

GEL 324 Sedimentology

General Guidelines for Writing Research Proposals and Final Papers

Project Proposal

A research proposal is a comprehensive, yet concise, work plan for research. The research proposal must contain a clear statement of the problem, a statement of anticipated outcomes and contributions that will be provided, the objectives to be achieved, a thorough review of the published literature, a detailed account of the methods that will be used. The proposal is used to gain a better understanding of the research topic and serves as a reference during the course of the work. A good proposal allows anyone who is reasonably knowledgeable in the field to evaluate the likelihood of success without reference to other documents or background information. An example outline is provided below.

1.0 Statement of the Problem

1.1 Purpose:

The purpose should be a concise statement that answers the questions; *What is the problem being addressed?*, *Why is this research significant?*, *Who will benefit from this research?*, and *How will the research contribute to the field of study?*

1.2 Objectives:

The objectives are specific, measurable tasks that will be accomplished during the course of the research program.

2.0 Literature Review

3.0 Experimental Design

3.1 Methods of Analysis:

This section should contain a general summary of the work plan strategy and methods of analysis. Detailed field or laboratory procedures are generally not included in the proposal's text unless the work involves a new or nonstandard procedure. The reader is usually referred to an appendix or the published literature for procedural details. This section may include flow charts, site maps, tree diagrams or other figures or tables that will enable the reader to better understand the experimental design.

3.2 Data Collection and Analysis:

Discuss the amount and type of data that will be recorded and how that data will be processed and compiled. Specify the computational algorithms that will be used to transform raw data into a useful form and describe any statistical procedures.

3.3 Assumptions and Limitations

3.4 Work Plan Timeline

3.5 Materials and Supplies

3.6 Budget

4.0 References

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Report Format

1.0 Title Page

2.0 Abstracts

An abstract is a short summary of a published paper or professional report. It should contain concise statements about the purpose and objectives of the study and summarize the methods of investigation and the most significant results and interpretations. In essence, the abstract is a condensed version of the paper and should be self-contained without bibliographic references, figures or tables (McGirr, 1973). Abstracts are generally less than 250 words but length may vary with purpose or venue.

Abstracts precede the main body of papers published in most professional periodicals. "A well-prepared abstract enables readers to identify the basic content of a document quickly and accurately, to determine its relevance to their interests, and thus decide whether they need to read the document in its entirety" (American National Standards Institute, 1979). This statement underscores the need to be careful in preparing an abstract so that you can attract and retain the interest of a potential reader.

Many scientific and professional organizations also publish the abstracts of technical papers in Proceedings volumes and distribute them to members prior to national or regional meetings. Abstracts should be prepared after the manuscript is completed but commonly the reverse is true especially when authors must meet abstract submission deadlines for professional meetings.

3.0 Main Body

3.1 Introduction

The Introduction should contain all the information the reader will need to understand the content and significance of the research being presented in the text. A good Introduction stimulates the reader's interest in the research while a poor one may cause the reader to lose interest, even if the research and its conclusions are well founded and relevant. Day (1988) suggests that the Introduction should: 1) present a clear statement of the nature and scope of the problem, 2) provide a literature review, 3) state and justify the methods used, 4) present the principal results of the investigation and 5) summarize the conclusions suggested by those results. Field studies may also include a brief summary of the geological or natural setting of the region.

3.2 Methods and Materials

This section should describe the experimental design and methodology in sufficient detail so that the reader can assess their scientific validity and repeat the experiments if necessary. Standard methods may be summarized but should include references to the published procedures. New or nonstandard methods should be described in detail. The types and technical specifications of all materials or equipment used should be presented but without reference to brand names. State the procedures that are used to

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record, compile, and analyze the data. Statistical treatments should be presented but the discussion should feature the data, not the statistics (Day, 1988).

The Methods and Materials section is written in the past tense. It is important to remember that this section deals only with the methodology and should not include any results.

3.3 Results

The Results section contains a description of the summarized or representative data written in the past tense. It is not necessary, or even desirable, to include all the results obtained during the course of the investigation. Carefully summarizing the data to emphasize important relationships will help to make this section more readable and informative. Raw data, if necessary, should be placed in an Appendix. The effective use of tables and graphs often benefits the overall presentation. The text should address the important results without reference to interpretations, opinions or speculation.

3.4 Discussion

This section is the place to integrate and interpret the results of the study. Day (1988) suggests the following rules for the Discussion section:

1. Present the principles, relationships, and generalizations indicated by the results without undue repetition of the Results section,
2. Point out exceptions or lack of correlation and define any unsettled points. Never attempt to hide or alter data that do not fit the general trends or relationships.
3. Show how your results compare, positively or negatively, with previously published work,
4. Discuss the theoretical implications and practical applications of your work,
5. State your interpretations and conclusions as clearly as possible,
6. Summarize your evidence for each conclusion. The Discussion section should end with a summary or conclusion that emphasizes the significance of the study. It is important, however, not to draw conclusions beyond those that can be supported by the data.

4.0 Acknowledgements

5.0 Literature Cited

Several conventions are used for the References section. The Geological Society of America uses the "Name and Year" system as demonstrated below.

Technical Writing References

American National Standards Institute, 1979, American national standards for writing abstracts: ANSI Z39.14-1979, American National Standards Institute, Inc., New York.

Bates, R.L., Adkins-Heljeson, M.D., and Buchanan, R.C., 1995, *Geowriting; A guide to writing, editing, and printing in earth science*, 5th Edition: American Geological Institute, Alexandria, 138p.

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- Day, Robert, A., 1988, How to write and publish a scientific paper, 3rd edition: Oryx Press, New York, 211p.
- Matthews, J.R., Bowen, J.M., and Matthews, R.W., 1996, Successful scientific writing; A step-by-step guide for the biological and medical sciences: Cambridge University Press, New York, 181p.
- McGirr, C.J., 1973, Guidelines for abstracting: Tech. Commun., V.25, No.2, p.2-5.
- Pearsall, T.E., 1996, The elements of technical writing: Allyn and Bacon, New York, 180p.
- Shelton, J.H., 1995, Handbook of technical writing: Ntc Business Books, New York, 210p.
- Weiss, E.H., 1990, 100 writing remedies; Practical exercises for technical writing: Oryx Press, New York, 192p.

6.0 Appendices

Appendices contain information that is too detailed or otherwise inappropriate for the text of the report. Each appendix should be organized by content and sequentially labeled by an uppercase letter. For example, Appendix A may contain the field descriptions of different stratigraphic sections and Appendix B the results of particle-size analyses of individual samples. Figure and Table labels should contain the Appendix designation, e.g. Figure A-1.

Figures and Tables

Figures refer to any graphical depiction of data such as line drawings (graphs), diagrams, photographs, or maps. Figures should be numbered sequentially, with Arabic numbers, and have a caption that describes their content. The figure number and caption are generally placed immediately below the figure. They should be placed in the document after their reference in the text to avoid confusing the reader. For example, you should not have a figure on page 5 that is first referred to on page 6.

A table is a compact, orderly list of related facts, figures, or numerical data generally arranged in rows and columns. Like figures, tables are numbered sequentially and have concise captions that describe their content. They should be placed in the document after their reference in the text with the number and caption immediately above the table. Figure 1 and Table 1 (following page) serve as examples.

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Table 1. Results of particle size analysis for Sample 533D.

Particle Size Passed (ϕ)	Particle Size Retained (ϕ)	Mass Retained (g)	Mass Retained (%)	Cumulative Mass (%)
-3	-2	0.0	0.0	0.0
-2	-1	1.9	3.1	3.1
-1	0	6.6	10.8	13.9
0	1	17.6	28.8	42.6
1	2	13.1	21.4	64.1
2	3	17.3	28.3	92.3
3	4	3.9	6.4	98.7
Pan		0.8	1.3	

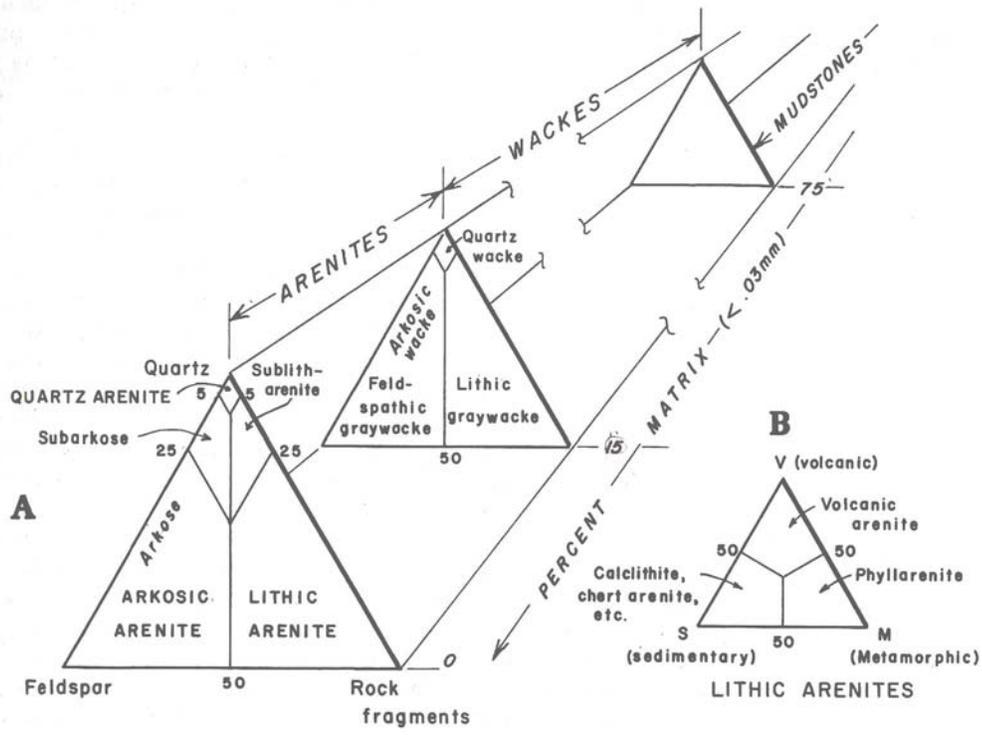


Figure 1. The sandstone classification of Dott (1964) (Fig. 1A) and the subdivision of lithic arenites from Folk (1968) (Fig. 1B) in Pettijohn (1975).