

Peer Review

Instructions: The project author receiving the review is responsible for managing this document and making sure all peer reviewers are received and of high quality. All sections should be filled out. The project author is also responsible for filling out how they will respond to the review in each section.

Once complete, upload PDF to canvas final project submission.

Detailed Steps:

1. Prepare project
2. Request reviews
3. Receive written reviews
4. Meet to discuss review and document specific edits to project
5. Make project edits

Project Author: Alexander Danielson

Project Title: Inspecting Mars Geomorphology with Implications of Yardangs/Lineaments using GIS and Python

Link to Document for Review: <https://github.com/ardumn/GIS5571/tree/main/Project>

Continue below for Peer Reviews

Peer Review 1

Name: James Erickson

Email: eric4255@umn.edu

Directions: Fill out rubric and answer prompts. Project author fill out last section.

Category	Description	Points Possible	Score
Structural Elements	All elements of a lab report are included (2 points each): Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score	28	28
Clarity of Content	Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level (12 points). There is a clear connection from data to results to discussion and conclusion (12 points).	24	22
Reproducibility	Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified.	28	26
Verification	Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated (10 points), the method of comparison is clearly stated (5 points), and the result of verification is clearly stated (5 points).	20	18
		100	94

Describe 3-5 things that are done well in the project.

Easy to follow the progression, results section very well formulated.

Data tables very detailed and helpful

With the results/verification you make it clear what direction you are heading/can improve which is cool

Clear and easy to access references

Describe 3-5 areas you could see room for improvement. Be specific and provide suggestions for how these areas could be improved.

One thing that would be nice for someone not familiar with your project would be to spell out the acronyms (the first time) to bring some more context along with your very detailed content. You do this on some but not all and its kinda random throughout the sections

Methods section seems to lack some overall organization to it. Maybe restructure how it is layed out to aid the reader

Maybe add a bit more context with your conclusions, as someone unfamiliar with Mars most of the lingo didn't make sense

PROJECT AUTHOR ONLY:

What specific actions will you take to respond to this review?

1. Implement notation on Martian features in maps/clips for the general audience and spell out all acronyms and truncated words throughout.
2. Revisit methodology after initial findings for data sources and list out new methods and purpose for it.
3. Explain Martian terminology and geological implications by giving overview in presentation and possibly in abstract.

Peer Review 2

Name: Diego Osorio

Email: osori050@umn.edu

Directions: Fill out rubric and answer prompts. Project author fill out last section.

Category	Description	Points Possible	Score
Structural Elements	All elements of a lab report are included (2 points each): Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score	28	26 ^a
Clarity of Content	Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level (12 points). There is a clear connection from data to results to discussion and conclusion (12 points).	24	18 ^b
Reproducibility	Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified.	28	28
Verification	Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated (10 points), the method of comparison is clearly stated (5 points), and the result of verification is clearly stated (5 points).	20	20
		100	92

^a No project repository link

^b The text and the overall goal are a bit hard to understand in a quick read due to punctuation mistakes

Describe 3-5 things that are done well in the project.

1. The data sources are clearly identified and there are backups in case the core data cannot be retrieved or processed
2. The project considers previous work to set the basis and compare preliminary results.
3. As the project is built on undergraduate work, the upside is that the author is already familiar with the types of datasets used and typical issues which leads to low time-consuming when troubleshooting.

Describe 3-5 areas you could see room for improvement. Be specific and provide suggestions for how these areas could be improved.

1. Deepen in how geological features on Earth can be used to verify the results on Mars. It is mentioned that Mars had liquid water and that yielded the geological units now existing on the red planet which are similar to Earth's. However, it is not stated how those units on Earth will help to verify the project's findings.
2. The two workflows shown are very general. More details regarding tools, inputs, and outputs are needed so the project can be reproduced. Also, these workflows are raw

diagrams taken from external sources. They need to be adapted to the purpose and limitations of this project.

3. There are several mistakes in the writing, such as missing words, punctuation mistakes, and redundancy, among others, that do not make the text organic and intelligible. Proofreading is highly recommended. Also, tools such as Grammarly are very useful for this.

PROJECT AUTHOR ONLY:

What specific actions will you take to respond to this review?

1. Give side by side image explanatory analysis of certain Earth geological features that are similar to that Martian features in the final report/presentation.
2. Finalize definitive toolsets, images, and ETL of data that will be utilized for project from said sources and mirrored from literature review.
3. Use grammatical and writing spell checker for first and final drafts of report, likewise proofreading the reports before turning in for coherence and comprehension.

Peer Review 3

Name: Rob Hendrickson

Email: hendr862@umn.edu

Directions: Fill out rubric and answer prompts. Project author fill out last section.

Category	Description	Points Possible	Score
Structural Elements	All elements of a lab report are included (2 points each): Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score	28	28
Clarity of Content	Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level (12 points). There is a clear connection from data to results to discussion and conclusion (12 points).	24	18
Reproducibility	Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified.	28	26
Verification	Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated (10 points), the method of comparison is clearly stated (5 points), and the result of verification is clearly stated (5 points).	20	20
		100	92

Describe 3-5 things that are done well in the project.

- 1) The presentation is very visually striking/awesome and does a good job of introducing the topic.
- 2) The code is consistently commented!
- 3) The descriptions and captioning in the results section are great and really demonstrate you know the material.
- 4) Overall, I think the hypothesis is solid and the fact that you have much of the groundwork already laid out allows you to really get into some cool analysis. How do we quantitatively prove that the water and tectonic features are from different eras?!

Describe 3-5 areas you could see room for improvement. Be specific and provide suggestions for how these areas could be improved.

- 1) Visualizations are key and I think that different colormaps/classification schemes would make a huge difference (particularly with slope, aspect, and the various linear features). Maybe looking at the distribution (histogram) of values to identify good breakpoints in the classifications?

- 2) For your code, [Markdown](#) could be utilized for organization. Using header levels to identify subsections is nice. Also splitting code cells when you're performing different sub-processes. Don't forget to `.close()` your rasters after you save the values!! Note: if you put the parameter, `ax = ax`, into your `geopandas .plot()` then the lines would be on the same figure as your raster.
- 3) Much of your descriptions/explanations within the prospectus come later in the paper. This kind of leaves the reader at a loss initially. I think the problem statement section could be expanded significantly with this information.
- 4) Methods and future work/discussion could be expanded as well. How do you plan to look at this quantitatively? Are you hoping to automate this work so new imagery could be plugged in as acquired?

Overall this project is exciting! I'm just left with a few questions that I'm sure you're working on. Great work.

PROJECT AUTHOR ONLY:

What specific actions will you take to respond to this review?

1. Use more colormaps and optimal distributions for imagery/digital products given configuration to each linear feature or aspect of Martian surface.
2. Subdivide code and follow best practices and rules to give descriptive ideation of what code does and what values/variables are. Since the Martian nomenclature is broad in context, the general audience must be more descriptive in area, generalize to descriptive use of code with comments and markdown cells.
3. Expand on initial findings in undergraduate work and explain why these matters are important and compare to Earth and geological past. Not media res (in the middle), Congruent throughout Beginning, middle and end with, why Tharis Mons is geologically different from other parts of Mars (geologically and biophysically) and similar to Earth (with reference to literature).
4. Use of Spatial Moran's I for each surface product or study area in general, Cost Surface Analysis, will automate the digital products and digitize the yardangs.