Requirements and recommendations

for written report in Geol487

The final report is worth 60% of your grade in this course. To make a report, choose one of the geophysical methods that we used during the field school and write an about 1500-word[1] summary of your understanding of it. The selected subject can be a group of methods such as resistivity, EM, or Seismic , or a more specific technique such as resistivity sounding, Max-Min[2], or MASW[3]. Try writing in precise, concise and technical language, in the style of a research paper. **Focus on the experiments which you observed and participated in**, and on the data collected.

Textbooks and review papers are good sources for this report. You can cite websites such as Wikipedia but be sure to follow through to their sources. Include in your report a bibliography of at least two reliable sources like textbooks and journal papers. Any bibliographic citation style is OK.

If possible, illustrate your report with data plots and field photos provided to the class, or your own. When showing photos and/or plots, provide good figure captions. Again follow examples of research publications.

Organize your report with the following headers. The lengths of the different sections are estimates, and you can shorten some sections and lengthen others if you prefer.

1) **Introduction** (about 250 words): Give a brief description of the principle and purpose of the method. Which group of physical properties is being examined, for example mechanical, electric, or magnetic, or propagation of which waves? What is its spatial and temporal resolution? Most importantly, indicate when the method is most commonly used. Describe some history of development for this method, and give a short description of its strengths and limitations or weaknesses. What other geophysical or geological methods are used for complementing these limitations?

[1] This is about twice the length of this document. Figure captions or table headings are not counted in these 1500 words.

[2] Also known as Slingram – one of numerous controlled-source electromagnetic (EM) methods.

[3] Multichannel Analysis of Surface Waves (one of many seismic methods).

2) **Theory** (~250 words): Describe in greater detail how the method works. Describe the material or medium property that your method is sensitive to and how that property varies in different geological or environmental materials. Describe the sources of fields that are measured in the method. Does the geophysicist have to supply the source like in the resistivity and Max-Min methods or is the source always present like in gravity and magnetics? How do changes in material property affect the measured signal? What is the physical principle by which the instrument measures the signal?

3) **Field procedures** (~250 words): Answer the following questions based on your observations during the field course. What equipment is used in your selected method? Briefly describe how the equipment works to measure the fields. How is the equipment deployed? Are there special safety or other considerations when using the equipment? Note that we only conduct surveys on the ground in this field course. Can the method be used in borehole, marine, airborne, or satellite surveys?

4) **Data analysis** (~250 words): What are the basic steps that need to be taken in order to take the measured signal and turn it into an interpretable result? What analysis can be (or was) undertaken in the field or in the evening between days of data acquisition to check the quality of the data? What steps are undertaken in the office after the data are collected? What are the common ways of displaying the data for interpretation? Illustrate these answers with results from our data acquisition.

5) **Interpretation** (~375 words): What type of geophysical anomalies are we looking for in data (e. g., spatial variations, impulsive signals, velocity variations, reflections)? How do these anomalies typically show up in the plotted data? What can be learned by studying these anomalies (e. g., depth, position, or size of a body of the anomalous material, or degree of contrast in the material property). How and to what extent can the measured anomalies be connected to geology and areas of environmental concern. Give one or two examples of the use of your method to gain geological information, preferably using the observations during the field course.

6) **Conclusions** (~125 words): Briefly state the main points of the above sections: datasets acquired, observations from data, any indications of target anomalies, and their possible interpretations. Would you recommend using this method next time in this area or suggest any changes?

The report should be written entirely in your own words. Be careful to avoid plagiarism and abusing “AI summaries”. If you copy any text from a website or from a book, the

quotation must be appropriate for current discussion and cited properly. Usually, verbatim copies of any text are unnecessary in technical or research reports. More information on plagiarism can be found at the following link:

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