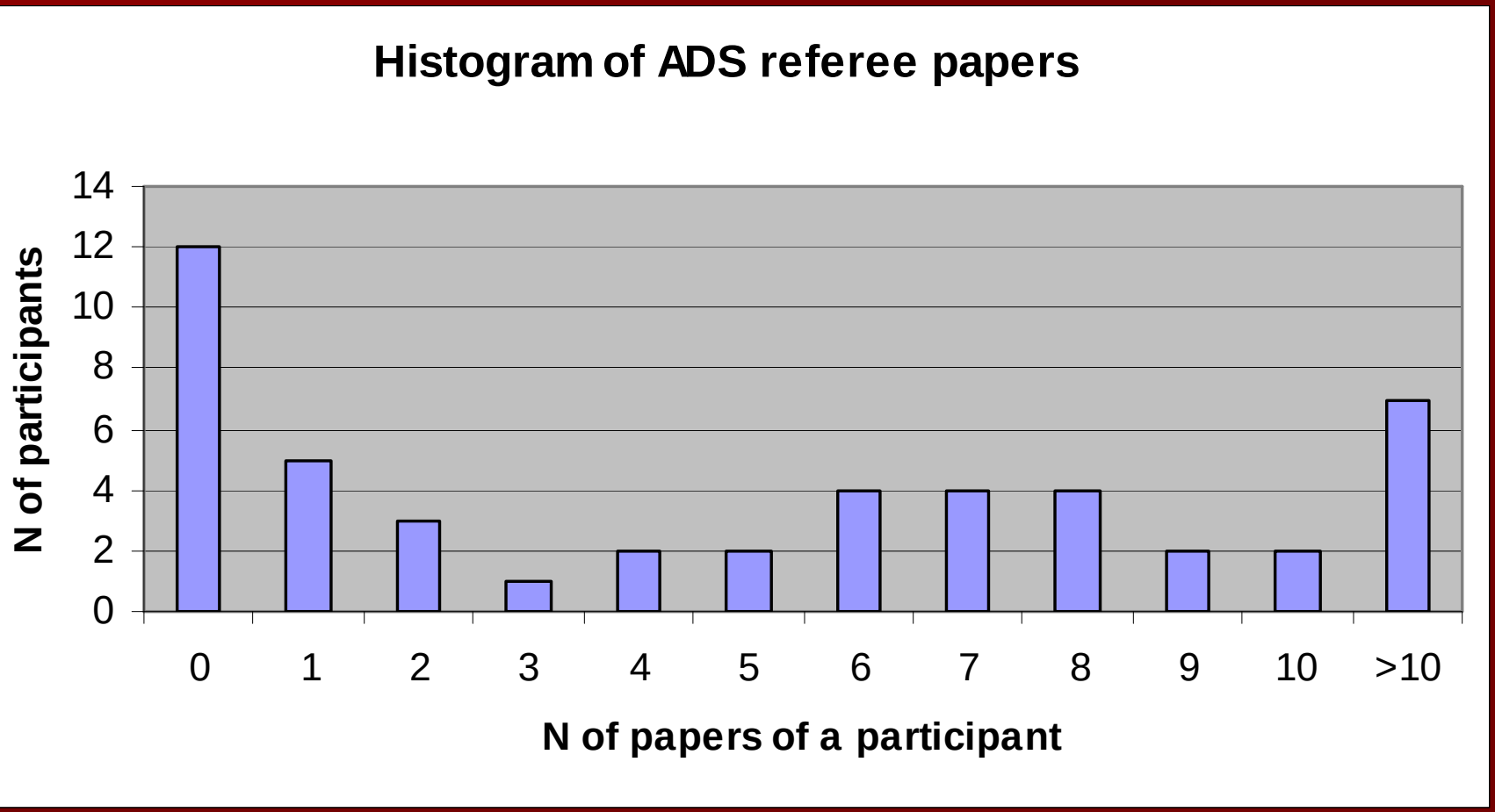
2. Topics in scientific written communication

Parts heavily based on:

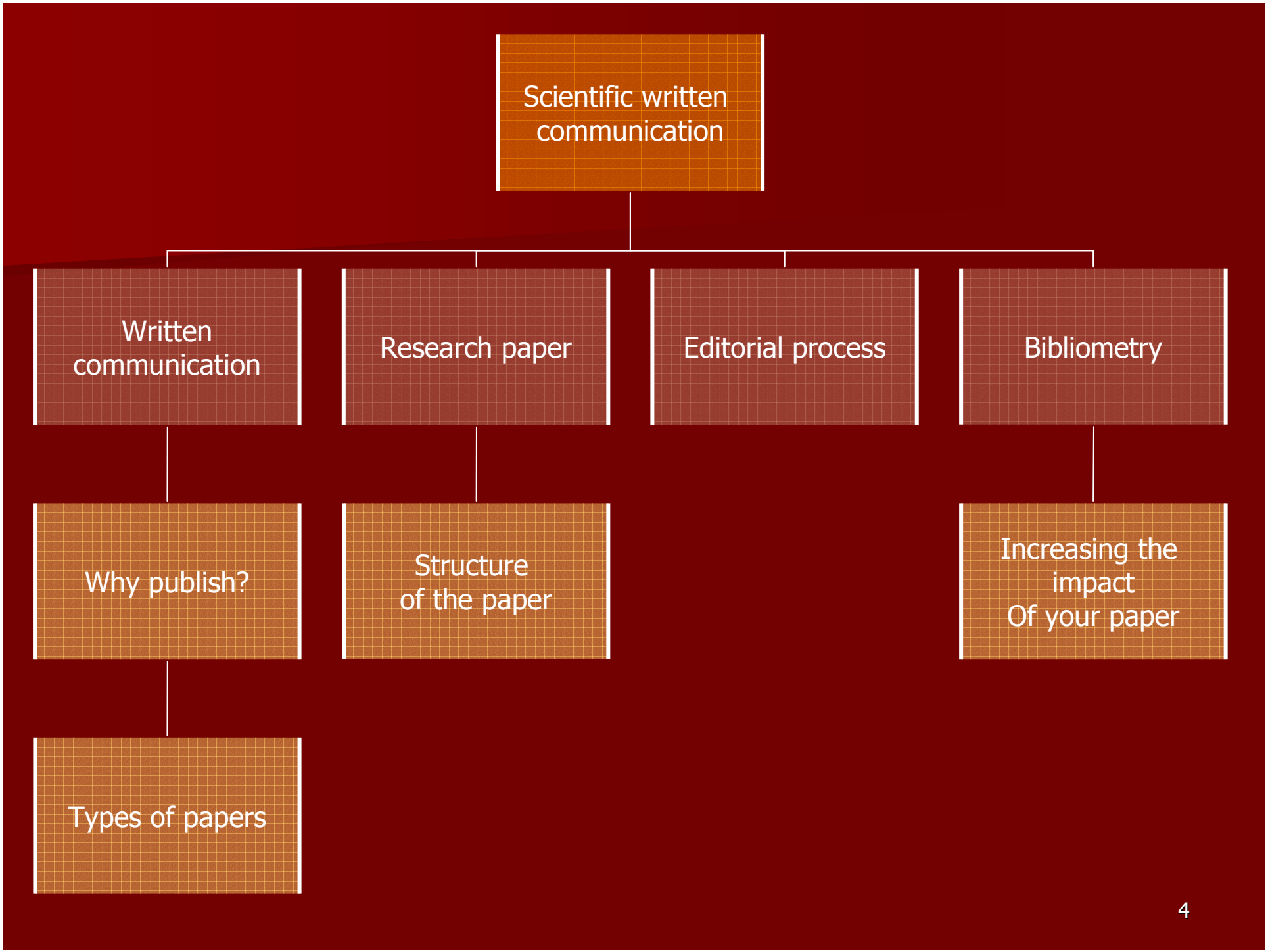
"Advice on writing a scientific paper" by C. Sterken, 2006,
In Astrophysics of Variable stars, ASP Conf. Series v.349, Eds. Sterken & Aerts



- ADS counts as referee papers some conference proceedings
- Any author order

Goal of lecture

- Inform you on
  - The specifics of the written communication
  - How a paper is structured
  - How the refereeing process works
  - What are citations and impact factors
  - How you can improve


Scientific written communication
Written communication
Research paper
Editorial process
Bibliometry
Why publish?
Structure of the paper
Increasing the impact Of your paper
Types of papers

Written versus oral communication

- Written information
  - Has no body language
  - Can be misunderstood and cited out of context
  - Allows high level of detail
  - Has long delivery timescales -> last forever
  - Is read alone

Why do scientists publish?

- Report new results and get credit
- Cover meeting travel costs
- To get a job, promotion or grant
- Achieve social climbing by being visible on ADS

Types of scientific "papers"

- **Research paper in a refereed journal**
- **Letter**
- Information bulletins and telegrams
- **Review paper**
- Instrument/software manuals
- **Invited talk**, contributed paper or poster in a conference
- **Grant or telescope/computer time application**
- Other papers
  - Ticket, Salami & Karaoke paper
  - Hoax paper
  - Outreach paper

Research paper

- Writing a paper is a process
- Start drafting your paper while work is in progress

- Requirements of a good paper
  - Good science
  - Clear
  - Accurate
  - Concise
  - Good logical structure

Structure of a research paper

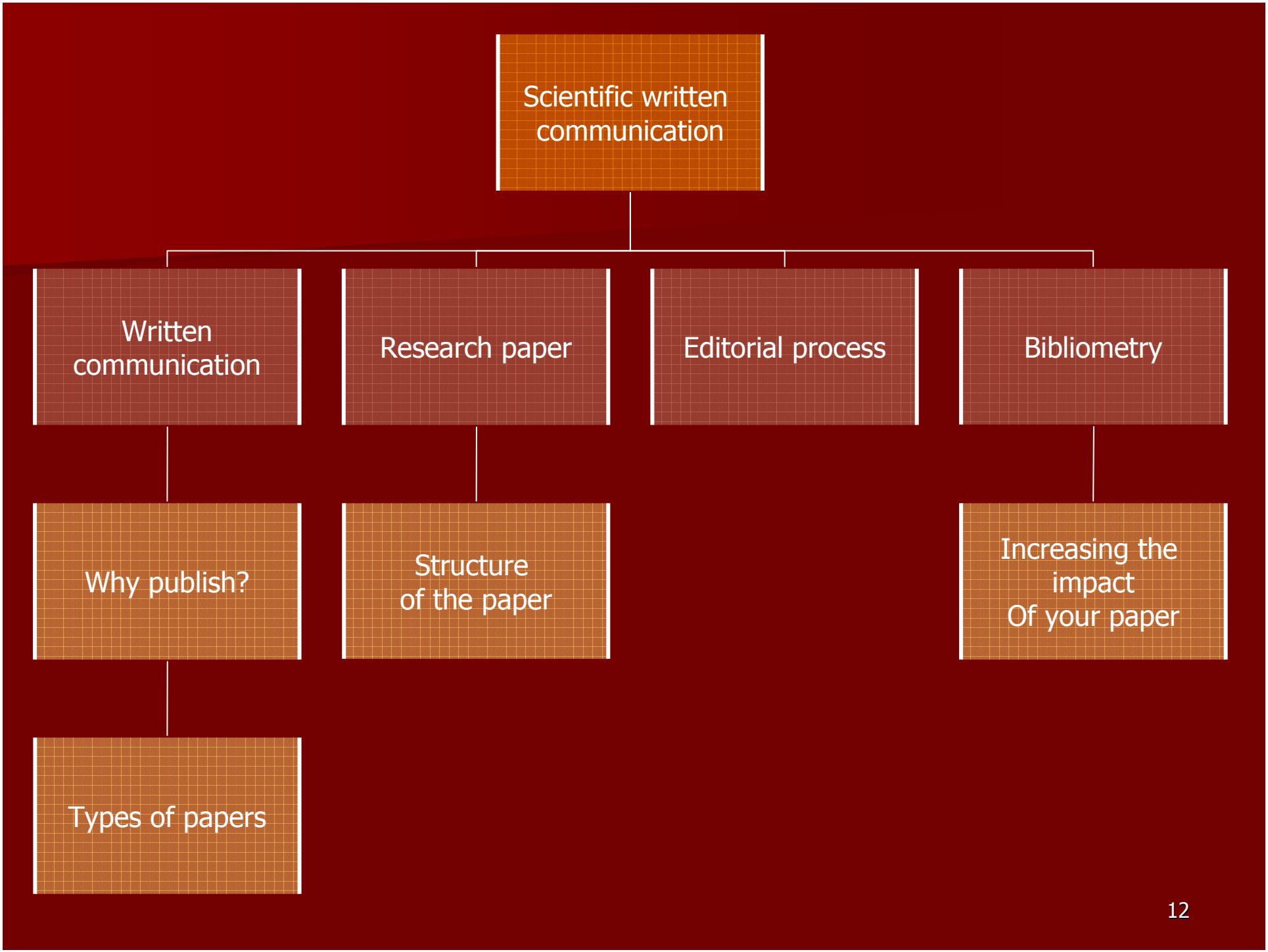
- Title and running title
  - Brief and attractive, no abbreviations
- Authors
  - Order should be a progression of delivered effort/labor
  - First author is responsible for the work/wrote most of the paper
  - Beware of gratuitous co-authors
  - Typos in co-authors names
- Abstract
  - Why, how and what
  - Impact is >50x higher than paper (ads friendly)
  - No reference to the paper structure
- Introduction
  - Statement of the problem and outline of the work
  - Careful citation
  - Recycle your telescope proposal here
  - One of the last parts to be written

Structure of a research paper

- Methods/observations/computations/theory
  - One of the first parts to be written
- Results
  - Use minimum interpretation of the data at this stage
  - One of the first parts to be written
- Analysis/discussion
  - Interpretation/analysis goes here
  - Always compare to previous work
  - Present limitations of work
  - Translate the accuracy of your data into the physical domain

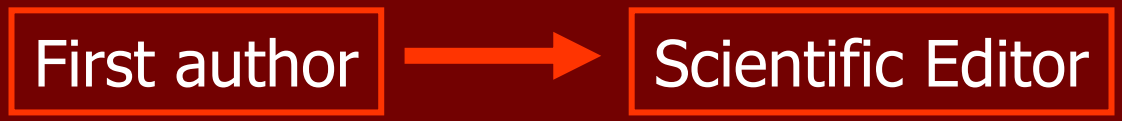
Structure of a research paper

- Conclusions
  - Recap problem
  - Summarize your conclusions
- Acknowledgments and dedications
  - Always give credit and acknowledge the help of others
  - Don’t forget your grant reference
  - Use common sense
  - Dedications are rarely used in research papers
- References and citations
- Postscript and appendix
  - Use appendix to ease reading of paper
  - Use postscript to add “in press” short comments


Scientific written communication
Written communication
Research paper
Editorial process
Bibliometry
Why publish?
Structure of the paper
Increasing the impact Of your paper
Types of papers

The editorial process

- Goals
  - Save time to the community by certifying and rationalizing written communication
  - Help the author



- First author
  - Verifies that all collaborators agree on publishing the paper
  - Makes sure a colleague reads the paper
  - Submits PDF to the scientific editor (can use sound arguments to avoid certain referees)
- Scientific Editor
  - Preliminary filter
  - Check if the paper is not a duplication (©)
  - Sends paper to referee (typically use ADS to find referee)

The editorial process: referee

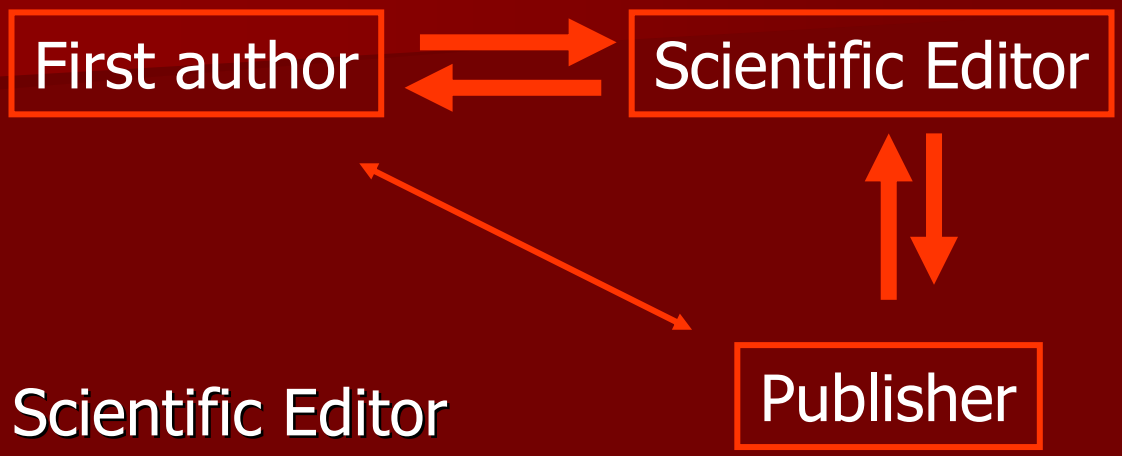
First author | Scientific Editor ⇄ Referee

- Judges scientific interest and originality
- Sends a report to Scientific Editor (including confidential remarks)
  - Scientific content: Acceptable?
  - Style and language: well-written, **concise**, self-contained, language editing
  - Why should this paper be published?
  - Are the assumptions spelled out clearly?
  - Are the methods fully described?
  - Are the new results adequately emphasized?
  - Are all the figures and tables necessary and properly laid out?
  - Which material (sections, tables, figures) should be published in electronic form only?
  - Is the designation of objects according to IAU rules?

The editorial process

- Scientific Editor
  - Forwards non-confidential report to first author
  - If rejected finds second referee
- First author
  - Makes sure he understands the referee comments
  - Forwards the comments to the co-authors
  - Doesn't contact the referee if he has disclosed his name
  - Answers in a positive way to the referee
  - Submits corrected version to Scientific Editor
- Scientific Editor
  - Accepts paper, or further interaction with referee
- First author
  - Sends source of paper to editorial office

The editorial process

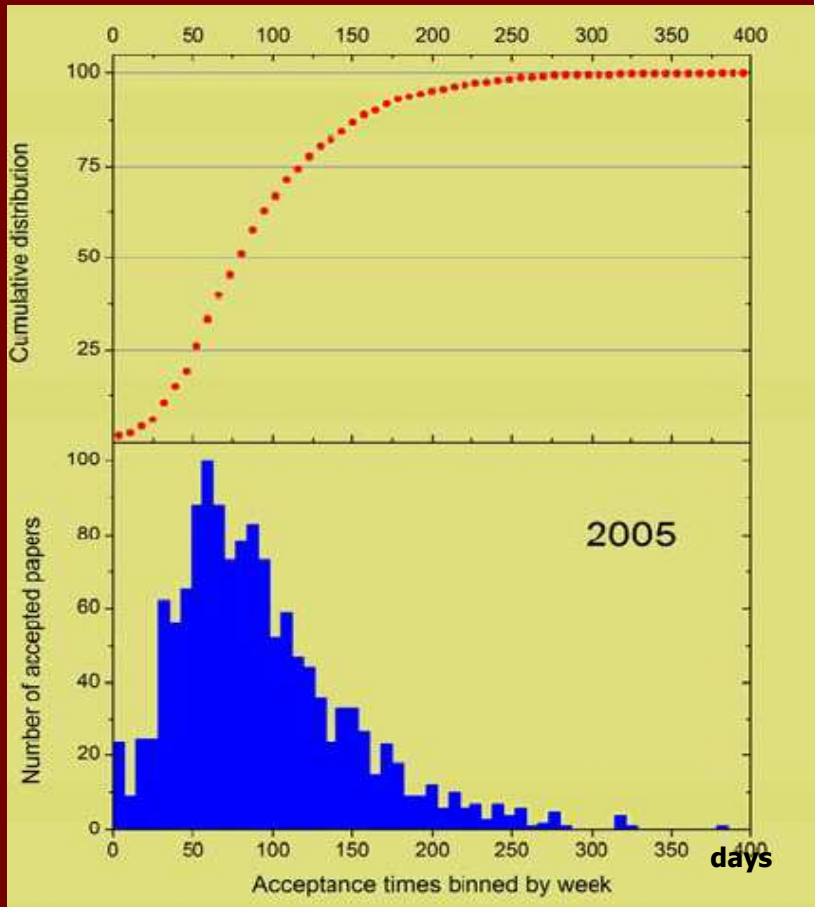


- Scientific Editor
  - Paper is proofread (?)
  - Forwards source to
- Publisher
  - Paper is typeset corrected, compiled
  - Issue is generated by merging all manuscripts in a master
  - Indexes are build – no more corrections implying page changes are possible.
  - PDF proofs are generated (you can/should interact here)
  - Final paper published

The editorial process: timescale

- Scientific Editor
  - ~3 months (A&A)
- Publisher
  - ~>3 months (A&A)
  - You don't care

Time at scientific editor for papers accepted in 2005



A&A 2005 Editors report

Common mistakes: (low level)

- Publisher instructions are not read and followed
- Margins (titles, figures, tables) are not respected
- Non standard fonts in eps files
- Figures with too thin lines
- Bitmaps with too low resolution
- Macros inside the manuscript
- Confusion between eps and ps
- Exceeding page limits (conference papers)

Copyright

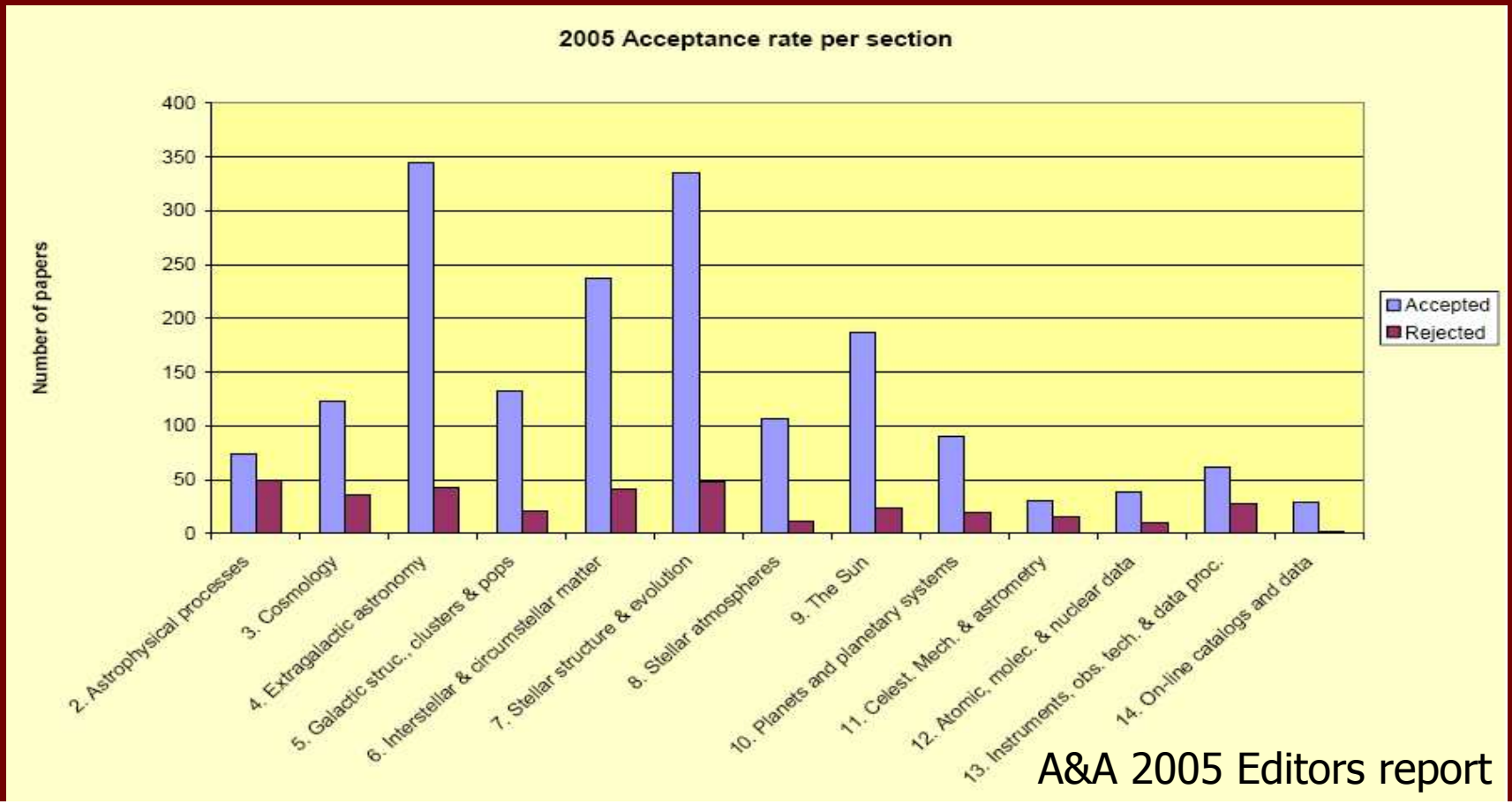
- Use your common sense
- You can publish “parts” of a conference proceedings in a paper (and vice-versa)

Bibliometry

- Main journals
  - Ap. J., MNRAS, AJ, A&A
  - 57% of all ISI 2004 astronomy papers
  - 78% of all ISI 2004 astronomy citations
- Citations
  - Number of times a paper appears in the bibliography of a paper from a (certified) journal
- Impact factor
  - average number of times articles from the journal published in the past two years that have been cited in the corresponding year

Bibliometry

- Citation/Impact factors vary widely from (sub) discipline to (sub) discipline
  - Do not overuse them to access the scientific quality of your paper



A&A 2005 Editors report

Bibliometry

Abbreviated Journal Title	2004 total cites	Impact factor	Immediacy index	2004 articles	Cited half-life	% of all papers
ANNU REV ASTRON ASTR	5043	18.839	1.800	15	9,8	0
ASTROPHYS J SUPPL S	13565	15.231	2.724	203	7,1	2
J COSMOL ASTROPART P	1014	7.914	1.943	141	1,3	1
ASTROPHYS J	144264	6.237	1.616	2478	6,2	23
ASTRON J	26385	5.841	1.226	523	5,9	5
MON NOT R ASTRON SOC	43858	5.238	1.306	1222	5,3	11
ANNU REV EARTH PL SC	1971	5.188	0,75	20	10	0
ACTA ASTRONOM	881	4.019	0,32	25	5,9	0
PUBL ASTRON SOC PAC	5926	3.900	0,595	111	8,9	1
ASTRON ASTROPHYS	63293	3.694	0,971	1870	5,8	18
ASTROPART PHYS	2196	3.610	1.388	103	4,2	1
REV MEX ASTRON ASTR	587	3.296	0,263	19	5,5	0
ICARUS	8839	3.074	1.185	233	7,8	2

Bibliometry

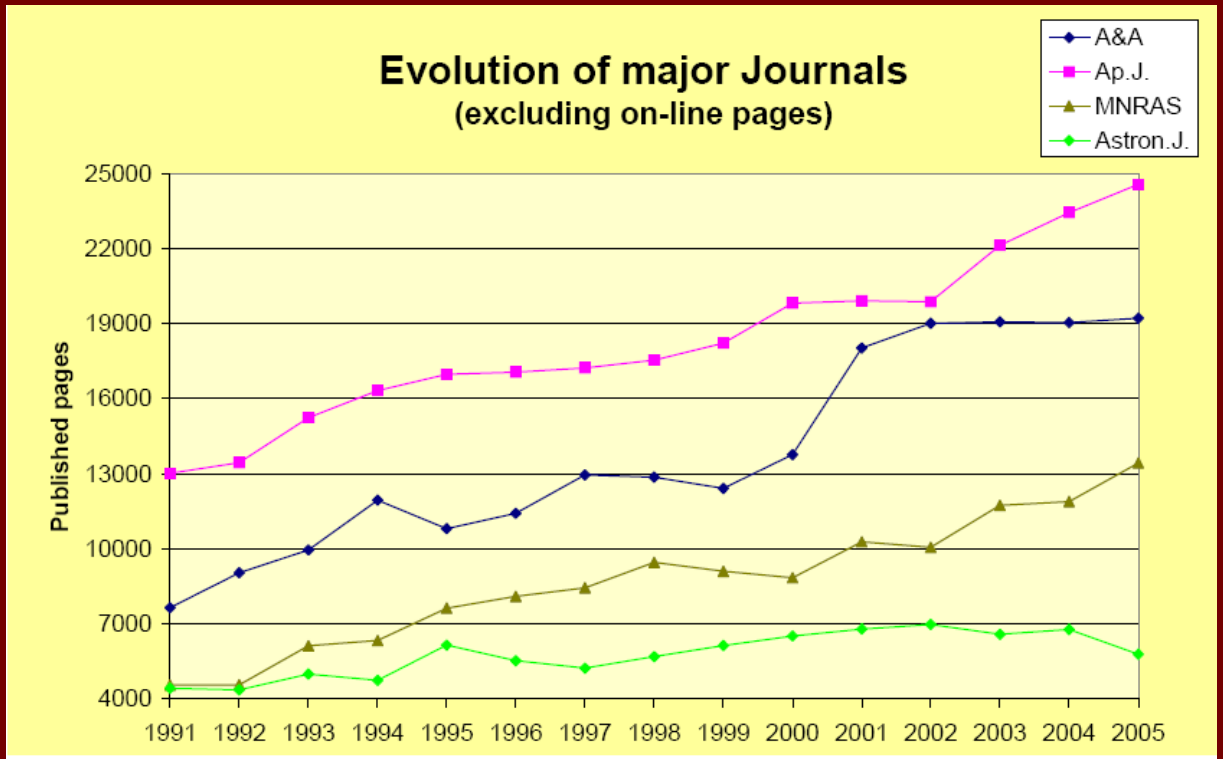
Abbreviated Journal Title	2004 total cites	Impact factor	Immediacy index	2004 articles	Cited half-life	% of all papers
ANNU REV ASTRON ASTR	5043	18.839	1.800	15	9,8	0
ASTROPHYS J SUPPL S	13565	15.231	2.724	203	7,1	2
J COSMOL ASTROPART P	1014	7.914	1.943	141	1,3	1
ASTROPHYS J	144264	6.237	1.616	2478	6,2	23
ASTRON J	26385	5.841	1.226	523	5,9	5
MON NOT R ASTRON SOC	43858	5.238	1.306	1222	5,3	11
ANNU REV EARTH PL SC	1971	5.188	0,75	20	10	0
ACTA ASTRONOM	881	4.019	0,32	25	5,9	0
PUBL ASTRON SOC PAC	5926	3.900	0,595	111	8,9	1
ASTRON ASTROPHYS	63293	3.694	0,971	1870	5,8	18
ASTROPART PHYS	2196	3.610	1.388	103	4,2	1
REV MEX ASTRON ASTR	587	3.296	0,263	19	5,5	0
ICARUS	8839	3.074	1.185	233	7,8	2

Bibliometry: the big 4

Abbreviated Journal Title	2004 total cites	Impact factor	Immediacy index	2004 articles	Cited half-life	% of all papers
ANNU REV ASTRON ASTR	5043	18.839	1.800	15	9,8	0
ASTROPHYS J SUPPL S	13565	15.231	2.724	203	7,1	2
J COSMOL ASTROPART P	1014	7.914	1.943	141	1,3	1
ASTROPHYS J	**144264**	**6.237**	**1.616**	**2478**	**6,2**	**23**
ASTRON J	**26385**	**5.841**	**1.226**	**523**	**5,9**	**5**
MON NOT R ASTRON SOC	**43858**	**5.238**	**1.306**	**1222**	**5,3**	**11**
ANNU REV EARTH PL SC	1971	5.188	0,75	20	10	0
ACTA ASTRONOM	881	4.019	0,32	25	5,9	0
PUBL ASTRON SOC PAC	5926	3.900	0,595	111	8,9	1
ASTRON ASTROPHYS	**63293**	**3.694**	**0,971**	**1870**	**5,8**	**18**
ASTROPART PHYS	2196	3.610	1.388	103	4,2	1
REV MEX ASTRON ASTR	587	3.296	0,263	19	5,5	0
ICARUS	8839	3.074	1.185	233	7,8	2

Increasing the impact of your paper in a growing field

- Good science
- Well written and published in a main journal
- Publicity
  - Astro-ph (>2x), newsletters, ADS friendly (abstract+references)
  - Workshops/conferences/talks



A&A 2005 Editors report

How to improve

- Read papers
- Read a lot of papers
- Read lots of papers every month
- Read a few articles/books
  - *Advice on writing a scientific paper,* by C. Sterken, 2006, In Astrophysics of Variable stars, ASP Conf. Series v.349, Eds. Sterken & Aerts
  - *The Science of Scientific Writing*, 1990, Gopan & Swan, American Scientist.
  - *Scientific Papers and Presentations*, by Martha Davis, 2004, 2nd ed.
  - *Editorship and peer-review at A&A*, by Claude Bertout & Peter Schneider, 2004, A&A, 420, E1
  - Instructions for authors of main journals
  - *The Rise and Citation Impact of astro-ph in Major Journals*, by T. Metcalfe, 2005, arXiv:astro-ph/0503519
  - *Not so deep-impact*, 2005, Editorial, Nature, 435, 1003
- Ask the opinion of someone you respect on your final draft

Thank you!