# Guideline for writing a scientific publication (research article)

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# Why is that important?

### Share you data/ results / knowledge with others

- Your own interest: Scientific publications are the international ", currency" for scientists
  - Total number and their citations ("Hirschindex")
  - How many paper as a first author?
  - GFZ expects one paper as first author per person and year

## Example: Simona Regenspurg on Scopus

63 cited documents

2

3

4

5

6

7

q



https://www.scopus.com/

https://scholar.google.com/

#### GF7 Helmholtz Centre POTSDAM

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→ Export 🛱 Print 🖾 Ema

# Considerations before you start writing

- What is the message? Which data do I need to tell the story?
- Selection of the journal ISI listed (=peer-reviewed)
- Avoid "mdpi" (poorly reviewed)
- Check the guidelines for authors!
- Address the topic based on the journal

## Impact factor of a journal:

$$\mathrm{IF}_y = rac{\mathrm{Citations}_y}{\mathrm{Publications}_{y-1} + \mathrm{Publications}_{y-2}}$$

- Grundwasser: 0.7
- Applied Geochemistry: 3.4
- Geothermics: 3.9
- Geothermal Energy Journal: 4.2
- Nature Scientific reports: 4.6
- Science: 56.9
- Nature: 64.8

*IF: yearly mean number of citations of articles published in the last two years in a given journal* 

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# Title, authors, title page

- Title as short and precise as possible (reserach design)→ check and recheck...
- Order of co-authors: First author (does the writing and is responsible for most of the data), second author (can be ranked as equal to first author), Last author (often the supervisor)
- **Author's contribution:** often required by the journals; Good scientific practice: authors have to make a contribution
- All co-authors **have to be asked** if they want to be co-authors / should read the manuscript before submission

**Title page** as seperate file with title, full names and institutional addresses for all authors

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 $\rightarrow$  indicate the **corresponding author**<sup>\*</sup> ( $\rightarrow$  not necessarily the first author)



# Acknowledgements

- Funding organization ?
- Who helped with analytics etc.?
- Subcontractors, companies that were paid
- Students who assisted
- Don't forget anyone!!!





## How to start – First steps

- Prepare your data (ideally Data publication: <u>https://bib.telegrafenberg.de/dataservices/</u>) → results and methods as raw data→ DOI number)
- 2. Plot some figures and play with your data  $\rightarrow$  what is the outcome? What is the story?
- 3. Make a structure for the mansucript





# Paper structure

- Abstract
- Introduction
- Materials & methods
- Results
- Discussion
- Conclusion

Do not follow this order when writing your scientific paper

# Efficient manuscript preparation

 Write goals (introduction) and answer to the goals (conclusion) →as bullet points

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- Discussion
- 3. Results
- 4. M&M
- 5. Introduction
- 6. Abstract



# Goals and conclusions

Many people read only Abstract and Conclusion, so these are the two most crucial parts.

- Always stay focused: Why was the research conducted? What was the outcome? And why is this relevant ? For which community is this relevant?
- The conclusion gives the larger context on your results. E.g. why is this research important for a geothermal operator to know
- Abstract and conclusions generally contain no references





# Discussion

The sublime part of paper writing

- All interpretations of the results belong to the discussion
- Discuss the implications of the findings in context of existing research (give references) and highlight limitations of the study
- Structure the discussion in subchapters → what is the question to be discussed?
- (Can be combined with results → "Results & Discussions"; however this can be messy)





## Results Describe the outcome

- Not all results obtained in a project have to go to the manuscript→ Present only those that are needed for the story.
- Other data can go to the "supplementary"
- Refer to data publication if possible
- Plot results in figures and tables and describe them
- No literature citations in the results





# Figures

- As simple as possible (few lines and patterns)
- Good resolution, well readible
- Correct units
- Looking at the figure and the description should be enough to understand the content of the figure
- (readible in black and white)



Figure 5. DOC content and the relative abundance of DOC fractions in the liquid phase of the two deep fluid samples. Hydrophobic organic carbon (HOC), biopolymers (Makro.1), humic substances (Makro.2), low molecular weight acids (LMWA), and low molecular weight neutrals (LMWN).



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## Tables

Raw data and results of the Study

Table 5

- Comparison with literature  $\rightarrow$  with references
- Larger datasets, can be uploaded as additional files (supplementary)
- Use same formatting style, as simple as possible
- Table description: information on type of data, unit, method used, references, mean values, errors

		Eosin Y	Nitrate	Iodide
1st Push–Pull Test (PPT1)				
Analyzed samples (tracer) Mean tracer concentrations co	[mg/].]	4 4.668 (+0.187)	4 78.398 (+1.018)	3 90.500 (+27.752)
Injected tracer mass $m_0$	[g]	130.7	2194.7	2533.5
2nd Push–Pull Test (PPT2)				
Analyzed samples (tracer) Measured tracer concentrations $c_0^*$ Analyzed samples (nre-flush & chaser)	[mg/L]	5 5.589 (±0.071) 7	5 94.422 (±0.028) 7	2 94.900 (±28.100) 2
Measured background concentrations $c_{bg}$ Mean tracer concentrations $c_0 = c_0^* - c_{bg}$ Injected tracer mass $m_0$	[mg/L] [mg/L] [g]	0.081 (±0.007) 5.508 159.8	0.536 (±0.204) 93.886 2724.3	1.300 (±0.100) 93.600 2716.0

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# Materials & Methods

- Describe all materials and all methods and instuments used in your study
- Your experiments (and results) should be reproducible
- Avoid brand names of instuments. E.g. filter "Roth" is not important, but filter pore size and material of the filter are relavant for your results (no plug!)
- Put correct references when the methods were developed by someone else.





# References

- Use ISI listed scientfic papers (peer-reviewed) if possible
- Avoid "grey" literature (reports, internet pages...)
- If something has a DOI it does not mean it is peer-reviewed
- Put a reference behind every statement that is not from you (best just in brackets)
- Be aware: if not cited correctly, you will be rejected because of plagiarism

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Consider to cite the right papers (e.g. those who discovered something first)



# Introduction

- After reading the intro, the reader should understand what your research is about and where it starts.
- Lists the state of the art of the research
- Should address the readers depending on the journal (e.g. if it is a geothermal journal, geothermal energy production needs not to be explained)

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• As short as possible



# Abstract

- The abstract is the summary of the manuscript
- Should include all relevant parts from the materials and methods (what was done?), the results, and the conclusion (why was this relevant?)
- Avoid too much introduction (just one sentence)
- Write it at the very end
- Normally no citations





# Style

- As short as possible
- Avoid replicates (both in words and content)
- Short and simple sentences
- English: be consistent British English, American English; have a proof read by an English native reader or use deep.gl
- Numbers 1-20 in letters ("one to twenty")
- Capitals only for names, locations
- Abbrevations: explain the first time it is used (from the introduction), otherwise abbrevations can be used throughout the Ms (exception: the beginning of a sentence)
- Grammar: use correct tenses (like in German: past tense for actions in the past; presence for general information)

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# Length and Timeline

How much time do I need ?

(if all data are available, and literature is understood)

- Plan your paper carefully
- 2-3 weeks is feasible
- Length: shorter paper are recommended; Even one page papers are possible.





# Important aspects

- Don't be resistant to criticism and frustrated by heavy corrections by your co-authors - it is normal that your manuscript will be several times rewritten; with increasing number of published papers you will get better
- It is not artwork
- Write "with one feather" (every co-author has her/his own style) the first author should correct everything according to her/his style





# Legal issues

- Are there agreements with companies, operators consortia on publishing/ confidentiallity? Check if everything was done properly/ legaly correct
- Consider research intergrity: research ethics that deals with best practice or rules of professional practice of scientists (e.g. transparency, reproducibility..).
- Avoid plagiarism (even unintentional)





# Submission process

- Graphical abstract
- All authors affiliation
- key words
- Pictures in seperate files
- Declarations
- letter to the editor
- Suggest reviewers (only people that are not biased)

## $\rightarrow$ Consider at least 3 hours for the submission



