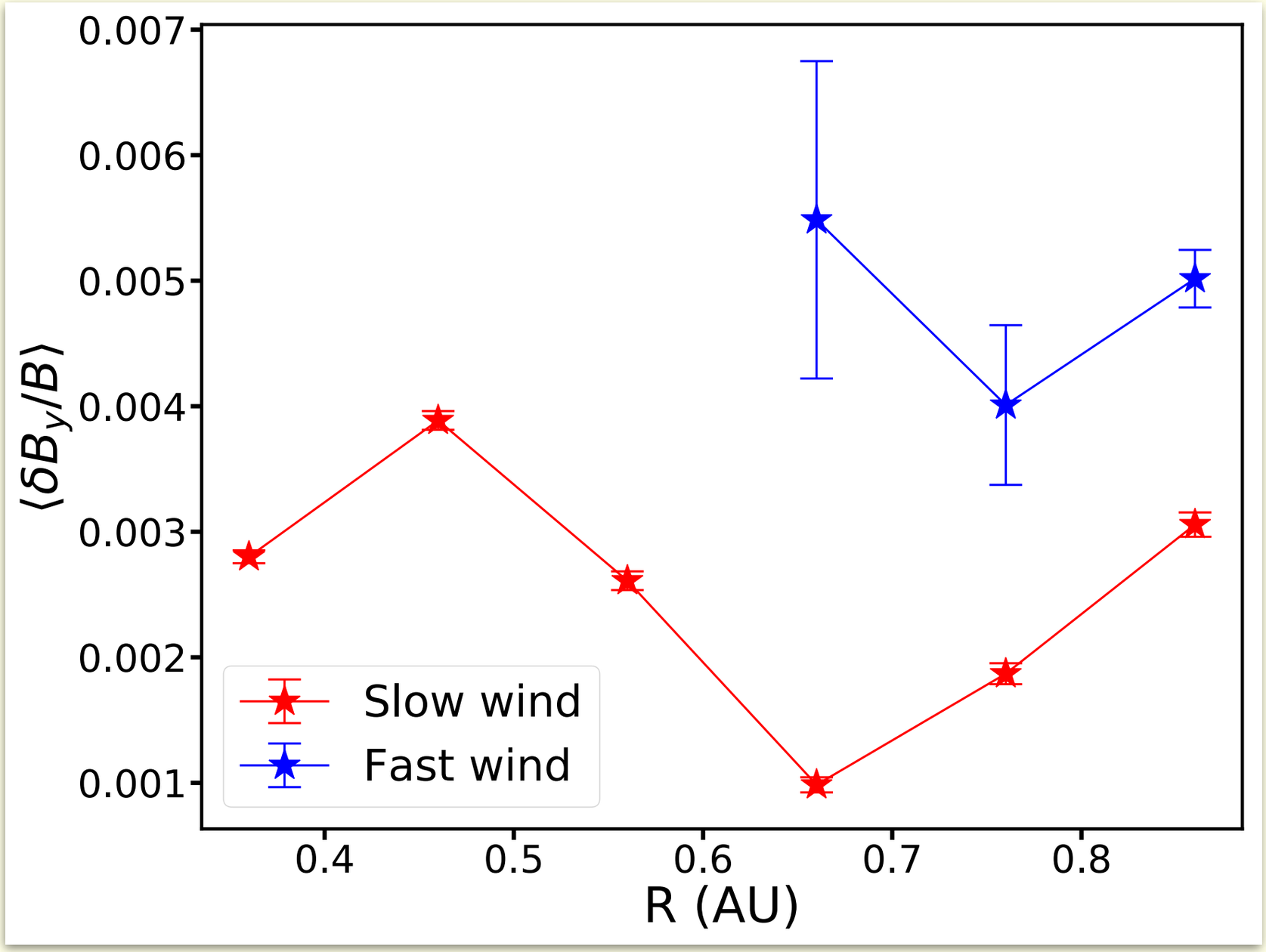
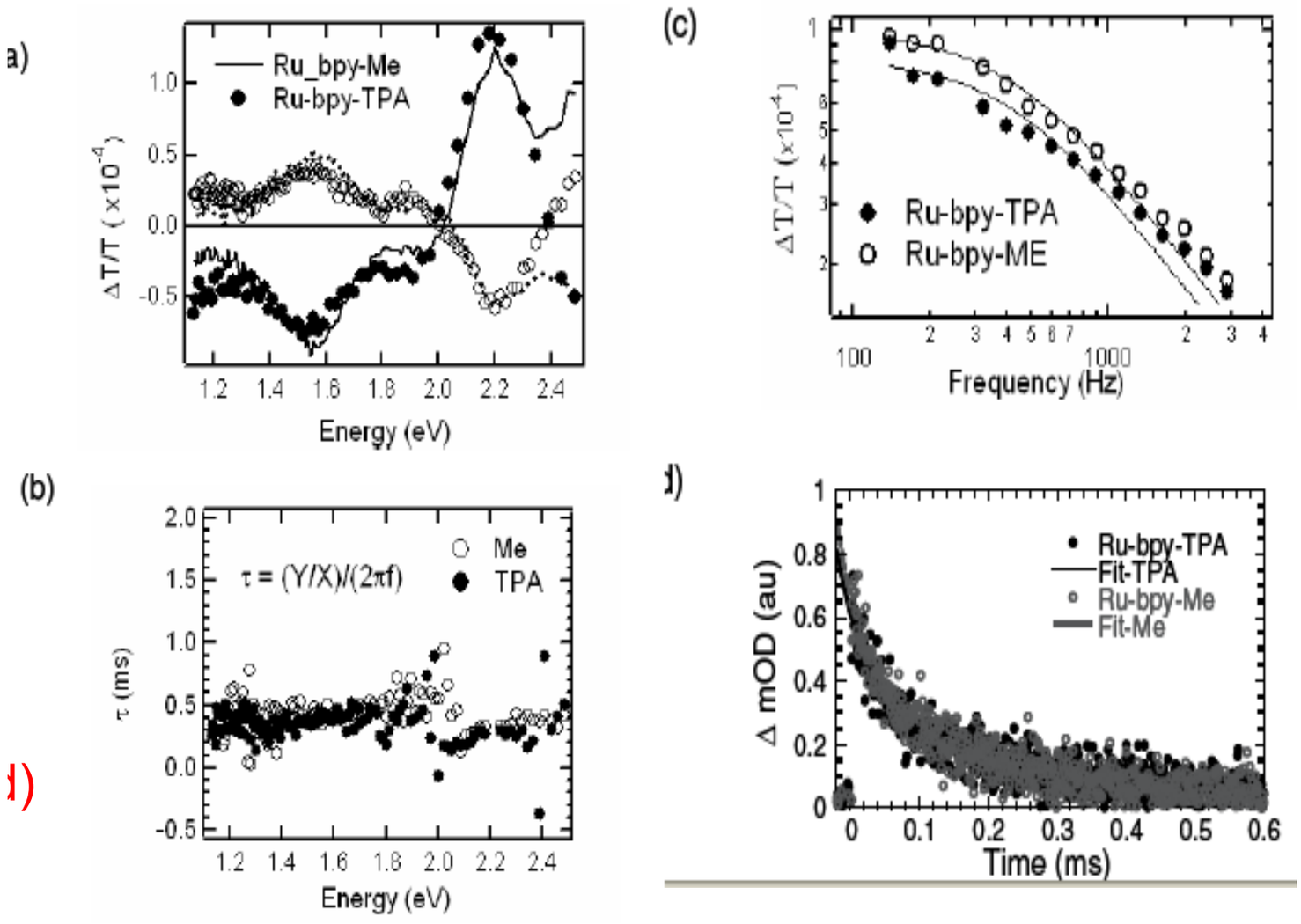


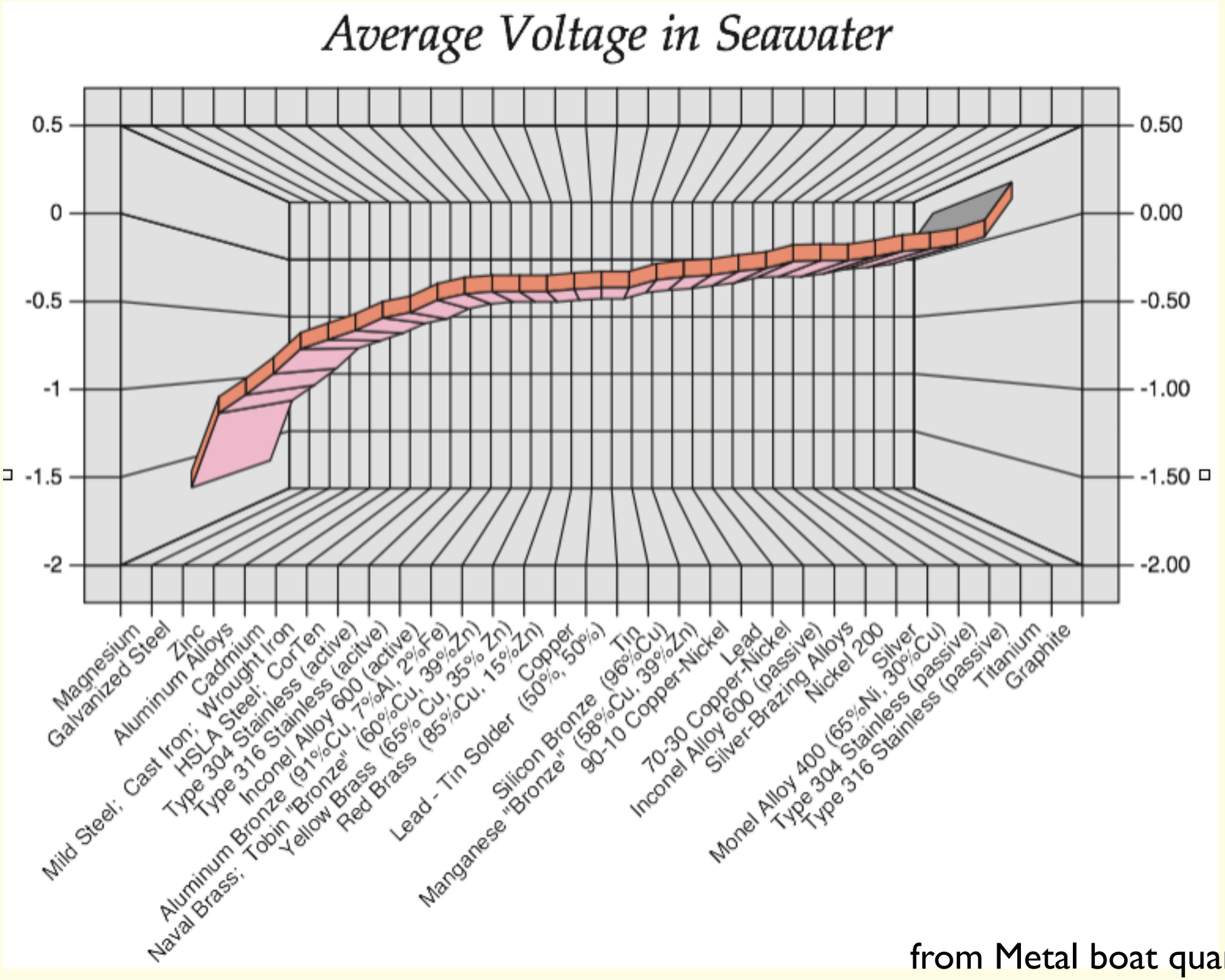
FIGURE 5.20: Normalized amplitude of whistler waves in the slow and fast solar wind, error bars show the standard error ($\frac{\sigma}{\sqrt{n}}$)

What is wrong here ?



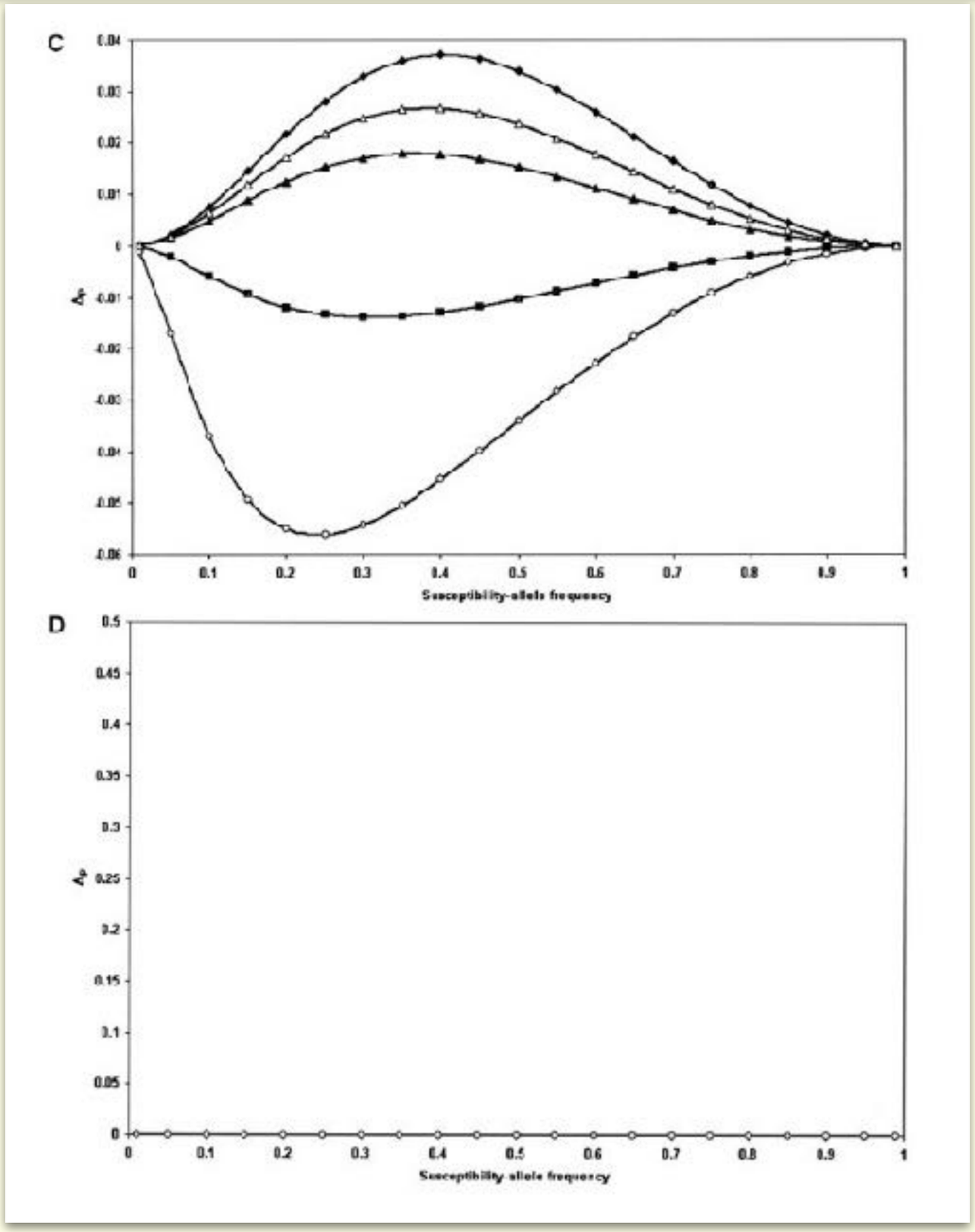
- Figure 2, a) Photo induced absorption (PIA) spectra for 1.4 µm thick mesoporous TiO2 films sensitized with Ru-bpy-TPA (circles) and Ru-bpy-Me (lines), pumped at 488 nm with an intensity of 128 mWcm-2 and a frequency of 200 Hz. The open circles and the dashed line correspond to the out-of-phase signals for the Ru-bpy-TPA and Ru-bpy-Me respectively. b) The frequency dependence of the PIA signal (dr = (dx2+dy2) at 800 nm (1.55 eV) under the same pump beam conditions as above. c) Transient absorption spectroscopy (TAS) of two similar samples to above, Ru-bpy-TPA (dark solid circles, solid line) and Ru-bpy-TPA (gray open circles, dashed line)of the transient absorption signal at 650 nm (~1.9 eV absorption of the oxidized dye species). The pump was at 600nm with a pulse width of ~ 5 ns with 35 µJ/pulse and a repetition rate of 30 Hz.

What is wrong here ?



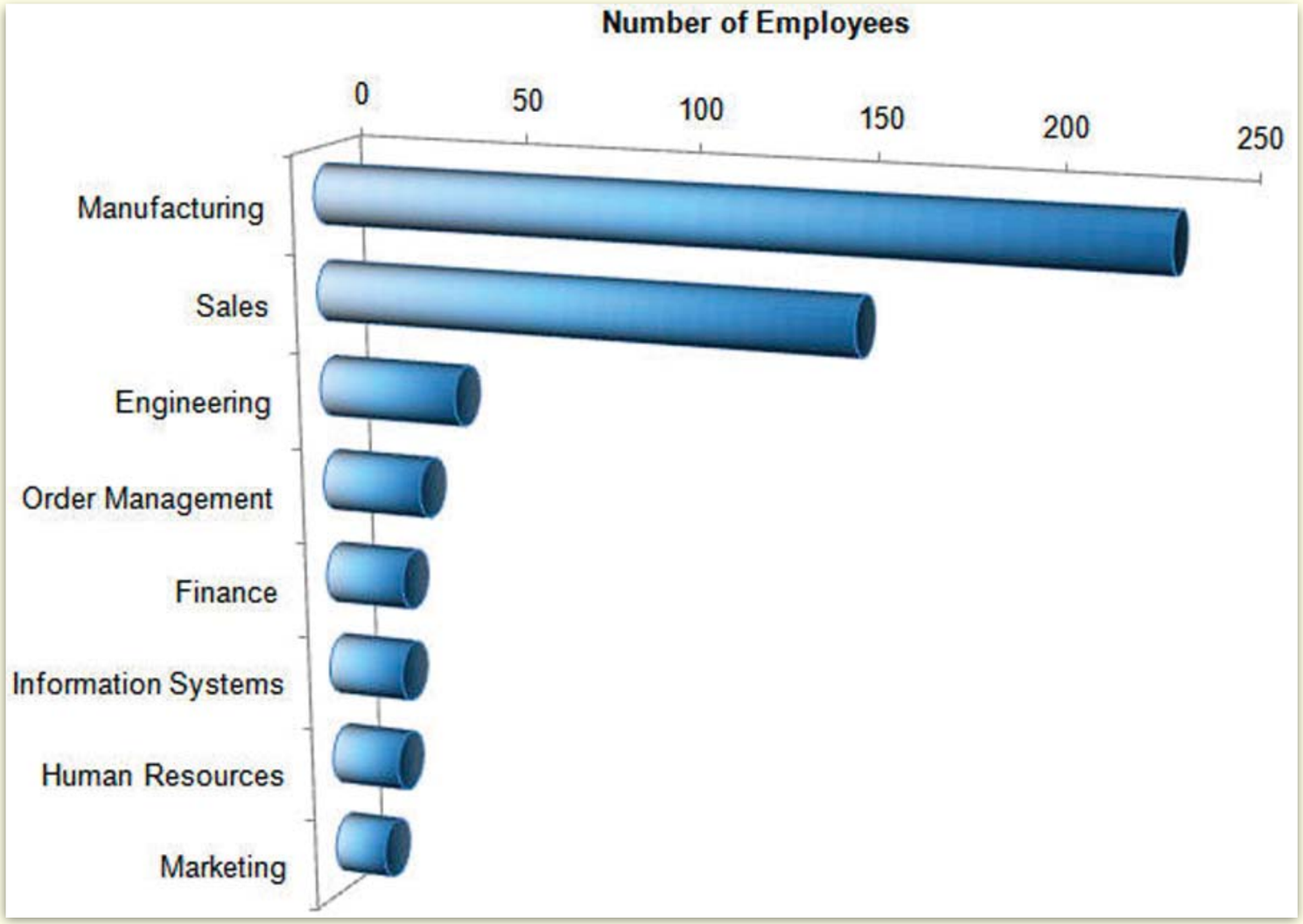
from Metal boat quarterly (1997)

What is wrong here ?



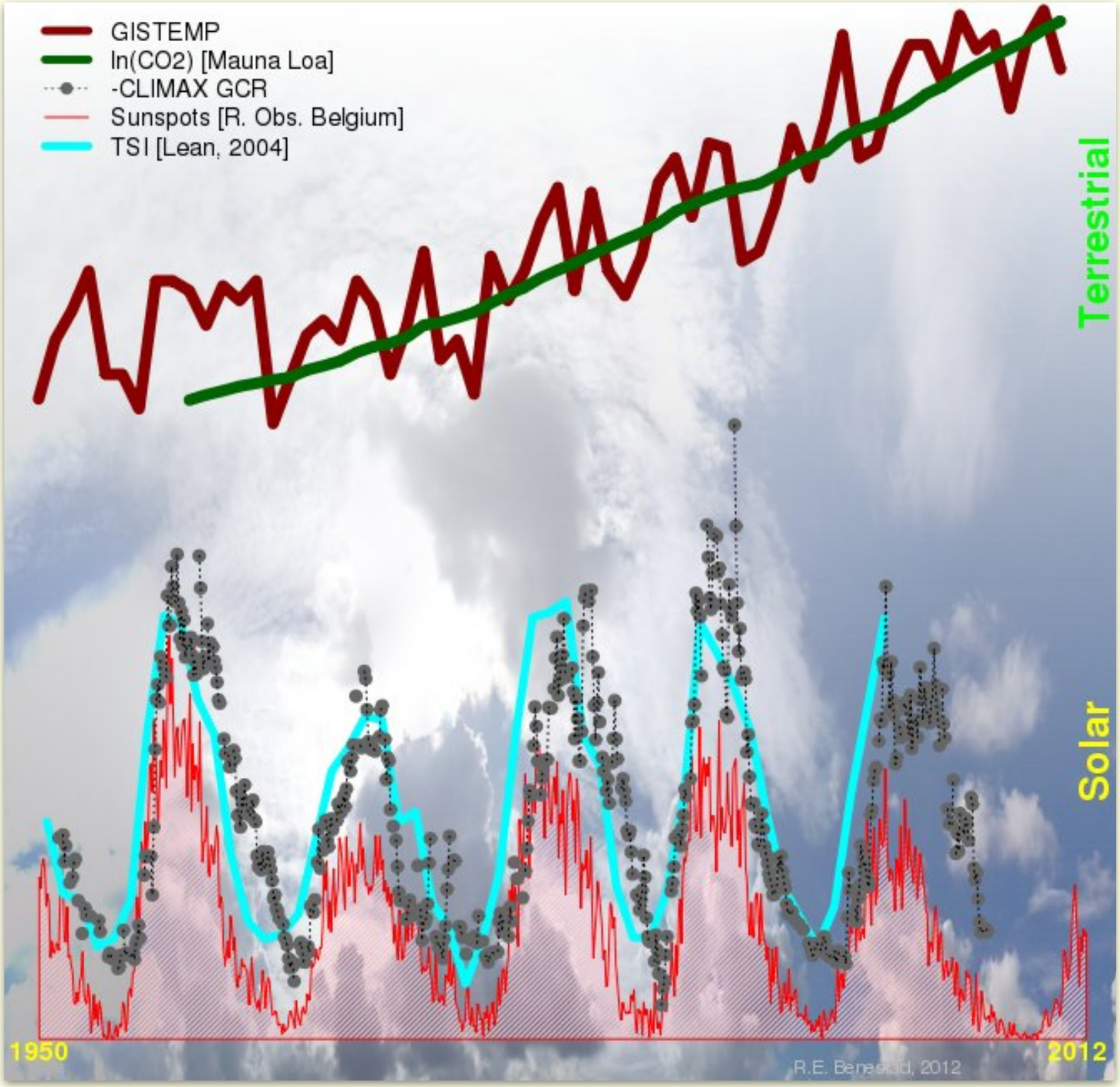
Wittke-Thompson et al. (2005)
Rational inferences about departures from Hardy-Weinberg equilibrium

What is wrong here ?



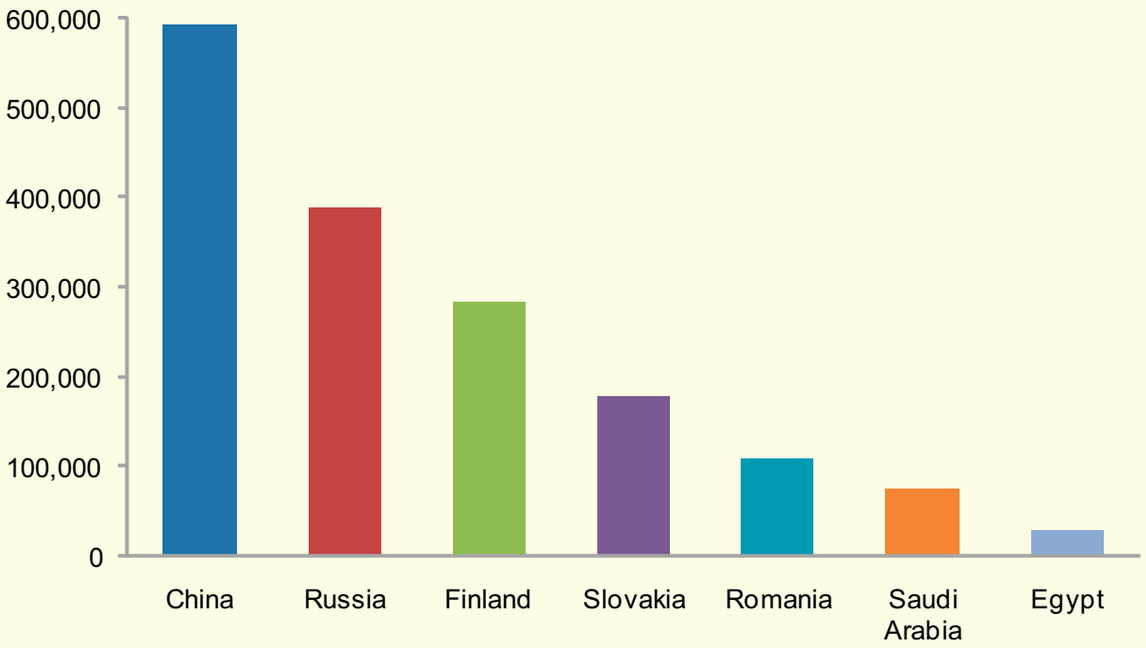
Stephen Few (2008)

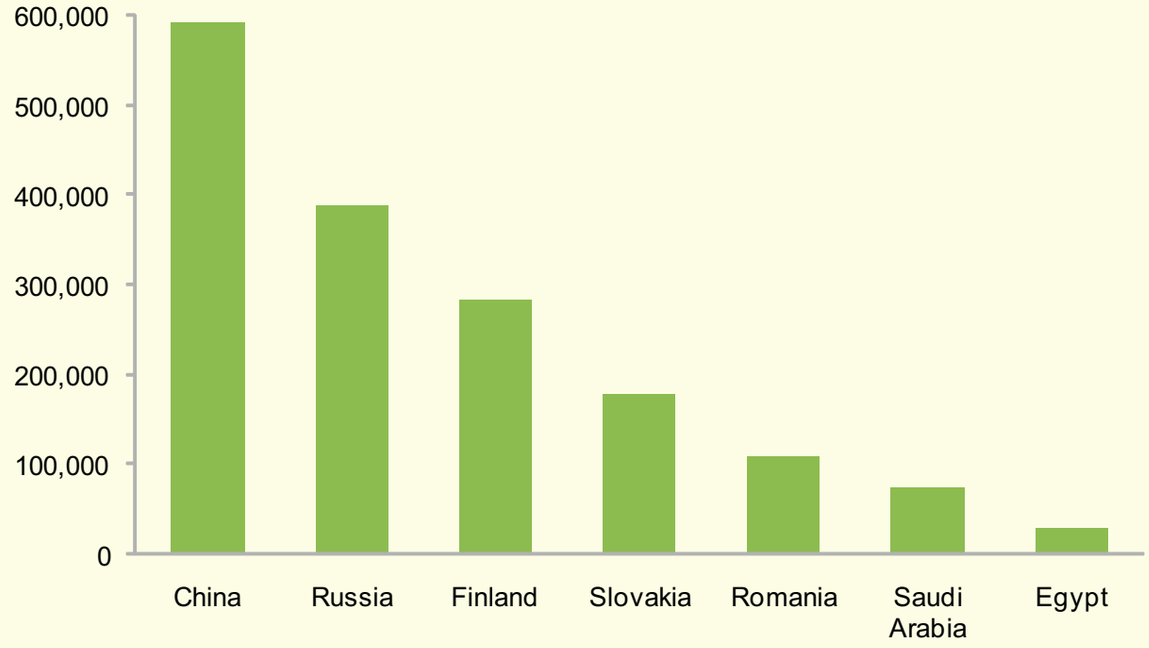
What is wrong here ?



R. Benestad (2015)

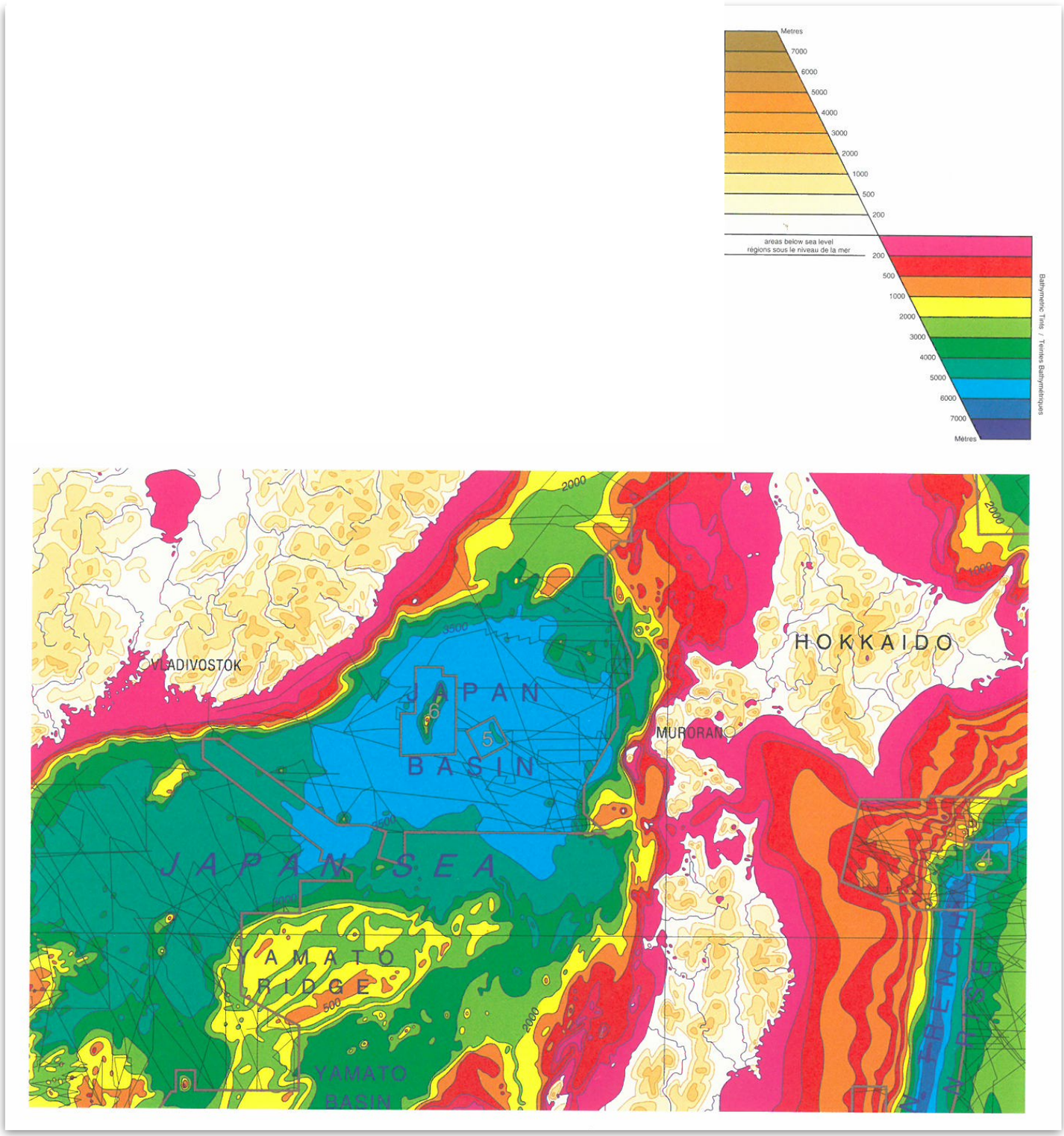
Which one is better ?





Use colours only when they add useful information

Colour palette

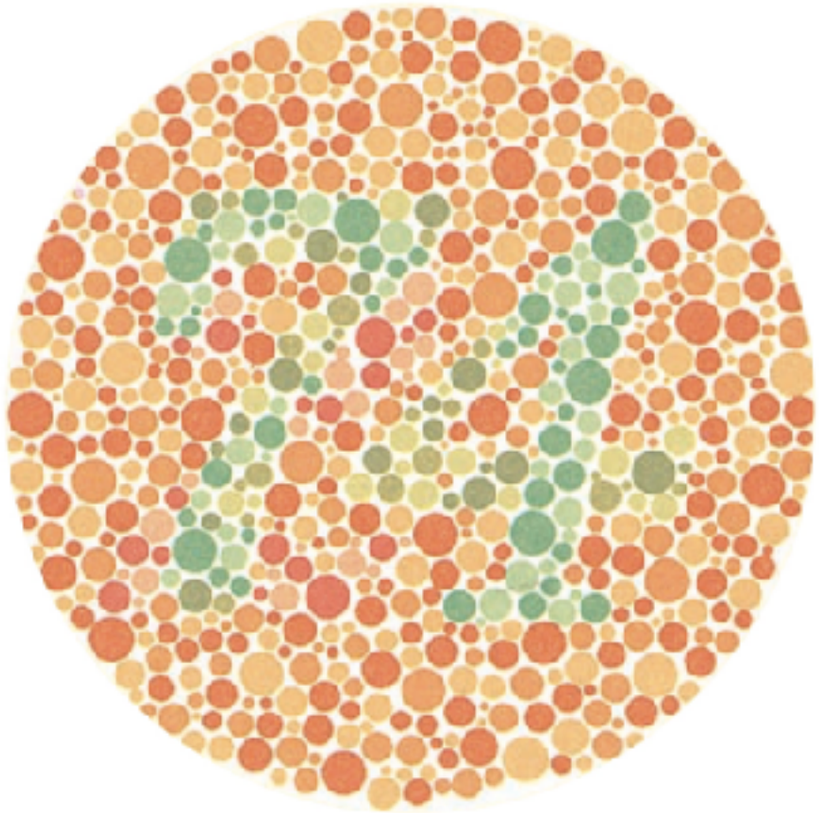


General bathymetric chart of the Oceans (GEBCO)

Coulours have a deep impact on what you want to reveal

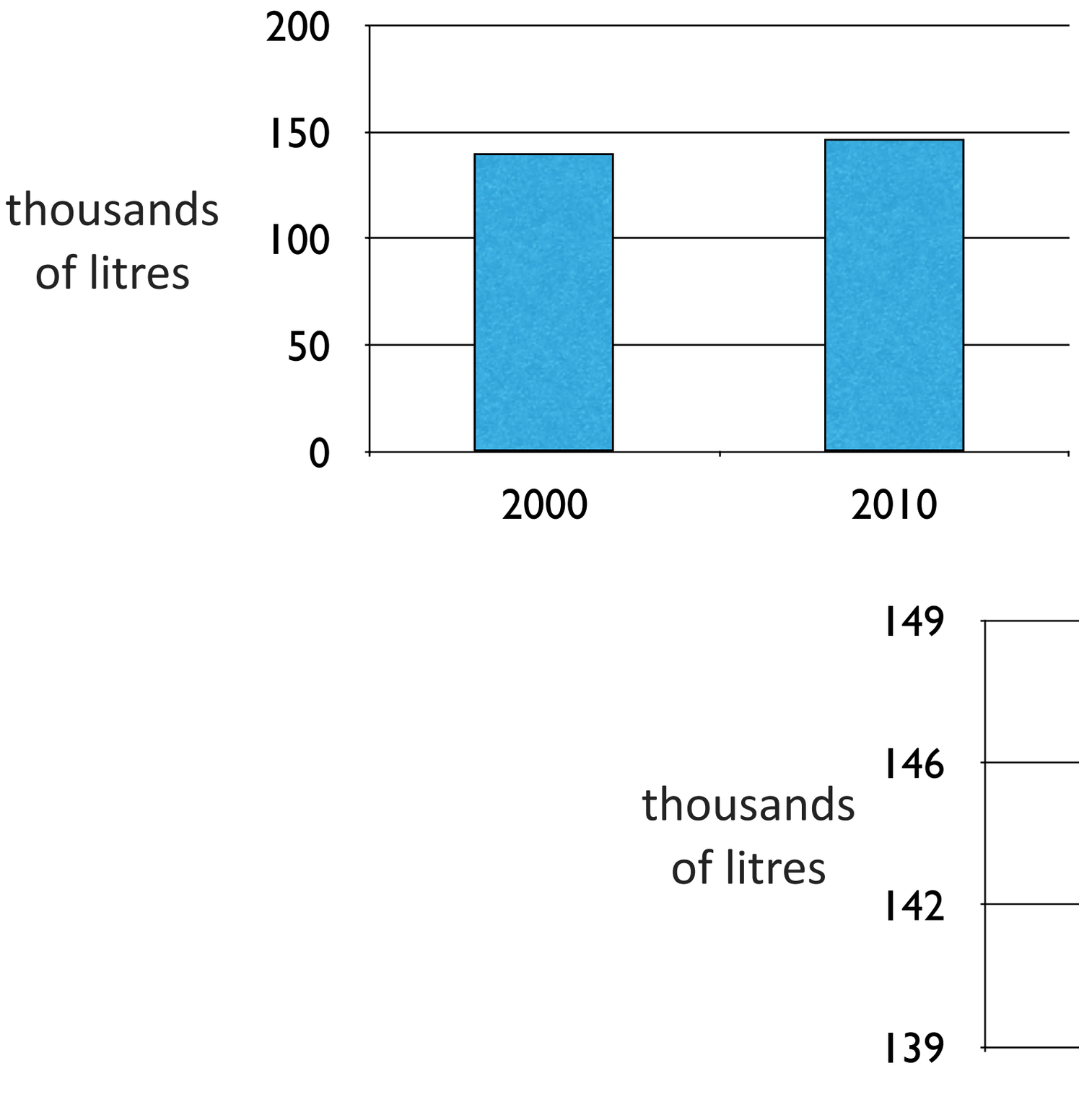
Some combinations must be avoided

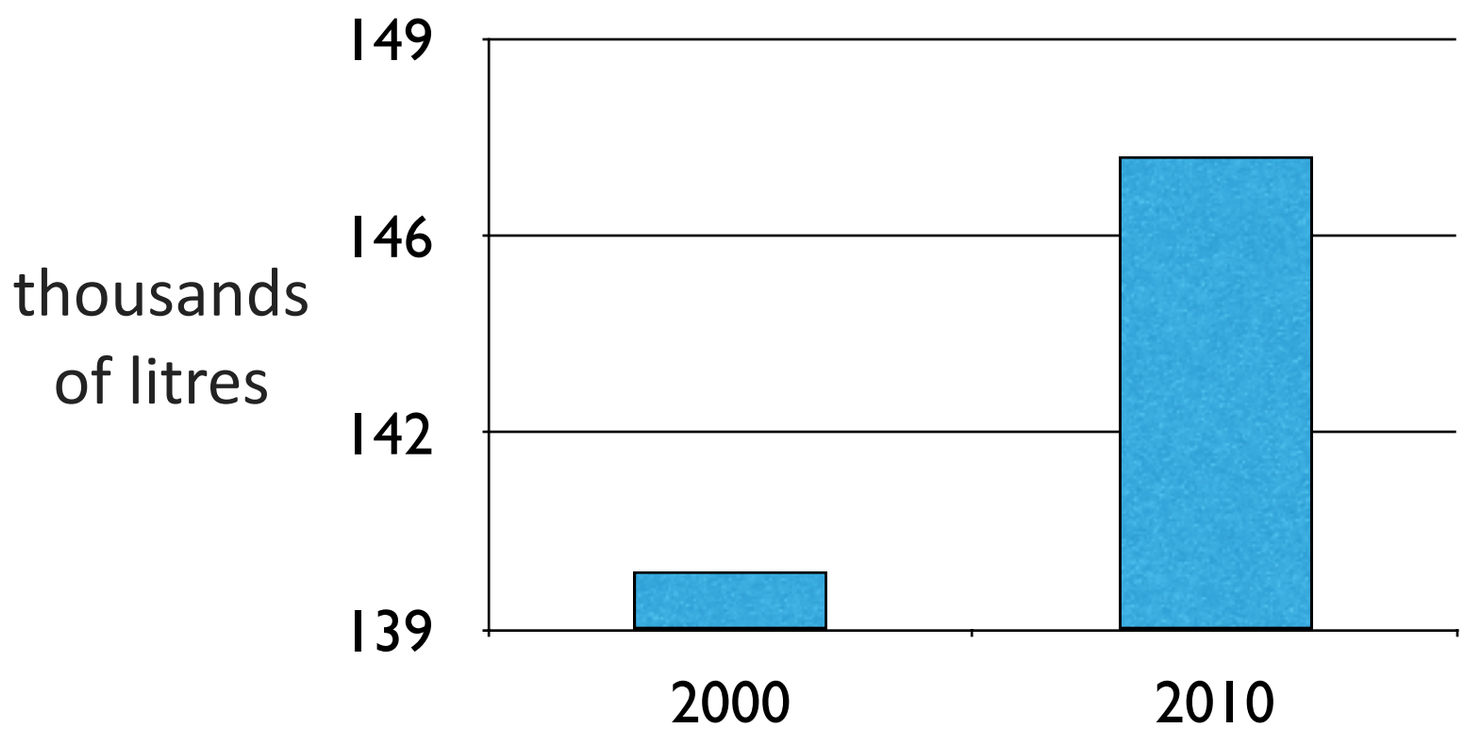
- Red and Green
  - about 10% of men suffer from daltonism
- Colours that will appear similar in black and white



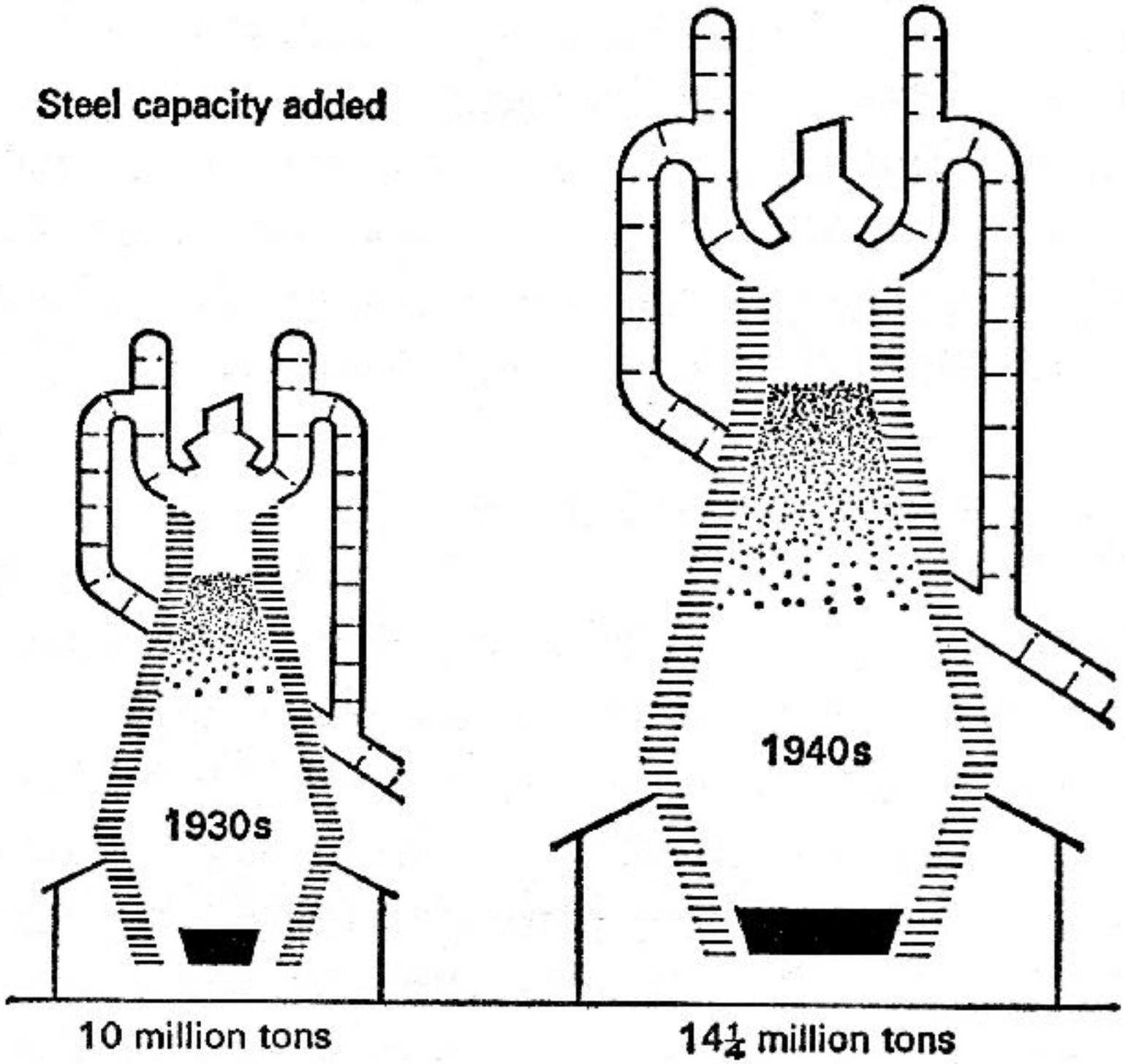
Isahara plates: what number is shown ?

Treacherous graphs



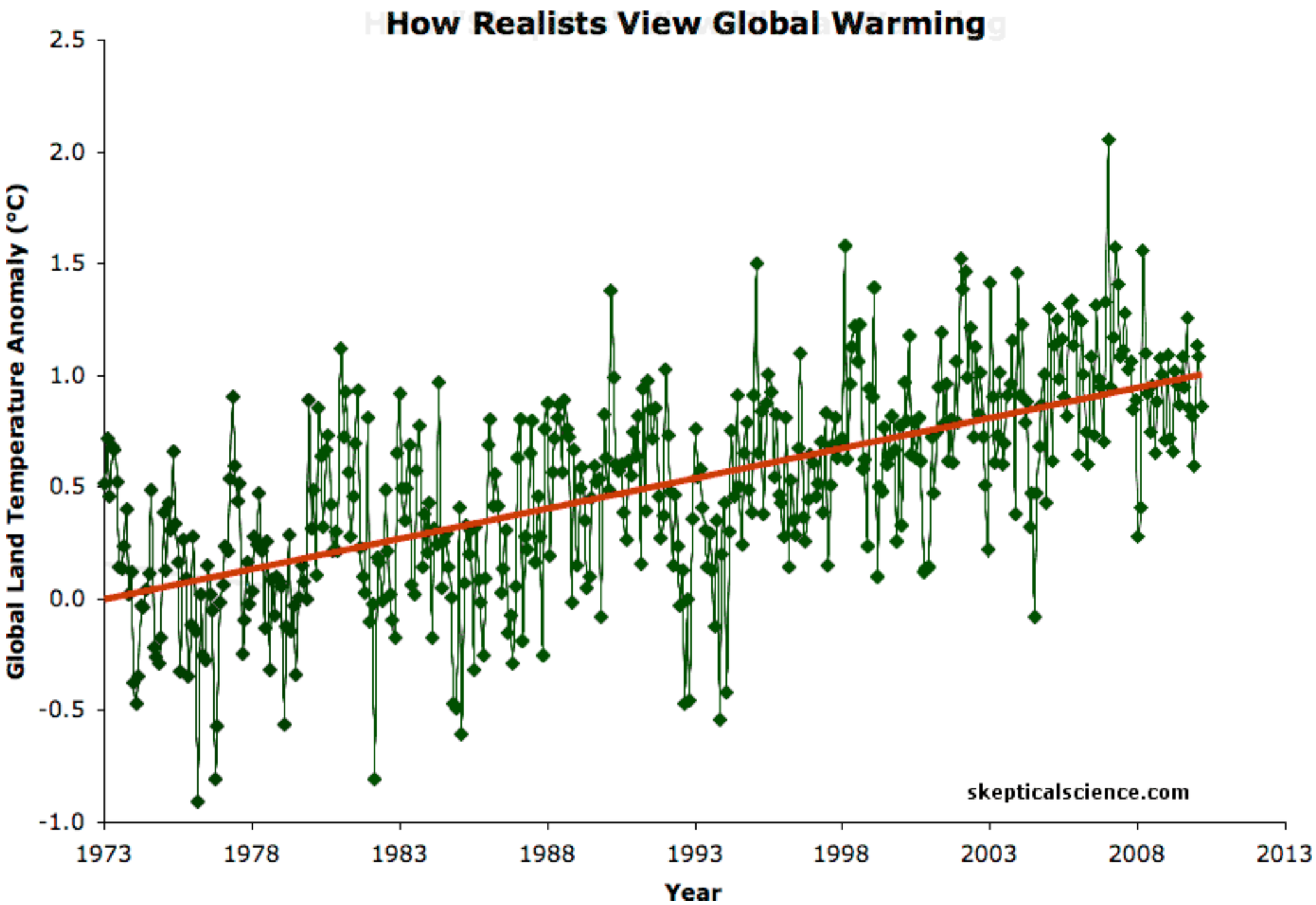


Treacherous graphs



How to lie with statistics (1989)

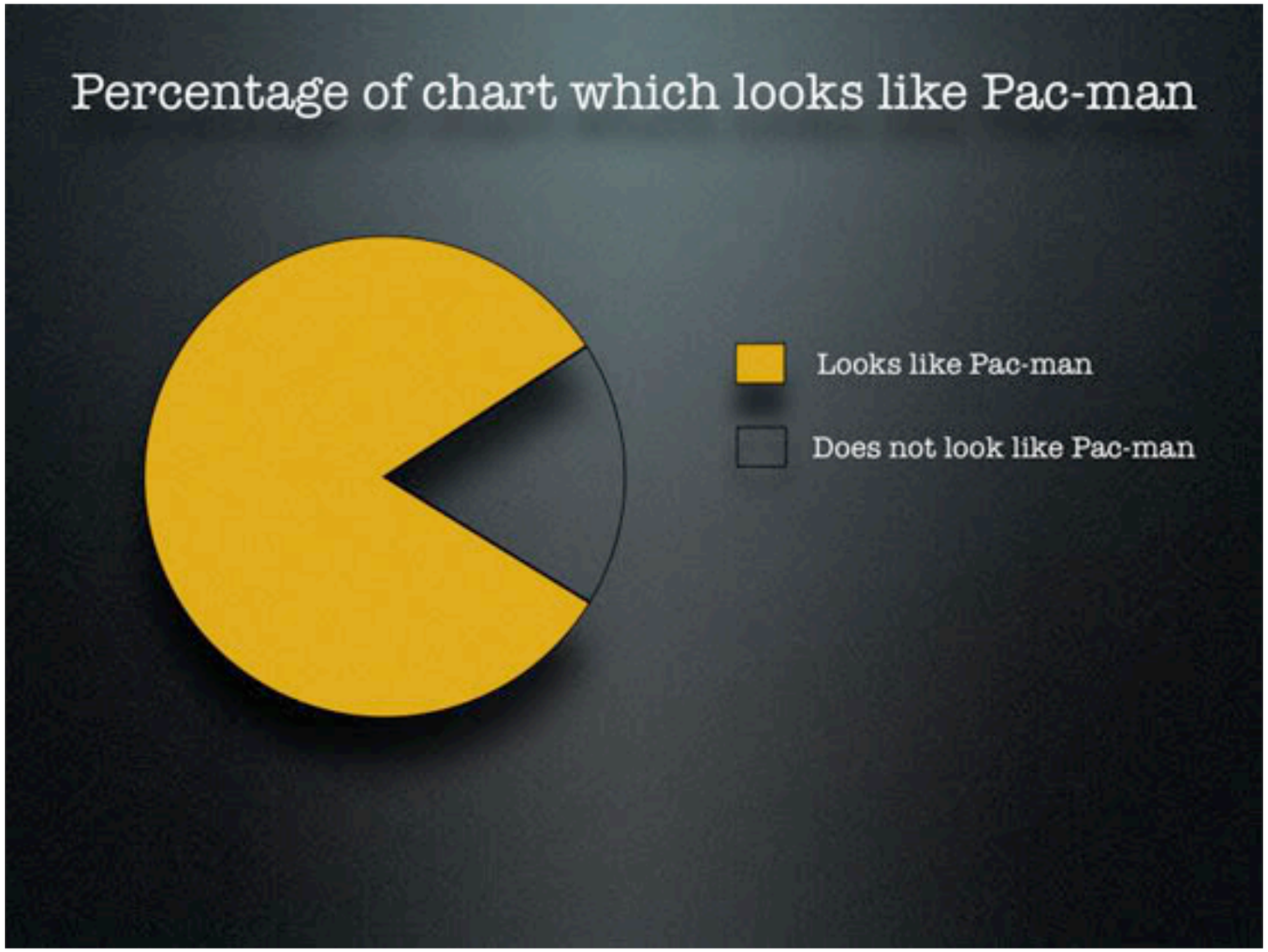
Treacherous graphs



Global land temperature
Skepticalscience (2012)

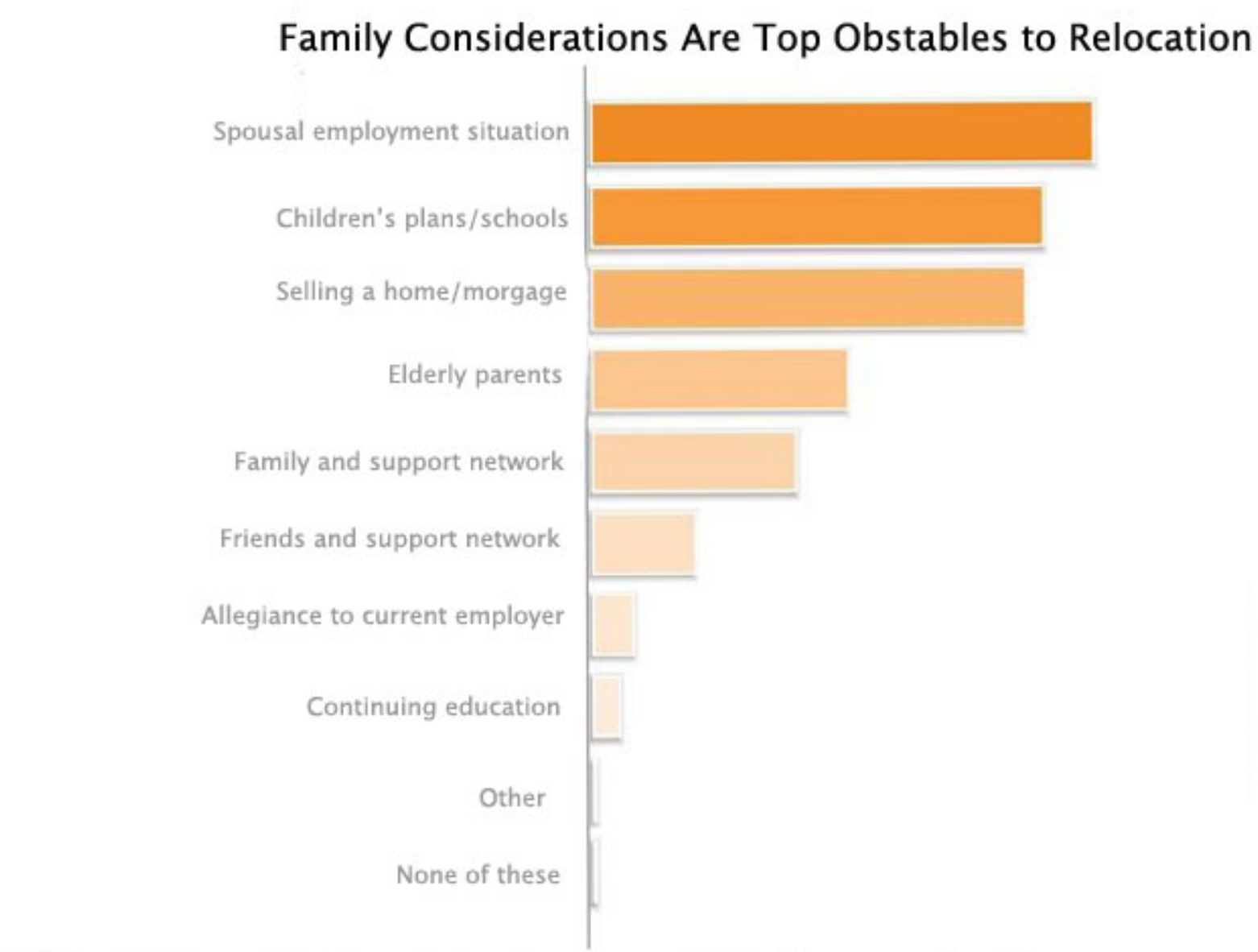
Some better examples

Examples



A. Gelman (2002)

Examples



http://compensationinsider.com/a-good-graph-is-worth-a-thousand-words/

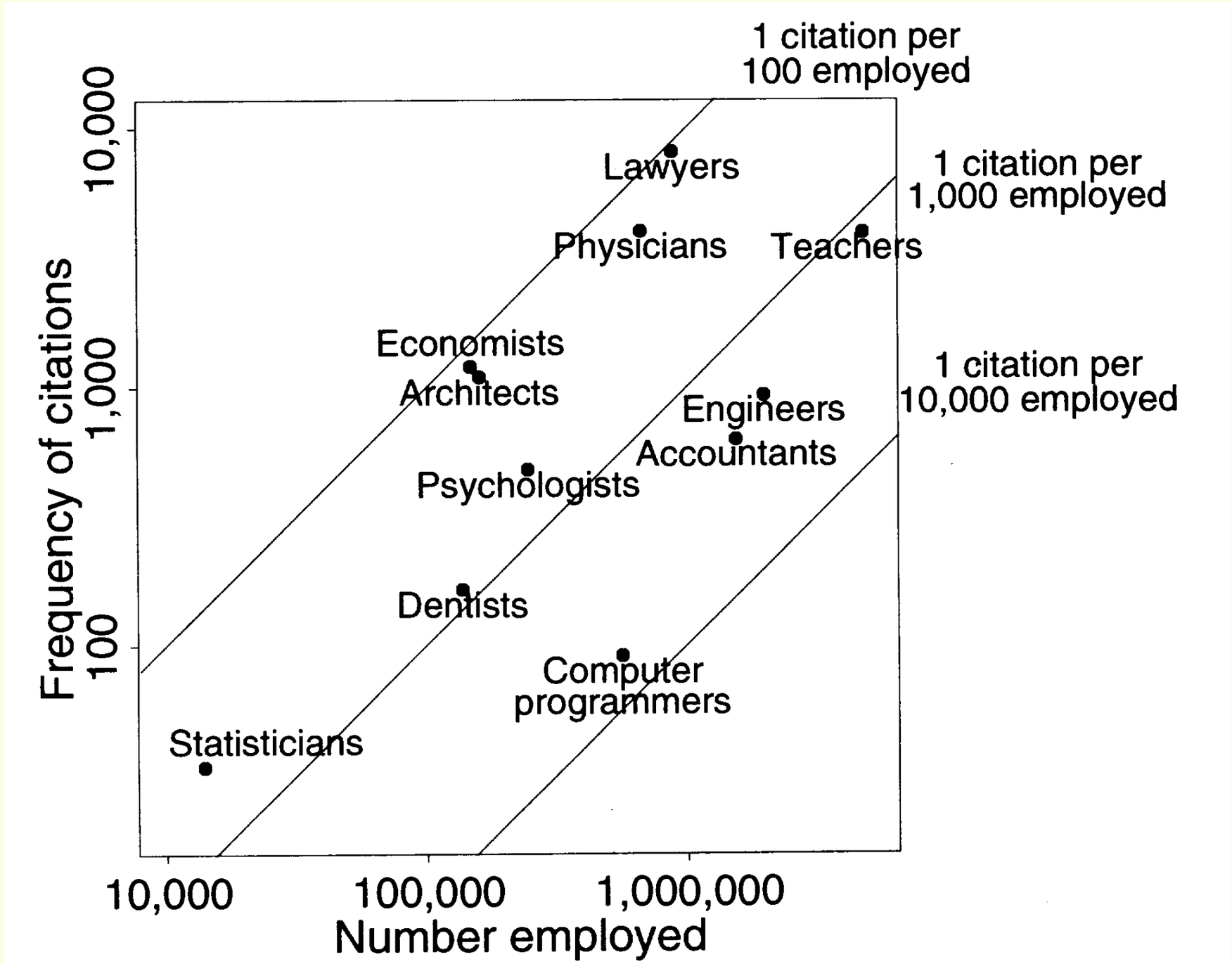
How to turn this into a good graph ?

- Counts of citations of various professions in the New York Times

Profession	*Frequency of recent citations*	*1996 total employed (1,000)*	*Relative frequency*
Lawyers	8101	880	9.2
Economists	1201	148	8.1
Architects	1097	160	6.9
Physicians	3989	667	6.0
Statisticians	34	14	2.4
Psychologists	479	245	2.0
Dentists	165	137	1.2
Teachers (not university)	3938	4724	0.8
Engineers	934	1960	0.5
Accountants	628	1538	0.4
Computer programmers	91	561	0.2
Total	20,657	11,034	1.9

A. Gelman et al. 2002

How to turn this into a good graph ?



A. Gelman et al. 2002

Graphics

For examples of beautiful or inspiring graphics, see

- https://informationisbeautiful.net
- http://www.storytellingwithdata.com
- https://www.edwardtufte.com/tufte/
- https://store.xkcd.com/collections/posters
- https://stats.stackexchange.com/questions/423/what-is-your-favorite-data-analysis-cartoon

One last thing…

- Fill free space **intelligently**
- Fonts can be 10 to 20% smaller than in main text. **But not less!**
- Label axes
- The legend is here only to **explain** what is on the figure, NOT to comment on it.

Where should I publish ?

Different types of article : choose the proper one

- **Journal paper**: presents final original results, careful description of technique etc., refereed
- **Special issue** : in general, following a conference. More focused, but with hard deadlines.
- **“Letter to the Editor” or Rapid communication:** short research paper that requires rapid publication (sometimes esteemed higher than regular papers) refereed
- **Review paper**: summarises, evaluates and synthesises results already published elsewhere. Generally on invitation only. No description of personal achievements.
- **Proceedings paper**: Often preliminary results. Short, sometimes speculative and often not as important as a journal paper
- **PhD thesis:** Combination of above, but much more challenging !

Where to publish ?

Criteria to take into account

- What is the audience of the Journal ?
- In what countries will the journal be mostly read ?
- Impact Factor
- Publication charges
- Quality of the editorial procedure: how many reviewers ?
- How long does it take to get the article online ?
- Details: online version, colour vs black/white figures
- …

Impact factor

- Impact factor
  = average of citations per publication of the last 2-3 years
  = proxy for the relative importance of a journal within its field

$$IF_y = \frac{\text{citations}_{y-1} + \text{citations}_{y-2}}{\text{publications}_{y-1} + \text{publications}_{y-2}}$$

- Usually provided by Scopus or by Web of Science
- See: https://www.scijournal.org

Impact factor : examples (2018)

- Acta Geophysica : 0.9
- Annual Review Biochemistry : 19.9
- Applied Physics Letters : 3.4
- Astronomy & Astrophysics : 5.2
- Astrophysical Journal : 5.5
- Atmospheric Research : 3.8
- Combustion and Flame : 3.7
- Fuzzy Sets and Systems : 2.7
- Geophysical Research Letters : 4.3
- Int Journal Modern Sciences and Technology : 0.7 (*predatory*)
- Int Journal Science and Nature : 0.9 (*predatory*)
- International Journal of Engineering Science : 4.4
- Journal of Geophysical Research : 3.31
- Journal of Hazardous materials : 6.6
- Living Reviews in Solar Physics : 12.5
- Nature : 40.1
- Nature Physics : 22.8
- Nature Geoscience : 13.9
- New England Journal Medicine : 72.4
- Physical Review Letters : 8.4
- Physical Review E : 2.3
- Plasma Processes and Polymers : 2.8
- Plasma Sources Science and Tech : 3.3
- Proc Nat'l Academy Sciences : 9.6
- Science : 37.2

Impact factor : caution !

- Impact factor
  - cannot be used to compare across disciplines
  - is highly skewed by scoops and controversial articles
  - is moderately correlated with the quality of the results

- High impact factor $\not\Rightarrow$ High quality journal
- High impact factor $\not\Leftarrow$ High quality journal

One last thing...

Non-refereed journals
or low-IF journals
usually are not considered for
promotions or for job applications.

When/what to publish ?

Important questions to ask yourself before writing

- What is your topic of discussion?
- Why is it important?
- How is it related to previous work in the field?
- What is new or different about your contribution?

Careful planning (before writing) will help you save a lot of time.

When to publish ?

- What is the best time to write my article ?

When I have collected all my results ?
When I have the idea ?
When I have finished analysing all the results ?
...

When to publish ?

My study is fully completed

- ***Advantage*** **: results have had time to mature**
- ***Advantage*** **: less risk that someone else will steal my results**
- ***Disadvantage*** **: work may never get published, long article = extra work**

I am still working on my study

- ***Advantage*** **: ideas are still fresh + writing may give new ideas**
- ***Disadvantage*** **: contributes to publication inflation, results may turn out to be wrong by lack of hindsight**

When to publish ?

The best publications generally are those which clearly express

one single,
simple,
novel idea
in an **elegant**
and **pertinent** way.

When to publish ?

KISS = Keep it simple, stupid !

- Focus on one single and strong message
- Avoid cluttering your message with too many results

When to publish ?

Too many messages will kill your message

Writing Style

Style = a difficult balance

original and catchy

clear, concise and factual

difficult balance

6 frequent problems

1. Subjects
2. Nominalizations
3. Flow
4. Passive vs active voice
5. Time (past/present/future)
6. UK vs US English

After “Scientific Writing: Clarity, Conciseness, and Cohesion” by Nathan Sheffield, Duke University (2011)

Problem 1 : Subjects

Exercise 1

What is wrong with this text ?

"The assumptions that all sites evolve at one of two evolutionary rates (conserved and nonconserved), that these rates are uniform across the genome, that sites evolve independently conditional on whether they are in conserved or nonconserved regions, and that the phylogenetic models for conserved and nonconserved regions have the same branch-length proportions, base compositions, and substitution patterns, all represent oversimplications of the complex process of sequence evolution in eukaryotic genomes."

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Long distance between **subject** and **verb**

Exercise 1

What is wrong with this text ?

"The assumptions that all sites evolve at one of two evolutionary rates (conserved and nonconserved), that these rates are uniform across the genome, that sites evolve independently conditional on whether they are in conserved or nonconserved regions, and that the phylogenetic models for conserved and nonconserved regions have the same branch-length proportions, base compositions, and substitution patterns, all represent oversimplications of the complex process of sequence evolution in eukaryotic genomes."

Context comes after the **main ideas**

Exercise 1

What is wrong with this text ?

"The assumptions that all sites evolve at one of two evolutionary rates (conserved and nonconserved), that these rates are uniform across the genome, that sites evolve independently conditional on whether they are in conserved or nonconserved regions, and that the phylogenetic models for conserved and nonconserved regions have the same branch-length proportions, base compositions, and substitution patterns, all represent oversimplications of the complex process of sequence evolution in eukaryotic genomes."

Complex subject

Exercise 1

What is wrong with this text ?

"The assumptions that all sites evolve at one of two evolutionary rates (conserved and nonconserved), that these rates are uniform across the genome, that sites evolve independently conditional on whether they are in conserved or nonconserved regions, and that the phylogenetic models for conserved and nonconserved regions have the same branch-length proportions, base compositions, and substitution patterns, all represent oversimplications of the complex process of sequence evolution in eukaryotic genomes."

Implied **actions** versus **verbs**

Problem 1 : Subjects

Problem : subjects and verbs are often too far apart

- English readers expect doers to be near their actions
- Use concise sentences whenever possible

Problem 2 : Nominalisations

Problem 2 : Nominalisations

Problem : overabundance of nominalisations

e.g. *division* versus *to divide*

- English readers expect actions to be in verbs.
- Nominalizations are actions that appear in parts of a sentence other than a verb (e.g. in nouns or adjectives)

Exercise 2

Correct this

"The assumption that all RNAs are poly-adenylated is an oversimplification of the transcription process."

Exercise 2

Correct this

"The assumption that all RNAs are poly-adenylated is an oversimplification of the transcription process."

Solution

"The model oversimplifies the transcription process because it assumes that all RNAs are polyadenylated."

Put action in verbs = avoid nominalisations

Problem 3 : Flow

Problem 3 : Flow

Problem : poor flow in the text (lack of cohesion)

- A cohesive sentence links with neighbouring sentences usually by putting familiar/old ideas first and ending with new ideas.

- Avoid disrupting the flow by:
  – Starting with unfamiliar ideas or words
  – Ending with backwards-linking ideas

Exercise 3

Identify old and new information

"Farmers try to provide optimal growing conditions for crops by using soil additives to adjust soil pH. Garden lime, or agricultural limestone, is made from pulverized chalk, and can be used to raise the pH of the soil. Clay, which is a naturally acidic soil type, often requires addition of agricultural lime."

Exercise 3

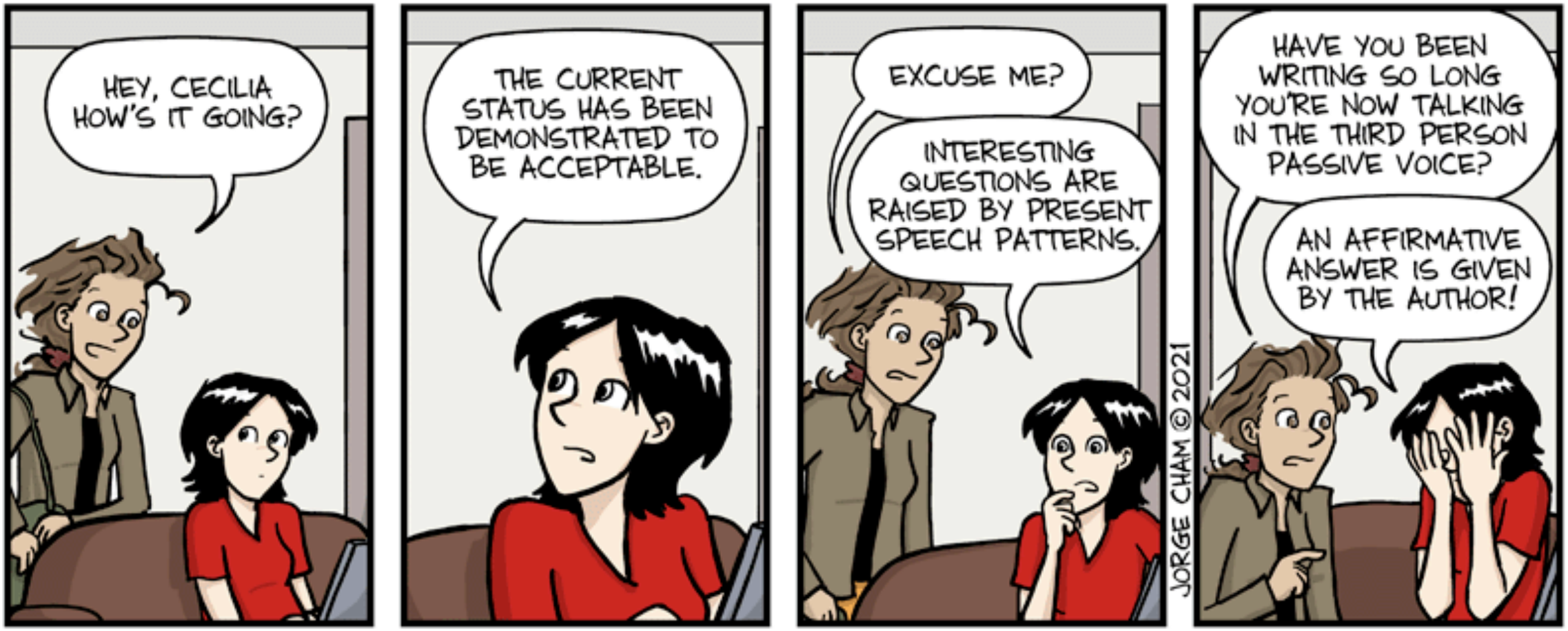
A better version

"Farmers try to provide optimal growing conditions for crops by using soil additives to adjust soil pH. One way to raise the pH of the soil is an additive made from pulverized chalk called garden lime or agricultural limestone. Agricultural limestone is often added to naturally acidic soils, such as clay."

Put familiar information first

Problem 4 : Passive vs Active

Problem 4 : passive vs active



Problem 4 : passive vs active

The dog kicks the ball

Active

The ball is kicked by the dog

Passive

Problem 4 : passive vs active

- **Active** voice
  - The subject of the sentence performs the action
  - The subject acts
  - Example : *I stole the money*

- **Passive** voice
  - The subject of the sentence receives the action of the verb
  - The subject is acted upon
  - Example: *The money was stolen by me*

Problem 4 : passive vs active

- Active voice emphasizes the author responsibility

***We** did not attempt to perform this experiment because…*

Problem 4 : passive vs active

- Active voice improves readability

The hypothesis that higher pressure causes thinner silicon deposition was rejected by the manufacturer

vs

The manufacturer rejected the hypothesis that higher pressure causes thinner silicon deposition

Problem 4 : passive vs active

- Passive voice : Sounds more neutral and focuses more on the result than on the actor

The team did not update the last table because…

vs

The last table was not updated because…

Problem 4 : passive vs active

- Passive voice : Allows to eliminate the actor

We did not attempt to perform this experiment because…

vs

No attempt was made to perform this experiment because…

Problem 4 : passive vs active

- Passive voice : emphasises what was found, NOT who did the finding

We determined that annealing the thin films at 700°C produced voids and increased surface roughness.

vs

Voids and increased surface roughness were observed in the thin films annealed at 700°C.

Problem 4 : passive vs active

- But passive voice has many **disadvantages**
  - It reverses the order of the sentence (A-B vs. B-A)
    I lit the candle <—> *The candle was lit by me*
  - It can eliminate the actor (causing ambiguity)
    No attempt was made to bypass the pressure valve
  - It often increases length

Problem 4 : passive vs active

Journal editors encourage the use of active voice

keep 10-30% in passive voice

Exercise 4

Correct this

"The substrate surface was mapped using an Atomic Force Microscope"

Exercise 4

Correct this

"The substrate surface was mapped using an Atomic Force Microscope"

Solutions

"We mapped the substrate surface using an Atomic Force Microscope."

"The Atomic Force Microscope mapped the substrate surface."

I or We ?

- Am I allowed to use “I” or “We” ?
- If I’m the only author, should I use “I” or “We” ?

Problem 4 : passive vs active

- It is ok to start some sentences with ***I*** or ***We***
- But don't use them excessively

"After all, human agents are responsible for designing experiments, and they are present in the laboratory; writing awkward phrases to avoid admitting their responsibility and their presence is an odd way of being objective."—
Jane J. Robinson, *Science* 7 June 1957: 1160.

Problem 4 : passive vs active

Passive voice can still lead to the Nobel prize...

PHYSICAL REVIEW VOLUME 108, NUMBER 5 DECEMBER 1, 1957

Theory of Superconductivity*

J. BARDEEN, L. N. COOPER,† AND J. R. SCHRIEFFER‡
Department of Physics, University of Illinois, Urbana, Illinois

(Received July 8, 1957)

A theory of superconductivity is presented, based on the fact that the interaction between electrons resulting from virtual exchange of phonons is attractive when the energy difference between the electrons states involved is less than the phonon energy, $\hbar\omega$. It is favorable to form a superconducting phase when this attractive interaction dominates the repulsive screened Coulomb interaction. The normal phase is described by the Bloch individual-particle model. The ground state of a superconductor, formed from a linear combination of normal state configurations in which electrons are virtually excited in pairs of opposite spin and momentum, is lower in energy than the normal state by amount proportional to an average $(\hbar\omega)^2$, consistent with the isotope effect. A mutually orthogonal set of excited states in one-to-one correspondence with those of the normal phase is obtained by specifying occupation of certain Bloch states and by using the rest to form a linear combination of virtual pair configurations. The theory yields a second-order phase transition and a Meissner effect in the form suggested by Pippard. Calculated values of specific heats and penetration depths and their temperature variation are in good agreement with experiment. There is an energy gap for individual-particle excitations which decreases from about $3.5kT_c$ at $T=0°K$ to zero at T_c. Tables of matrix elements of single-particle operators between the excited-state superconducting wave functions, useful for perturbation expansions and calculations of transition probabilities, are given.

Exercise 5

- What is wrong in this text ?

  Using a Beer-Lambert approach, we compute the primary production of excited and ionized states due to photoabsorption, neglecting the secondary production that is due to photoelectron impacts as well as to precipitated suprathermal electrons. Ions sputtered from the surface were also neglected. Computations are performed at the equator and close to the pole, in the same conditions as during the Galileo flyby. From the excitations, we are computing the radiative relaxation leading to the atmospheric emissions. We also proposed a simple chemical model to retrieve the stationary electron density. There are two main results…

Exercise 5

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  Using a Beer-Lambert approach, we **compute** the primary production of excited and ionized states due to photoabsorption, neglecting the secondary production that **is** due to photoelectron impacts as well as to precipitated suprathermal electrons. Ions sputtered from the surface **were** also neglected. Computations **are performed** at the equator and close to the pole, in the same conditions as during the Galileo flyby. From the excitations, we **are computing** the radiative relaxation leading to the atmospheric emissions. We also **proposed** a simple chemical model to retrieve the stationary electron density. There **are** two main results…

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Problem 5 : Time

Problem 5 : time

Problem : check for consistent times

- Avoid a mix of past/present/future tense
- Highlight verbs to check this

Problem 6 : UK or US English ?

Problem 6 : UK vs US

- Your text should be either in US English or UK English, not a mix of the two
- US English is more frequently used, especially outside of Europe

Exercise 6

Is this UK or US English ? Convert into the other one

The center of the 15-meter wide radiated zone revealed high ionization levels, leading to significant deviations from modeled air resistivity. At first, we though that this was a property of the local medium. However, further investigation revealed that this could have been an artifact of the sampling procedure, which was biased toward the central part of the zone. Consequently, the whole zone has to be reexamined and the possible role of sulfur-rich constituents has yet to be carefully evaluated.

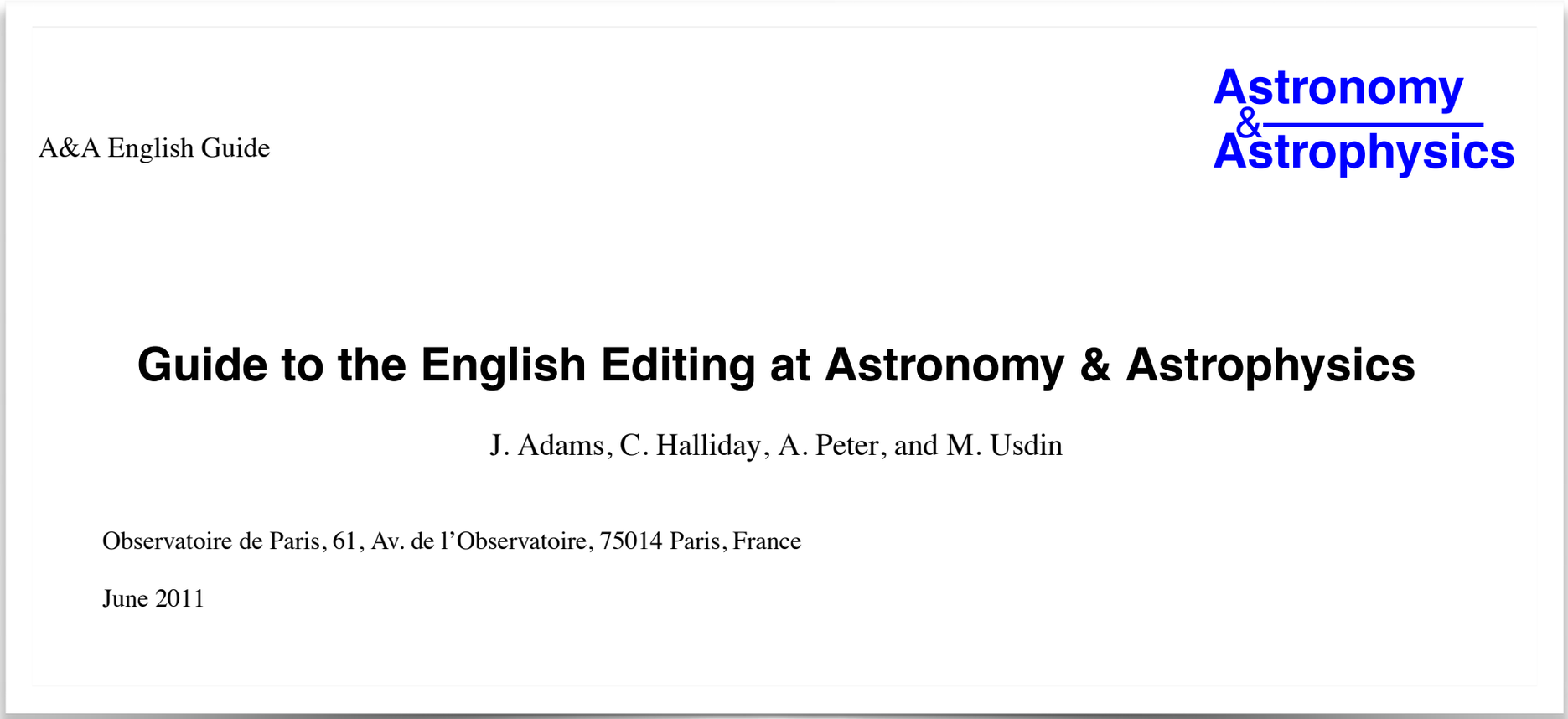
Exercise 6

Is this UK or US English ? Convert into the other one

The cent*re* of the 15-met*re* wide radiated zone revealed high ioni*s*ation levels, leading to significant deviations from mode*ll*ed air resistivity. At first, we though that this was a property of the local medium. However, further investigation revealed that this could have been an art*e*fact of the sampling procedure, which was biased toward*s* the central part of the zone. Consequently, the whole zone has to be reexamined and the possible role of sul*ph*ur-rich constituents has yet to be carefully evaluated.

Problem 6 : UK vs US

Much more information in this document (see on Celene)



A&A English Guide

Astronomy & Astrophysics

Guide to the English Editing at Astronomy & Astrophysics

J. Adams, C. Halliday, A. Peter, and M. Usdin

Observatoire de Paris, 61, Av. de l'Observatoire, 75014 Paris, France

June 2011

That or Which ?

One example: that or which ?

- Which is the correct formulation ?

1. Dogs which bark scare me.
2. Dogs that bark scare me.
3. Dogs, which bark, scare me.
4. Dogs, that bark scare me.

One example: that or which ?

- Simple rule (with some exceptions) : If removing the words that follow change the meaning of the sentence, use "*that*" Otherwise, "*which*" is fine

  Dogs *that* bark scare me.

  Dogs, *which* make great pets, bark a lot.

- But the meaning can also be different

  Our house, *which* has two cellars, is located in Orléans.
  Our house *that* has two cellars is located in Orléans.

One example: that or which ?

- Important: “*which*" is always preceded by a comma; “*that*” is never preceded by a comma.

- In scientific journals, “*which*” is used only when the information following is added and is not essential to the main idea of a sentence (e.g. something you may have put into parenthesis)

Some exercises

Exercise 7

Improve this sentence

This component chiefly involves a description and quantitative analysis of the study's data collection process.

Exercise 7

Improve this sentence

This component chiefly involves a description and quantitative analysis of the study's data collection process.

This component describes and quantitatively analyzes the data collection process.

Exercise 8

Improve this sentence

Detailed analyses of the evolutionary features of different types of regulatory elements are an important area for future research.

Exercise 8

Improve this sentence

Detailed analyses of the evolutionary features of different types of regulatory elements are an important area for future research.

Future research should analyze the evolutionary features of different types of regulatory elements.

Exercise 9

Improve this sentence

Improvements are expected in the predictive power of all the scores being computed on multispecies alignments.

Exercise 9

Improve this sentence

Improvements are expected in the predictive power of all the scores being computed on multispecies alignments.

We expect to improve the predictive power of our multispecies alignment scores.

Exercise 10

Improve this sentence

Some astonishing questions about the nature of the universe have been raised by scientists studying the nature of black holes in space. The collapse of a dead star into a point perhaps no larger than a marble creates a black hole.

Exercise 10

Improve this sentence

Some astonishing questions about the nature of the universe have been raised by scientists studying the nature of black holes in space. The collapse of a dead star into a point perhaps no larger than a marble creates a black hole.

Scientists studying black holes have raised some astonishing questions about the universe. A black hole is created by the collapse of a dead star into a point perhaps no larger than a marble.

Exercise 11

Improve this sentence

We identified genes that are differentially expressed between species. A phylogenetic tree based on the number of differentially expressed genes between species recapitulates their known phylogeny.

Exercise 11

Improve this sentence

We identified genes that are differentially expressed between species. A phylogenetic tree based on the number of differentially expressed genes between species recapitulates their known phylogeny.

We identified genes that are differentially expressed between species. The number of differentially expressed genes can be used to build a phylogenetic tree that recapitulates the known phylogeny.

To summarise

- **KISS** always !
- Omit unnecessary words
- Put actions in verbs: find nominalizations and see if they should be converted to verbs.
- Place verbs near subjects: highlight subjects and verbs and check for subject-verb distance
- Put familiar information first: check each sentence for old and new information.

There can be exceptions

Comparative Mobility of Halogens in Reactions of Dihalobenzenes with Potassium Amide in Ammonia

J. F. BUNNETT[1a] AND FRANCIS J. KEARLEY, JR.[1b]

Metcalf Chemical Laboratories, Brown University, Providence, Rhode Island 02912

Received June 22, 1970

Dihalobenzenes in which the two halogens are unlike release two different halide ions, generally in unequal amounts, on reaction with KNH_2. From *m*-dihalobenzenes, the relative yields of halide ion are in the order I > Br > Cl, but *o*- and *p*-dihalobenzenes give more complex patterns because either of two steps in the aryne-forming reaction may be rate limiting. Under reaction conditions, haloanilines furnish little halide ion. When potassium anilide is the base, the heavier halogen is in all cases released preferentially.

Reactions of potassium amide
With halobenzenes in ammonia
Via benzyne intermediates occur.[3,4]
Bergstrom and associates[5] did report,
Based on two-component competition runs,
Bromobenzene the fastest to react,
By iodobenzene closely followed,
The chloro compound lagging far behind,
And fluorobenzene to be quite inert
At reflux (−33°).
Reactions with *para*-dihalobenzenes,
In which the halogens were not the same,
The same order of mobility revealed,
But differences in reactivity
Were somewhat less in magnitude.
The irregular mobility rank
Explanation finds in the mechanism
Whereby arynes are formed.[3,4] There are two steps:
Abstraction of the ortho proton
And then expulsion of the halogen
From the anion intermediate.
In Scheme I the mechanism is set forth.
Is faster in the opposite order.
According to the evidence, for both
Iodine and bromine step 1 limits rate.[3]
But on the other hand, the setting free
Of halogen determines total rate
For chlorine and fluorine atoms on the ring.
We have repeated the experiments
With dihalobenzenes of Bergstrom's group.
They are extended to the isomers
Meta and ortho, and to the action
Of potassium anilide reagent.
Throughout, halide ions have been determined
By potentiometric titration
In which end points for diverse halide ions
Are discrete, and easy to recognize.
Nitrogenous products were not assayed.

Results

Data for reactions of all nine mixed
Dihalobenzenes (excluding fluorine)
With four equivalents of amide base
Are set forth in Table I. Reactions

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elines for options on how to legitimately share published articles.

There can be exceptions

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(2) NOTE FROM EDITOR.—Although we are open to new styles and formats for scientific publication, we must admit to surprise upon receiving this paper. However, we find the paper to be novel in its chemistry, and readable in its verse. Because of the somewhat increased space requirements and possible difficulty to some of our nonpoetically inclined readers, manuscripts in this format face an uncertain future in this office. However, we take this opportunity to encourage readers and authors to examine carefully a new format represented by the articles on pages 3591–3646 and the *Editor's Notice* in the November 1970 issue of this journal.

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The chlo
And fluo
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One last thing

Say what you mean and mean what you say

Some of the best scientific articles turn the text into a narrative, as if you were telling a story.

Make your article attractive !

Formatting

Formatting

Your layout is your business card

Which font ?

1. A New Mini-Moon Was Found Orbiting Earth. There Will Be More. The object, a car-size asteroid called 2020 CD3, won't be here for long, and new telescopes will help us spot more of these objects.

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4. A New Mini-Moon Was Found Orbiting Earth. There Will Be More. The object, a car-size asteroid called 2020 CD3, won't be here for long, and new telescopes will help us spot more of these objects.

New York Times 2/2020

Fonts

Some elementary rules

- Fonts with serif (Times, Georgia, Bookman, …) are more confortable to read on the long term than fonts without serif (Helvetica, Calibri, Verdana, …)
- Avoid using more than 2 different fonts
- Avoid constantly changing font size/style/type
- Never write in capitals

How to make a text more readable ?

By changing style, using different fonts *and alternating styles.* You can also use different font sizes, or vary colours. BUT THE READER WILL EVENTUALLY **get annoyed and upset.**

Ethics

Example

You joined Prof. Jones's lab at the beginning of a summer program, and you were instructed by him to follow experimental procedures from the lab notebook of last summer program's participant, Jane.

However, Jane's notebook was so badly written (e.g., missing important pieces of information, hard to read) that you were unable to use it. Upon showing the notebook to Prof. Jones at the beginning of the summer, you saw firsthand his surprise, disgust, and anger about the state of the notebook.

Prof. Jones explained how to re-do the work, and he put together a scientific paper based on your results at the end of the summer. He has just emailed you the first draft of this paper for your comments. You notice that his name is first and that Jane's name is not listed as an author on this paper.

What is unethical here ? What would you do ?

Cindy Palinkas

Ethics

- Peer review is today increasingly threatened by fraudulous behaviour
- There are different kinds of problems
  - misconduct
  - conflicts of interest
  - plagiarism
  - falsification
  - fraud
  - predatory journals
  - and more

see: https://publicationethics.org/

Misconduct accounts for the majority of retracted scientific publications

Ferric C. Fang[a,b,1], **R. Grant Steen**[c,1], **and Arturo Casadevall**[d,1,2]

Departments of [a]Laboratory Medicine and [b]Microbiology, University of Washington School of Medicine, Seattle, WA 98195; [c]MediCC! Medical Communications Consultants, Chapel Hill, NC 27517; and [d]Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY 10461

Edited by Thomas Shenk, Princeton University, Princeton, NJ, and approved September 6, 2012 (received for review July 18, 2012)

A detailed review of all 2,047 biomedical and life-science research articles indexed by PubMed as retracted on May 3, 2012 revealed that only 21.3% of retractions were attributable to error. In contrast, 67.4% of retractions were attributable to misconduct, including fraud or suspected fraud (43.4%), duplicate publication (14.2%), and plagiarism (9.8%). Incomplete, uninformative or misleading retrac-

published by the authors of a manuscript in the *Journal of Cell Biology* stated that "In follow-up experiments . . . we have shown that the lack of FOXO1a expression reported in figure 1 is not correct" (11). A subsequent report from the Office of Research Integrity states that the first author committed "research misconduct by knowingly and intentionally falsely reporting ... that

PNAS 109 (2012)

Ethics

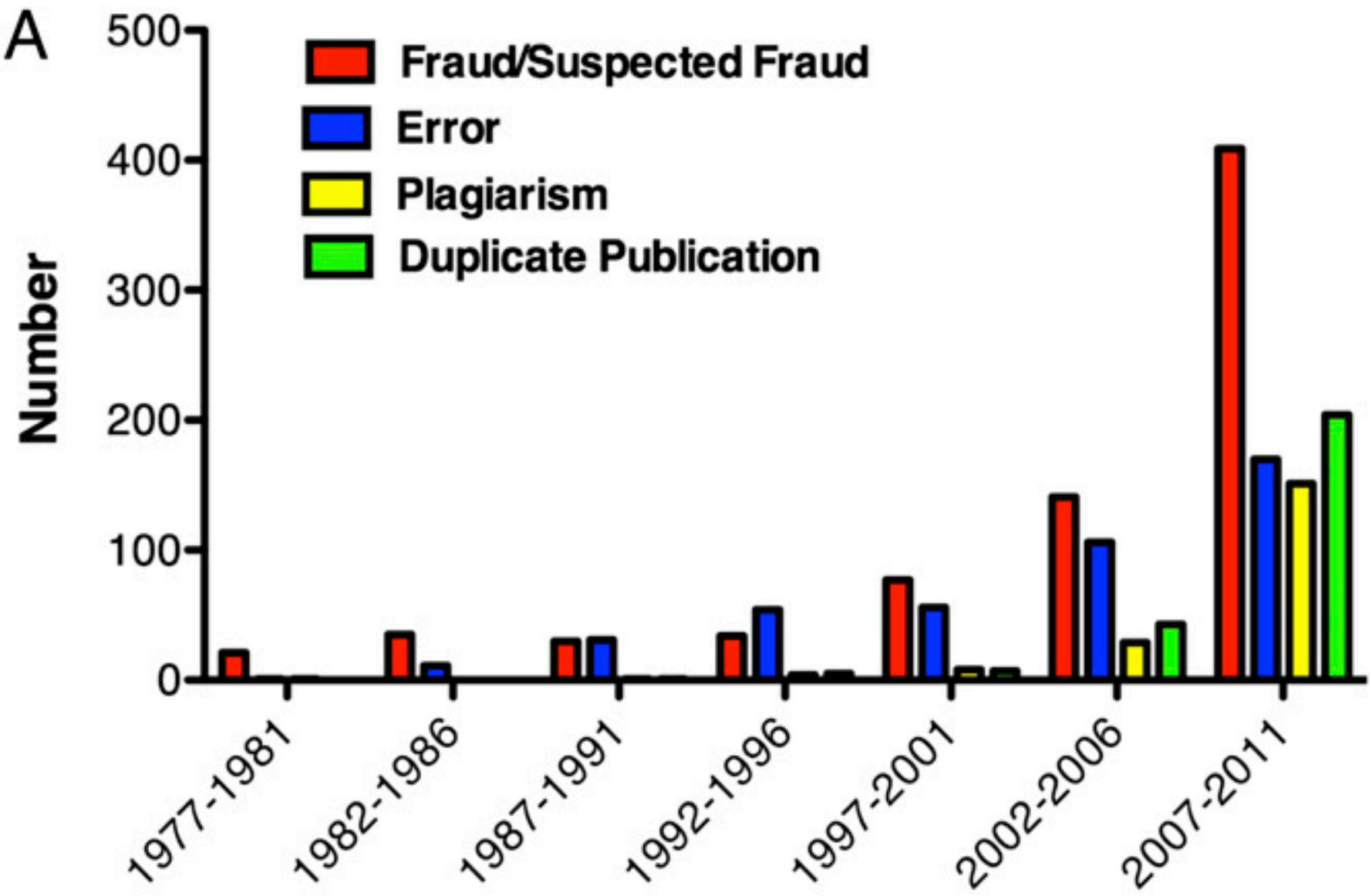

Fig. 1. (*A*) Number of retracted articles for specific causes by year of retraction. (*B*) Percentage of published articles retracted for fraud or suspected fraud by year of publication.

Plagiarism

The top 4 reasons for retractions

- Mistakes
- Self-Plagiarism
- Plagiarism
- Fabrication or Falsification

Plagiarism: example

NDT & E International
Volume 38, Issue 6, September 2005, Pages 453-458

New matching pursuit-based algorithm for SNR improvement in ultrasonic NDT

N. Ruiz-Reyes, P. Vera-Candeas, J. Curpián-Alonso, R. Mata-Campos, J.C. Cuevas-Martínez

Show more

https://doi.org/10.1016/j.ndteint.2004.12.001

Get rights and content

Abstract

In this paper a fast and efficient matching pursuit-based algorithm is proposed for SNR improvement in ultrasonic NDT of highly scattering materials. The proposed algorithm utilizes time-shifted Morlet functions as dictionary elements because they are well matched with the ultrasonic pulse echoes obtained from the transducer used in the experiments. The proposed algorithm is fast enough to be used in the signal processing stage of real time inspection systems. Computer simulation has been performed to verify the SNR improvement for diverse ultrasonic waves embodied in high-level synthetic grain noise. This improvement is also experimentally verified using ultrasonic traces acquired from a carbon fibre reinforced plastic material. Numerical results show meaningful SNR improvements for low input SNR ratios (below 0 dB).

published in September 2005 in
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published in September 2005 in NDT&E International

Signal Processing
Volume 86, Issue 5, May 2006, Pages 962-970

RETRACTED: Matching pursuit-based approach for ultrasonic flaw detection

N. Ruiz-Reyes [a], P. Vera-Candeas [a], J. Curpián-Alonso [a], J.C. Cuevas-Martinez [a], F. López-Ferreras [b]

Show more

https://doi.org/10.1016/j.sigpro.2005.07.019

Referred to by N. Ruiz-Reyes, P. Vera-Candeas, J. Curpián-Alonso, J.C. Cuevas-Martinez, F. López-Ferreras

Retraction notice to: “Matching pursuit-based approach for ultrasonic flaw detection”
Signal Processing, Volume 87, Issue 5, May 2007, Pages 1172

Download PDF

This article has been retracted at the request of the Editor-in-Chief and Publisher. Please see http://www.elsevier.com/locate/withdrawalpolicy.

Reason: This article is virtually identical to the previously published article:“New matching pursuit-based algorithm for SNR improvement in ultrasonic NDT”, *Independent Nondestructive Testing and Evaluation International,* volume 38 (2005) 453–458 authored by N. Ruiz-Reyes, P. Vera-Candeas, J. Curpián-Alonso, R. Mata-Campos and

published in May 2006 in Signal Processing, retracted in May 2007

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Abstract

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published in May 2006 in Signal Processing, retracted in May 2007

Different forms of plagiarism

- Use graphic material that is not your own, with citing its sources
- Repeat someone else's words without using quotation marks
- Paraphrase someone else's ideas improperly
- Describe findings or ideas that are not your own

after: http://www.bio.davidson.edu/dept/plagiarism.html

Paraphrasing often leads to plagiarism

- Paraphrasing = repeat someone else's ideas while not copying verbatim.
- Typically
  - Use phrases from the original source without enclosing them in quotation marks
  - Emulate sentence structure even when using different wording
  - Emulate paragraph organization even when using different wording or sentence structure.

after: http://www.bio.davidson.edu/dept/plagiarism.html

Plagiarism : example

Original version

Few laboratory creatures have had such a spectacularly successful and productive history as Drosophila. It first entered laboratories about 1900, revealed its talent for experimental genetics to Thomas Hunt Morgan and his students at Columbia University in the early 1910s, and after some ups and downs in status is still going strong almost a century later.

(from Kohler, R.E. 1994. The Lords of the Fly. The University of Chicago Press, 321 pages.)

Paraphrased version

Despite some ups and downs in status, nearly a century after the fly revealed its talent to Thomas Hunt Morgan and his students, Drosophila genetics research continues its spectacularly successful history (Kohler, 1994).

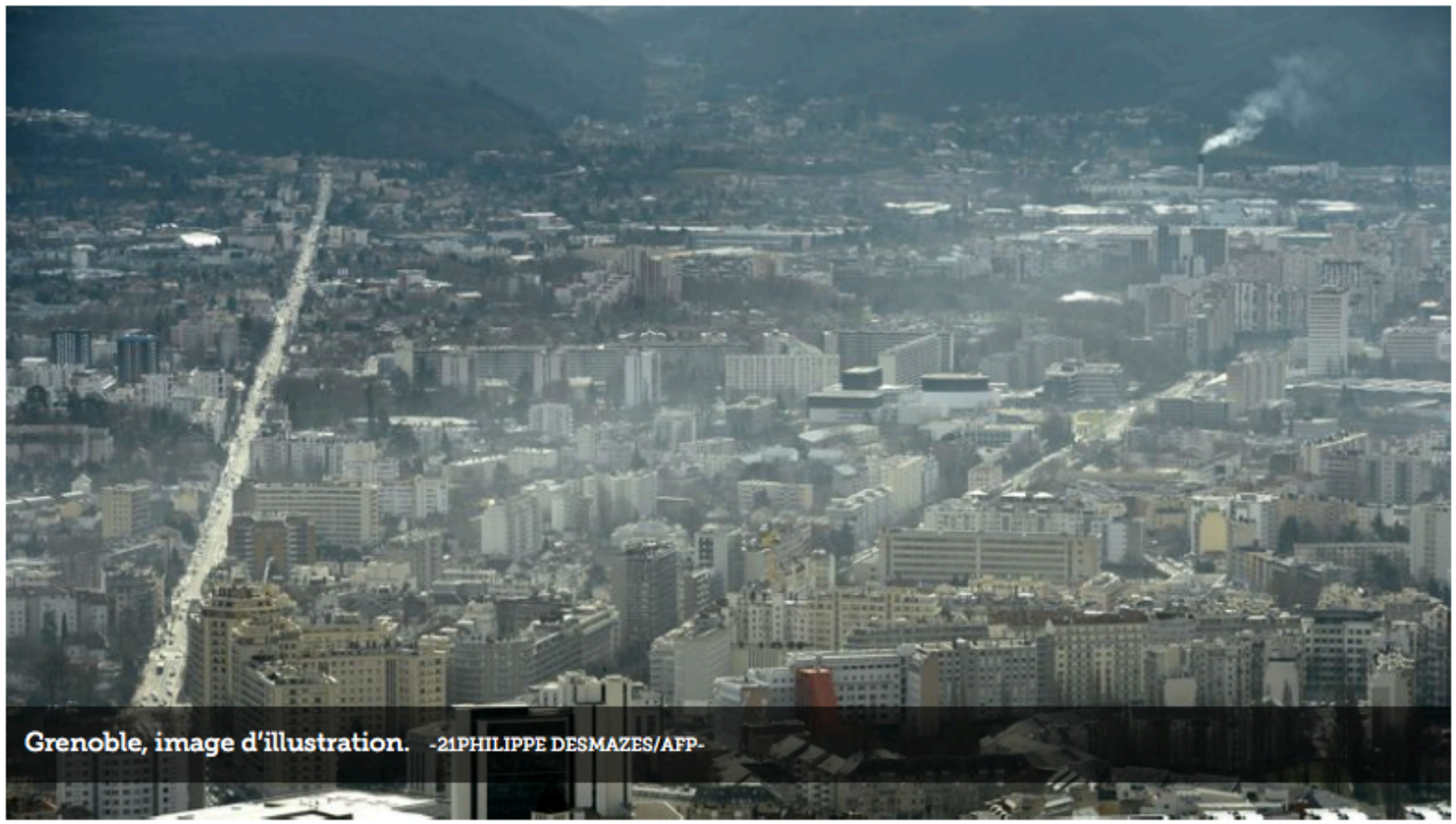
after: http://www.bio.davidson.edu/dept/plagiarism.html

Plagiarism

Rosalind Franklin (1920-1958), English X-ray crystallographer, who co-discovered the DNA double helix structure together with Crick, Watson and Wilkins. She was never nominated for the Nobel prize

Accusée de plagiat, la vice-présidente de l'université de Grenoble démissionne

Par Figaro Etudiant | Publié le 08/07/2014 à 10:49



Grenoble, image d'illustration. -21PHILIPPE DESMAZES/AFP-

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L'Etudiant 8/7/2014

Plagiarism

French physicist accused of plagiarism seems se to lose prestigious job

Science popularizer Étienne Klein declines to step down, says his scientific integrity is "absolute"

6 APR 2017 · BY MARTIN ENSERINK

Klein says any mistakes were due to "carelessness or negligence, not a conscious desire to plagiarize." LIONEL BONAVENTURE/AFP/GETTY IM

SHARE:

Étienne Klein, a celebrated French physicist and popularizer of science, seems set to lose his post as president of the Institute for Advanced Studies for Science and Technology (IHEST) in Paris after allegations that he plagiarized more than a dozen scientists, philosophers, and writers in books and

Science Insider 6/4/2017

Plagiarism

Humanoid Robot Localization and Navigation in Domestic Environment using RGBD Sensor

ABSTRACT

A growing number of research studies deal with object manipulation in everyday environments, to perform service tasks such as retrieving and delivering objects at home, or improving the lives of the elderly or disabled. However, to apply such a task, we need a precise localization of the humanoid robot in its environment which is a challenging issue due

physical disabilities to retrieve dropped objects [9, 11]. But robust and precise robot/object localization is a prerequisite for such task, and remains a challenging issue because of inaccurate foot step odometry and noisy onboard sensor observations especially during walking [7].

Since our humanoid is targeted to human-friendly indoor

submitted

article

Plagiarism

Humanoid Robot Localization and Navigation in Domestic Environment using RGBD Sensor

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A growing number of research studies deal with object manipulation in everyday environments, to perform service tasks such as retrieving and delivering objects at home, or improving the lives of the elderly or disabled. However, to apply such a task, we need a precise localization of the humanoid robot in its environment which is a challenging issue due

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article

First International Conference on Technology for Helping People with Special Needs

Humanoid Robot Localization and Navigation in Domestic Environment using RGBD Sensor

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***Abstract*—A growing number of research studies deal with object manipulation in everyday environments, to perform service tasks such as retrieving and delivering objects at home, or improving the lives of the elderly or disabled. However, to apply such a task, we need a precise localization of the humanoid robot in its environment which is a challenging issue due to rough odometry estimation, noisy onboard sensing, and the swaying motion caused by walking. To overcome these limitations, we advocate the use of external sensors for localization and**

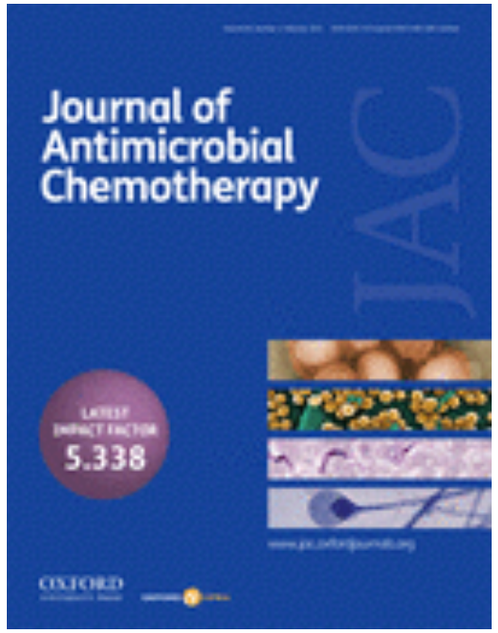
network [5]. Various sensors could be used to control and monitor the entire living space: several are embedded in the robotic system (force sensors, inertial center, (omni) cameras, odometers ...) and others are attached to the robot's environment (laser sensors, external cameras ...).

One of the relatively new and powerful low-cost sensors is the Kinect which provides color and range images, suitable for human motion detection and tracking. It was

proceedings of the International Conference on Technology for Helping People with Special Needs (Riyadh, 2013)

Plagiarism

We did what? Authors retract paper after forgetting they'd published the same study elsewhere



"After online publication of this article, it was brought to our attention by the Journal that an overlapping article had been published by us almost simultaneously in another journal[1] and that there was no cross citation between the two articles."

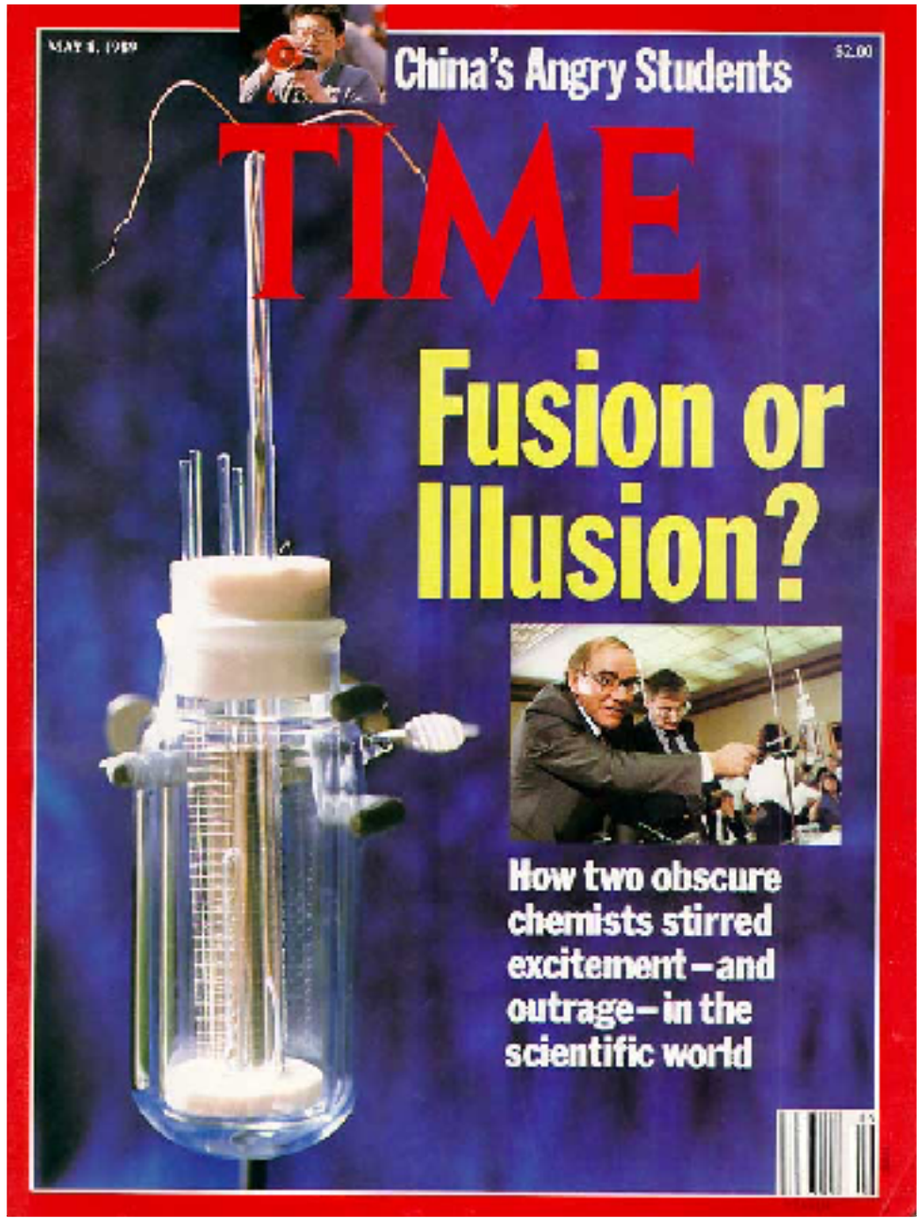
Geophysicists accused of breach of publishing ethics

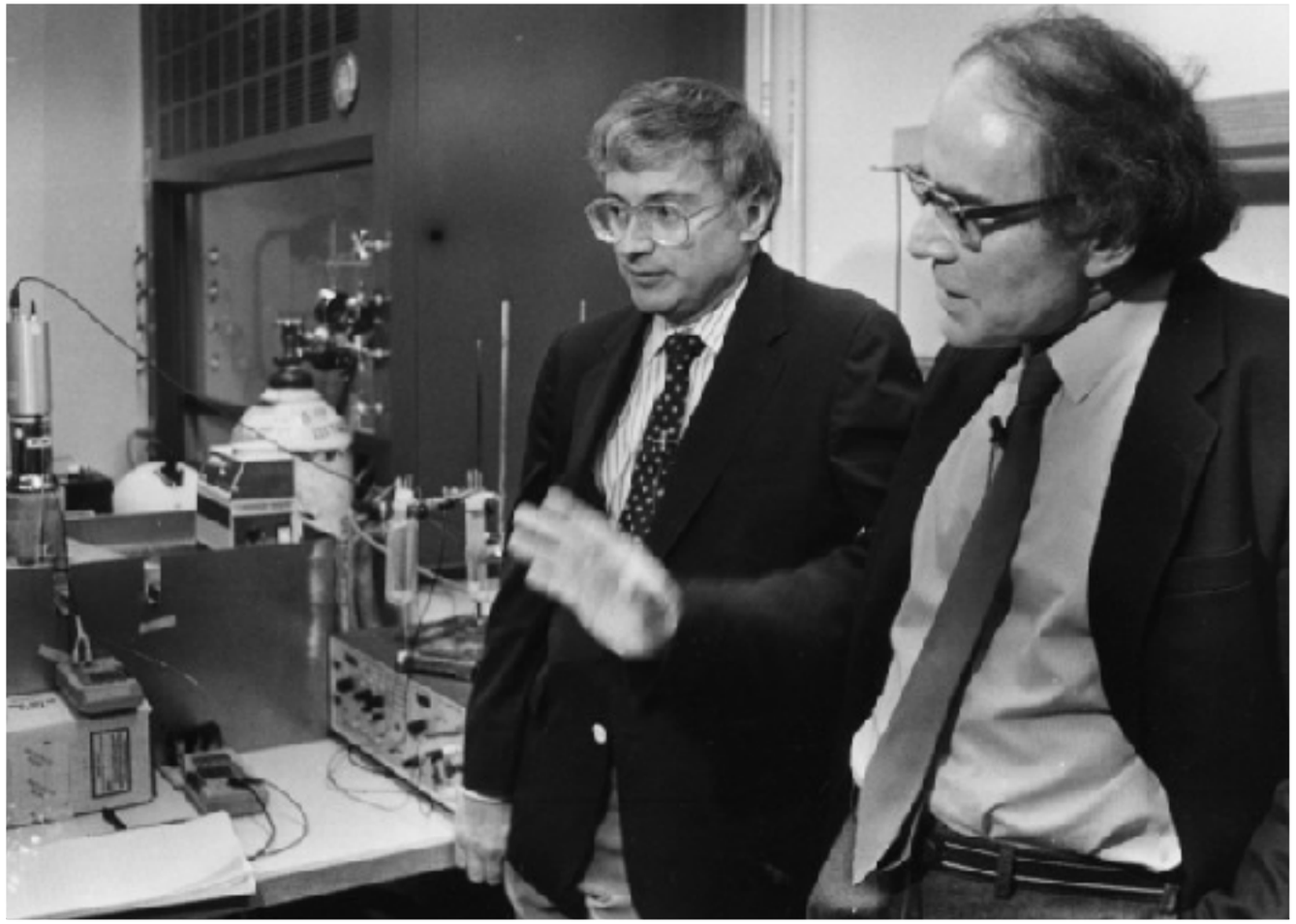
Scientists at the Institute of Geophysics in Paris (IPGP) have been accused of acting as editors for dozens of papers by IPGP colleagues published from 1992 to 2008 in the journal *Earth and Planetary Science Letters* while they were members of the editorial board. The allegations follow a joint investigation by science journalists at the French newspapers *Le Monde* and *Libération*.

Nature, 2009

Non-reproducible research

- Cold fusion (1989)





Ethics expectations (1/3)

Main ethics expectations for authors of papers in AGU journals (by J. Liemohn)

- Give an accurate account of the research and its significance
- Give enough information for others to repeat the work
- Cite prior work that's essential for understanding the investigation
- Be complete in documenting the methodology, including assumptions and uncertainties

Ethics expectations (2/3)

- Follow the appropriate laws governing ethics of work with human or animal subjects
- Always provide appropriate citation instead of plagiarizing
- Personal criticism is unacceptable
- Report to the Editor any changes made after acceptance

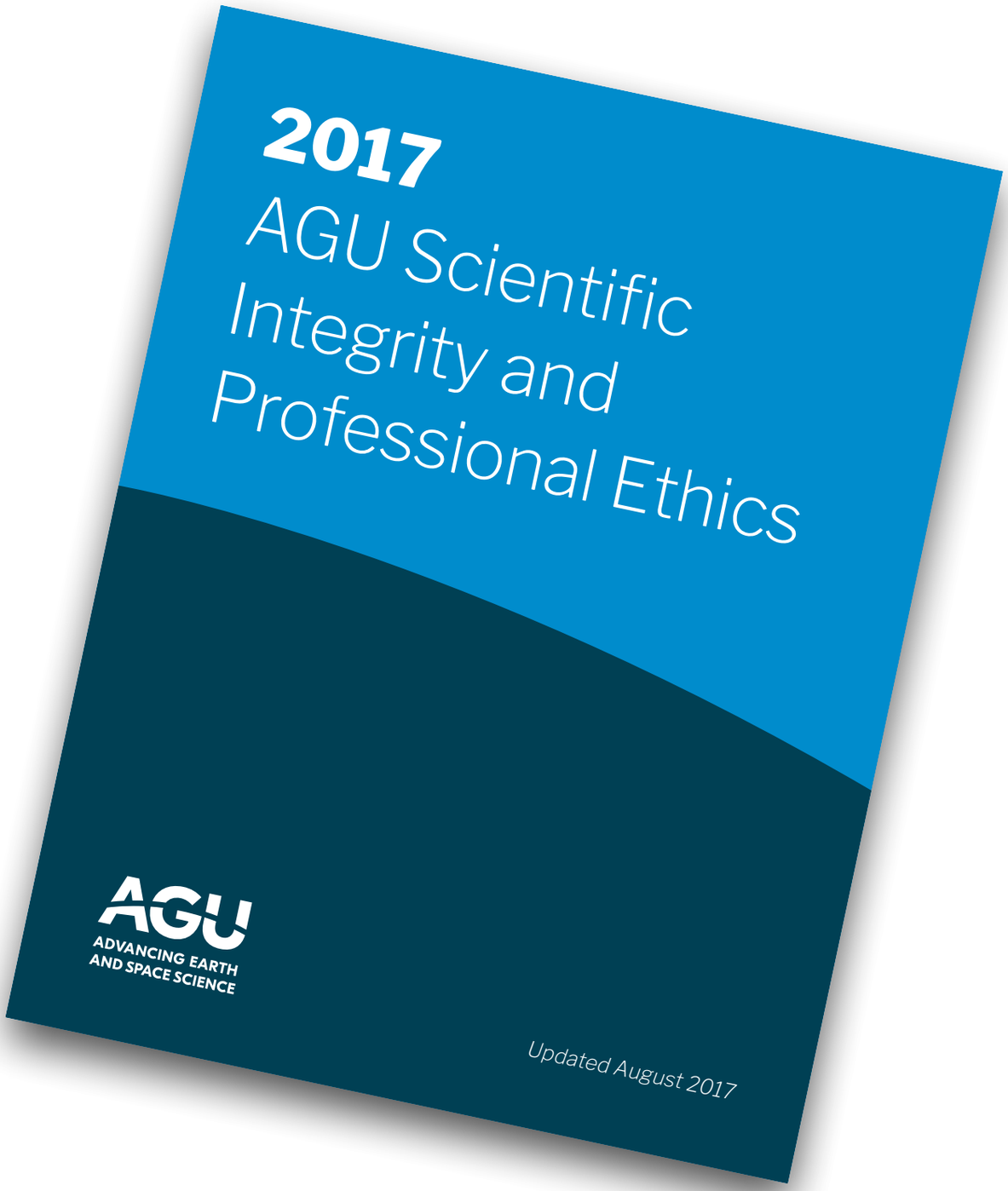
Ethics expectations (3/3)

- The coauthor list should include everyone that contributed to the study, but only those that contributed; all coauthors share responsibility for the quality and integrity of the work

- Reveal to the Editor any potential conflicts of interest regarding authors and list all funding sources in the acknowledgments

- The corresponding author should ensure that all coauthors are aware of and approve of the submission (and revision submissions)

Ethics expectations



https://www.agu.org/Learn-About-AGU/About-AGU/Ethics