“国际学生学术能力提升工程”系列讲座

丝路博士论坛

Silk Road Doctor Forum

（2021-6）

中国地质大学（武汉） 国际教育学院

“国际学生学术能力提升工程”系列讲座

My self learned research art that may work for you

Muhammad Afaq Hussain

School of Geography and Information Engineering

Research Papers

- Remote Sensing
- Journal of the Indian Society of Remote Sensing
- Civil Engineering Journal

remote sensing

MDPI

Article

PS-InSAR-Based Validated Landslide Susceptibility Mapping along Karakorum Highway, Pakistan

Muhammad Afaq Hussain [1], Zhanlong Chen [1,*], Run Wang [1] and Muhammad Shoaib [2]

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Abstract: Landslide classification and identification along Karakorum Highway (KKH) is still challenging due to constraints of proposed approaches, harsh environment, detail analysis, complicated natural landslide process due to tectonic activities, and data availability problems. A comprehensive landslide inventory and a landslide susceptibility mapping (LSM) along the Karakorum Highway were created in recent research. The extreme gradient boosting (XGBoost) and random forest (RF) models were used to compare and forecast the association between causative parameters and landslides. These advanced machine learning (ML) models can measure environmental issues and risks for any area on a regional scale. Initially, 74 landslide locations were determined along the KKH to prepare the landslide inventory map using different data. The landslides were randomly divided into two sets for training and validation at a proportion of 7/3. Fifteen landslide conditioning variables were produced for susceptibility mapping. The interferometric synthetic aperture radar persistent scatterer interferometry (PS-InSAR) technique investigated the deformation movement of extracted models in the susceptible zones. It revealed a high line of sight (LOS) deformation velocity in both models' sensitive zones. For accuracy comparison, the area under the curve (AUC) of the receiver operating characteristic (ROC) curve approach was used, which showed 93.44% and 92.22% accuracy for XGBoost and RF, respectively. The XGBoost method produced superior results, combined with PS-InSAR results to create a new LSM for the area. This improved susceptibility model will aid in mitigating the landslide disaster, and the results may assist in the safe operation of the highway in the research area.

Keywords: Karakorum Highway; susceptibility mapping; interferometric synthetic aperture radar; extreme gradient boosting; random forest

check for updates

Citation: Hussain, M.A.; Chen, Z.; Wang, R.; Shoaib, M. PS-InSAR-Based Validated Landslide Susceptibility Mapping along Karakorum Highway, Pakistan. *Remote Sens.* **2021**, *13*, 4129. https://doi.org/10.3390/rs13204129

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CONTENTS

- Know about Community
- Research
- Writing
- Abstract
- Summary
- My Research Paper

KNOW YOUR COMMUNITY

Knowing the academic context of your research, will help you define the importance of the research, and it may also help you to think about your future career.

- Which academic Conference are important for your research ?
- Which academic Journals are relevant for your research?
- What are the important theories and concepts in your particular research domain?
- Who are the influential researchers, in that academic community?

First of all, This process is not one short process. Its continuous process. There is no one standard way. YOU LEARN AS YOU GO.

CONT.…

Two aspects

Making precise researches

- Your priority is reading the Article that use the same methodology as your research.

Discovering Researchers

Discover Key researcher in your topic

- You will find who are working on your topic?
- Who are important for your research domain ?
- Who are influential in that specific community?
- In fact you need to look through a plenty of academic papers to understand better about your scientific community BUT you need not read all of them

CONT.…

Classify into Two Groups

- Essential Papers
- Related Papers

Reading articles you will find few domains that are essential to your research focus. And several domains that relates to your research. This differentiation between essential and related helps you to position your research under the scientific context.

Identifying academic conferences and journals will help you to discover the ecosystem of the community.

- Visiting nearby research centers
- Visiting nearby experimental laboratories
- Making a recent 10 years bibliography of specific topic may also help you.

- You should attend Conferences and meet with Autor's and academic professionals who can help you, and that will be starting point of your strong academic network.
- To some effect, knowing your community helps you understand the academic context of your research, and in fact knowing your community is understanding about your research itself.

RESEARCH PAPER

- describe, explain, predict and control the observed phenomenon.
- A systematic approach must be followed for accurate data. Research is based on logical reasoning and involves both inductive and deductive methods.
- The data or knowledge that is derived is in real time from actual observations in natural settings.
- There is an in-depth analysis of all data collected so that there are no anomalies associated with it.
- Research creates a path for generating new questions. Existing data helps create more opportunities for research.
- Research is analytical in nature. It makes use of all the available data so that there is no ambiguity in inference.
- Accuracy is one of the most important aspects of research. The information that is obtained should be accurate and true to its nature.

RESEARCH PAPER

- requires you to critically think about, evaluate, organize, and compose
- is an assignment or project that grows over time as you interact with other sources
- varies in length

There are two major types of Research.

- **Qualitative Research** is a process that is about inquiry. It helps create in-depth understanding of problems or issues in their natural settings. This is a non-statistical method.

- **Quantitative Research** method uses a computational and statistical process to collect and analyze data. Quantitative data is all about numbers.

GOAL SETTING

- Base paper should high rank journal
- Target journal be T1 and T2
- Paper citation should be high rank journal
- Publisher should be high e.g. Nature, Elsevier, Springer ….

HOW DO YOU USUALLY CHOOSE A TOPIC?

- Read.
- Talk with a Professors, friends and classmates.
- Write down your initial thoughts about the topic.

Breadth. You may need to start broad and let your research take you narrower.

Originality. Choose a topic that will allow you to contribute to the field, rather than just regurgitate facts.

Sources. On the other hand, also choose a topic that has scholarly grounding.

NARROWING THE TOPIC

- Focus on a specific TYPE or CLASS
- Focus on a particular PLACE or REGION
- Focus on a certain TIME PERIOD
- Focus on a certain ASPECT
- Focus on a specific POPULATION
- Focus on a RELATIONSHIP with two or more topics
- COMBINE different kinds of focuses

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- Focus on a RELATIONSHIP with two or more topics
- COMBINE different kinds of focuses

Tips: Use journalistic questions: who?, what?, when?, where?, why?

Review recent literature (journals, trade papers, etc.)

Recall questions asked in class.

Apply your paper to your career goals.

Talk to your professor.

THE WRITING PROCESS

- Outline
- Draft
- Revise
- Edit

BENEFITS OF AN OUTLINE

- Aids in the process of writing
- Helps you organize your ideas
- Presents your material in a logical form
- Shows the relationships among ideas in your writing
- Constructs an ordered overview of your writing
- Defines boundaries and groups
- Prevents you from “straying” from the topic

BENEFITS OF AN OUTLINE

- **Research**: Perform initial research to learn about your chosen topic.
- **Brainstorm**: List all the ideas that you want to include in your paper.
- **Organize**: Group related ideas together.
- **Order**: Arrange material in subsections from general to specific or from abstract to concrete.
- **Label**: Create main and sub headings.

OUTLINE TIPS

- **Begin early!** A strong, detailed outline is a crucial step of the writing process.
- **Refer to your outline often.** A strong outline provides a consistent backbone during the writing process.
- **Be as specific as possible.** This will be your guide throughout the entire writing process.
- **Avoid having too many subheadings.** This may indicate that you can further narrow the topic of your paper.
- **Don't be afraid to change your outline.** Further research may provide additional information or counterpoints.
- **Allow yourself enough time to make changes.** Attempting a complete overhaul of your paper the night before it's due is both frustrating and often futile.

CUBING

- Cubing is a good way to look at your topic from 6 different perspectives.

Here's what you do:

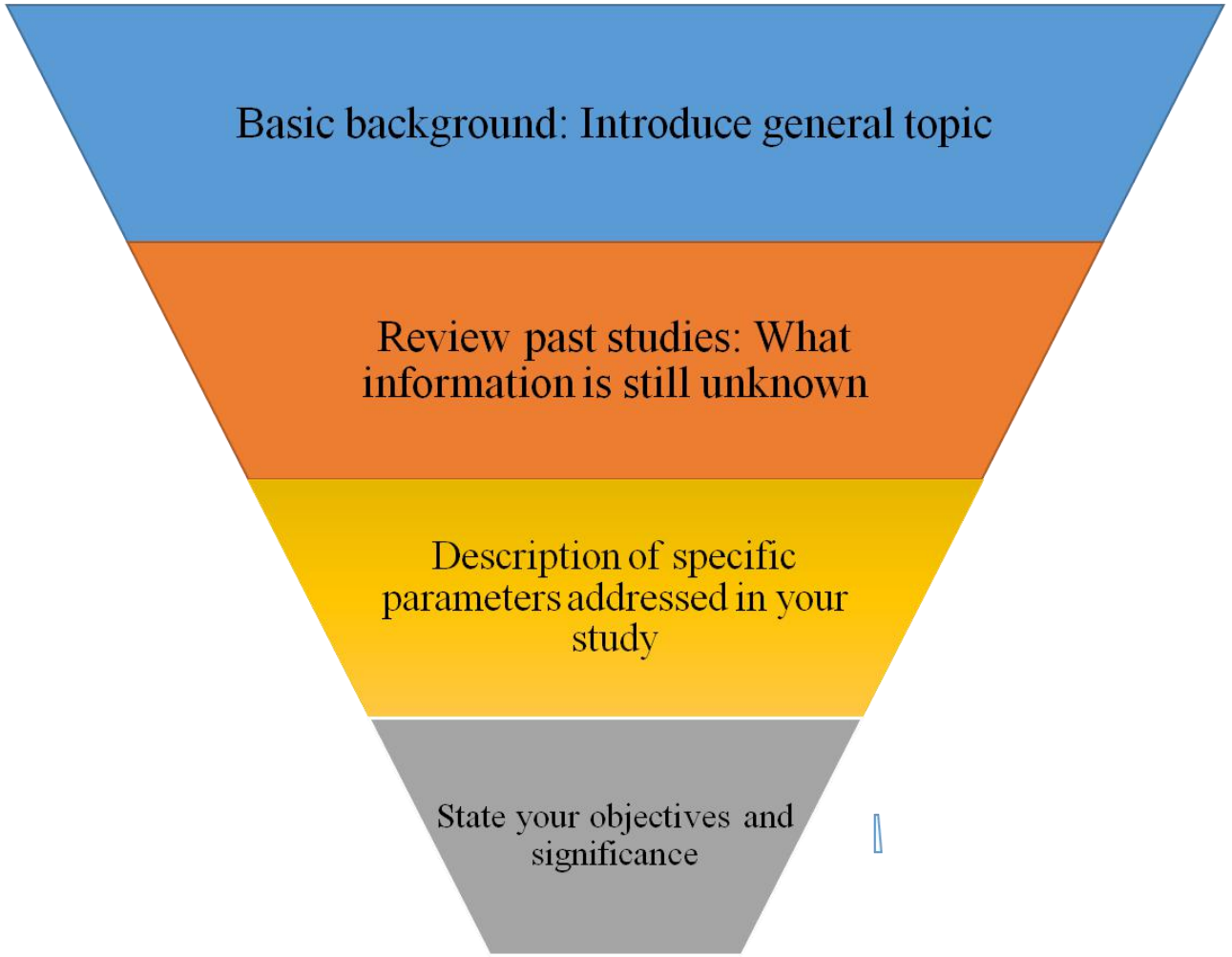
- Describe it
- Compare it
- Associate it
- Analyze it
- Apply it
- Argue for and against it

INTRODUCTION

- leads the reader from a general research issue or problem to your specific area of research. This is usually done by summarizing current understanding (research to date) and background information about the topic.

- ✓ Establish the problem or issue you want to research: • Highlight the importance of the problem/issue, and/or • Make general statements about the problem/issue, and/or • Present an overview on current research on the issue or problem.
- ✓ Provide an overview of existing thinking about and/or research into your research problem.
- ✓ Identify a gap, problems or unresolved issues in the existing knowledge/research that your research can fill or identify a research focus that will be useful
- ✓ State your research question, your hypothesis and your knowledge claim, making sure to place your research within the gap in existing knowledge. • State the intent of your study, including the research question and your hypothesis, • Outline the key characteristics of your study, • Describe important results that you have found or hope to find
- ✓ Stress the value and relevance of your research. Why is your research relevant? What will it contribute to the field (and beyond)? Why should we care about your research?

STRUCTURE OF INTRODUCTION



1. Introduction

The energy sector plays an essential role in sustainable economic growth for both developed and developing economies, and energy is a key input in production processes. Accordingly, because of the importance of energy in the economic growth, studies have investigated the nexus between energy and growth (Sarwar et al., 2017; Shahbaz et al., 2017a; Isik et al., 2018; Nordin and Sek, 2018; Tugcu and Topcu, 2018; Benkraiem et al., 2019). The manufacturing sector is heavily dependent on electricity availability. The consequences of greater energy demand are the substantial pressures on the environment and ecosystem and are pertinent to energy economists, environmentalists, and policymakers worldwide that design and implement friendly energy–environment policies. Although the energy–growth nexus is valid for sustainable growth, it is also true that energy use has been responsible for environmental degradation through carbon dioxide (CO_2) emissions, which are emitted from the burning of fossil fuels in industrial production. Rising energy demand and the concern for climate change caused by the massive consumption of fossil fuel sources

Background Information

Significance

and that a strong relationship would exist between the environment and economic activities. For the purpose of this study, we focus on the relationship between ecological footprint (EF), economic growth, and energy consumption in Pakistan.

Our study investigates the environmental quality, energy consumption, and economic growth nexus by focusing on the Pakistan case. Investigations of environmental degradation are notable for many reasons. First, according to the World Bank (2016), there are critical, worrying situations in terms of global environmental pollution. Second, the Pakistan energy situation is critical because the total demand for energy is more than the supply. Therefore, the energy sector relies on fossil fuels to generate more electricity, disrupting the environment in terms of CO_2 emissions and increasing trade deficits because of fossil fuel imports.

Under these circumstances, we consider EF as one unit of various natural areas that contribute to and support the national economy. This information and other information on the accessibility of forests, water, fresh air, grazing, and cultivation areas compose the EF. Thus, in this

In the literature, empirical studies have investigated the interactions among economic activities, energy consumption, and environmental degradation. The literature is divided into two sections: the first section has considered economic–environment nexus. This link can has been demonstrated by investigating variability and using monotonic, quadratic, and cubic approaches. However, because of the economic situation of Pakistan, we use the nonlinear and asymmetric techniques to assess the relationship between the variables. The pioneer analysis (Grossman and Krueger, 1991; Grossman and Krueger, 1995) of growth in economies demonstrated that it might not affect the environment. Balado-Naves et al. (2018) also considered the idea that expending economic activities may produce new opportunities for a friendly environment and improve greener technical efficiency. In a literature review, the majority of studies the environmental quality as CO_2 emission, but recently, a few studies have used EF as a proxy of environmental quality (Lanouar, 2017; Bello et al., 2018). Yousefisahzabi et al. (2011) investigated the link between the CO_2 emission and economic growth by using a panel dataset to investigate the case of Iran. Unidirectional causality was noted by Lee and Yoo (2016)) after they

Review of literature

WHAT ARE AIMS & OBJECTIVES?

If you build a house without foundations what will happen. It'll collapse

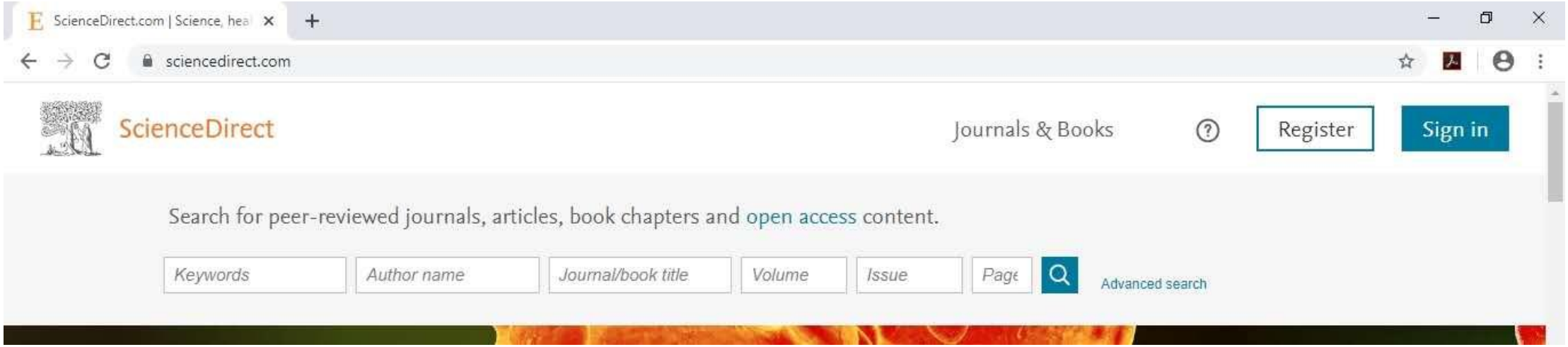
➢ When you write aim/objective, make sure they are SMART:

- **S**pecific: talk precise and clear way about what you are going to do
- **M**easurable: how will you know when you have achieved your aim
- **A**chievable: make sure that you aren't overly ambitious.
- **R**ealistic: recognize the time and resource constraints that come with doing a Master and don't attempt to do too much.
- **T**ime constrained: determine when each objective needs to be completed.

SEARCH LITERATURE

- https://www.sciencedirect.com/
- http://www.lib.cug.edu.cn/
- https://onlinelibrary.wiley.com
- https://connect.springerpub.com
- https://pubs.acs.org
- https://www.researchgate.net/
- http://www.6453.net
- https://scholar.google.com/
- https://sci-hub.tw/

CONT.....



METHODOLOGY

- The type of research you did
- How you collected your data
- How you analyzed your data
- Any tools or materials you used in the research
- Your rationale for choosing these methods

Tips for writing a strong methodology

- Focus on your objectives and research questions
- Cite relevant sources
- Write for your audience
- Discuss obstacles

RESULTS AND DISCUSSION

- List specific data and methods (preferably in materials method section)

- Have pretty and clear figures
  - Serve as a useful way to make your article structure more attractive

- Cause- consequence with clear logic
  - Use the combination of results in a clever way
  - Explain one aspect of result at once specifically.

- Compare (discuss) important results with available literature to justify the superiority of own results.

WRITING THE CONCLUSION

- If the argument or point of your paper is complex, you may need to summarize the argument for your reader.
- If prior to your conclusion you have not yet explained the significance of your findings or if you are proceeding inductively, use the end of your paper to add your points up, to explain their significance.
- Detailed policies and suggestion of your study
- Perhaps suggest what about this topic needs further research.

ABSTRACT

- Main Objective
- Methodology
- Results
- Implication/Significance

ABSTRACT

- Main Objective
- Methodology
- Results
- Implication/Significance

The [**main objective/topic/issue**] of this article is to examine the impacts of energy consumption and economic growth on environmental quality in Pakistan. We use the ecological footprint (environmental quality) as a target variable, the control variables of gross domestic products are a proxy of economic growth, and energy consumption and gross fixed capital formation are proxies of capital from 1971 to 2014. [**Methodology**]For this purpose, a unit root test with break dates is employed for a stationary check, and a BDS test is used for nonlinearity. The nonlinear autoregressive distributed lag approach is employed to assess the asymmetric co-integration among the variables. [**These results**] confirm the asymmetric co-integration among the variables. The asymmetric causality technique is also applied to scrutinize the causal link between the variables. The asymmetric feedback effect is observed between positive shocks to environmental quality and energy consumption, and symmetrically, environmental quality causes energy consumption. By contrast, the neutral effect is observed among environmental quality, economic growth, and capital. [**Implications/policy**]Based on these findings, current energy portfolios should be diversified by either enhancing or incorporating renewable energy technologies, and this is indispensable to support the existing successful strides of environmental policies. Thus, policymakers must buttress their commitments to reduce emissions by sustaining and decarbonizing the trajectory of economic growth.

PRESENTATION OF SCIENTIFIC JOURNALS

- **Composition of editorial board**

- That's allow you to look into the kind of research the editors are doing, and what their areas of expertise are.
- You can than check is the paper you want to submit is coherent with editorial line of journal.
- You can also adept the paper so that's its fits with what the editors are looking for.

- **Articles most cited of this journal**

- Look at the type of articles that are most referenced in the journal
- It's the essential you include references that are most commonly cited in publication in this journal, especially in your field of interest
- This shows that you share the same language and belong to the same scientific community.
- Think of it as a matching exercise.
- By tailoring your paper for one academic journal, hence one editor, you minimize the disk reject risk.

RESPONSE LETTER

major concerns.

Comment 1. The contribution of this paper is very minor or not expressed sufficiently! This needs to be shown clearly in both abstract and Introduction. The motivation and contribution are very important to show how this paper is different from others in literature.

Response: For your kind information, the required and necessary information is pasted in last paragraph of the "Introduction section". Please find in revised manuscript. For your convenience the required information pasted here.

"The reason for our study's to contribute to the existing literature of growth-energy nexus by examining the asymmetric link between the pair of variables. We adopt an asymmetric approach because of positive and negative variation in one variable does not have same effect on other variable. The presence of nonlinear nexus between the variables can be affected by various factors, such as political changes, financial and economic issues, and technology innovations that bring positive or negative variations in energy consumption have not the same impact on economic growth. We also enrich the existing energy economics literature by employing the NARDL bounds testing approach developed by Shin et al. (2014) to examine the asymmetric cointegration between economic growth and its determinants".

Comment 2. The introduction style is not consistent with Energy readers. Author(s) need to improve the Introduction.

Response: According to your virtuous suggestion, the Introduction section have been modified accordingly. Please go through Introduction section in our revised manuscript.

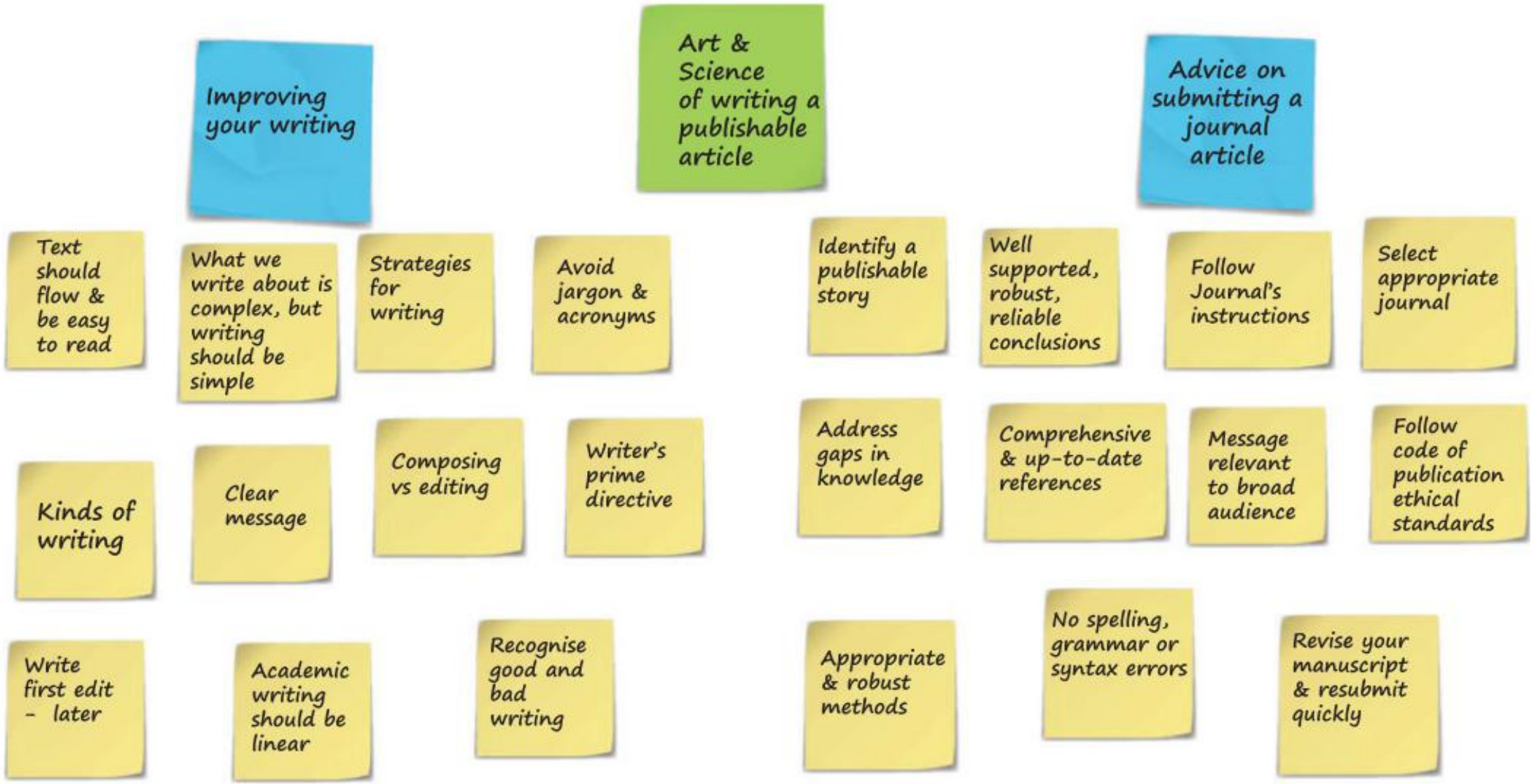
Comment 4. The data-section is the heart of any technical study. Thus author(s) need to pay more attention to data by discussing in more details the variables, definition of variables, elaborate on the statistics represented in table (1), frequency and sources supported with other related figures for example! and you may give a convincing reason for having the data up to 2014 only while we are in 2019!

Response: According to your good advice note, the Data section revised accordingly and Table (1) explained in section 3.1 (Descriptive statistics and unit root test). We scant our data set up to 2014 because data set was not available over the entire time span for all comprised variables.

Comment 5. Method and models need to be discussed more clearly. No need to provide historical literature about the models, just focus on the equations and the usage of your variables in those equations and provide a strong justification for using NARDL? What advantages does it provide? Refer to explanation provided by Pesaran (1997), Pesaran et al. (2001) then explain how it fits with this case. Why not VECM? What about the cointegration? It is not clear!

Response: Thanks for your timely and valuable suggestion, the methodology section has been updated accordingly, please have look in to our revised manuscript. For cointegration, the NARDL model F-statistics (F_{PSS}) from (Pesaran, Shin et al. 2001) endorse the presence of asymmetric cointegration and t-statistic

SUMMARY



SUMMARY

Improving your writing

Art & Science of writing a publishable article

Advice on submitting a journal article

Text should flow & be easy to read

What we write about is complex, but writing should be simple

Strategies for writing

Avoid jargon & acronyms

Identify a publishable story

Well supported, robust, reliable conclusions

Follow Journal's instructions

Select appropriate journal

Kinds of writing

Clear message

Composing vs editing

Writer's prime directive

Address gaps in knowledge

Comprehensive & up-to-date references

Message relevant to broad audience

Follow code of publication ethical standards

Write first edit - later

Academic writing should be linear

Recognise good and bad writing

Appropriate & robust methods

No spelling, grammar or syntax errors

Revise your manuscript & resubmit quickly

MY RESEARCH

- Landslide
- 74 landslides
- China Pakistan Economic Corridor (CPEC)
  (Project value in 2017 is 62 billion dollar)
- XGBoost (93%) and RF (92%)
- PS-InSAR technique

remote sensing

MDPI

Article

PS-InSAR-Based Validated Landslide Susceptibility Mapping along Karakorum Highway, Pakistan

Muhammad Afaq Hussain [1], Zhanlong Chen [1,*], Run Wang [1] and Muhammad Shoaib [2]

[1] School of Geography and Information Engineering, China University of Geosciences (Wuhan), Wuhan 430074, China; khanafaq121@cug.edu.cn (M.A.H.); runwang@cug.edu.cn (R.W.)
[2] State Key Laboratory of Hydraulic Engineering Simulation and Safety, School of Civil Engineering, Tianjin University, Tianjin 300101, China; xs4shoaib@tju.edu.cn
* Correspondence: chenzl@cug.edu.cn

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Keywords: Karakorum Highway; susceptibility mapping; interferometric synthetic aperture radar; extreme gradient boosting; random forest

check for updates

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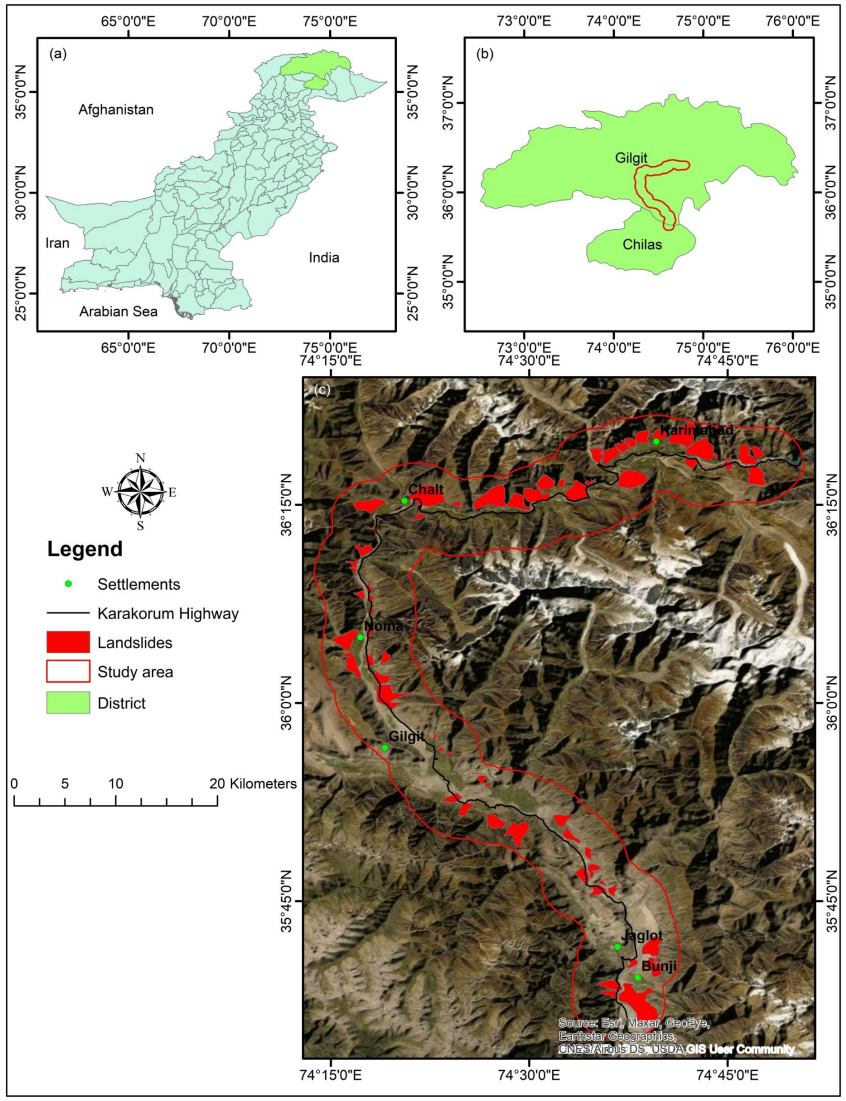
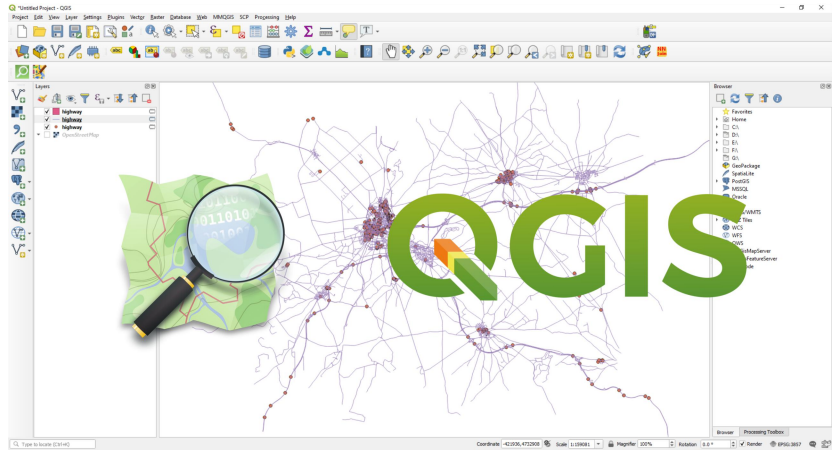
STUDY AREA

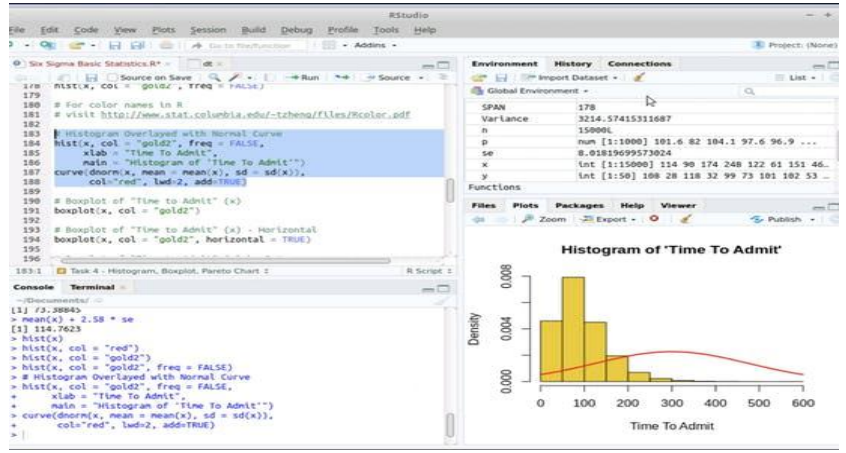
- 170 km with 5 km radius buffer
- Rocks are Paleozoic, Proterozoic, and Mesozoic in age
- Maximum temperature 16 to 25 ◦ C
- Minimum temperature −3 to −21 ◦ C

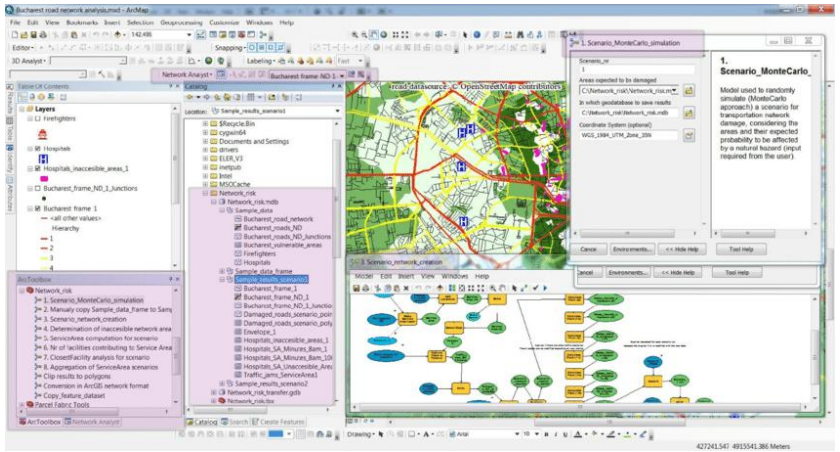


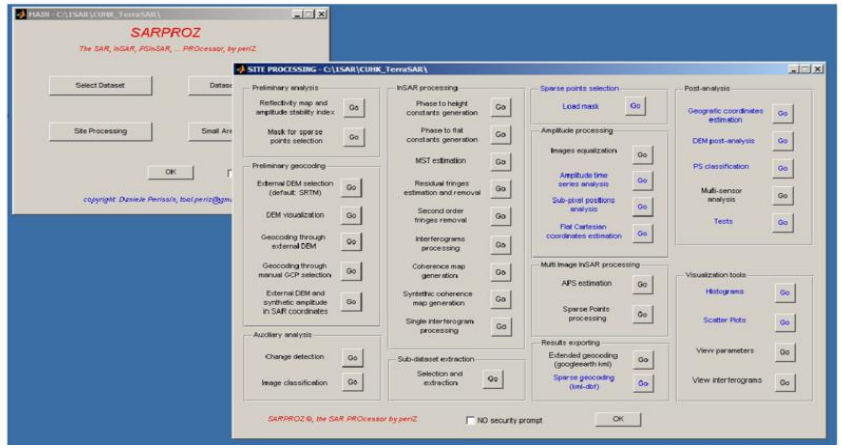
SOFTWARES

- ✓ Google Earth
- ✓ QGIS
- ✓ Arc GIS 10.4
- ✓ R Studio
- ✓ Origin 2019b
- ✓ SARPROZ ©

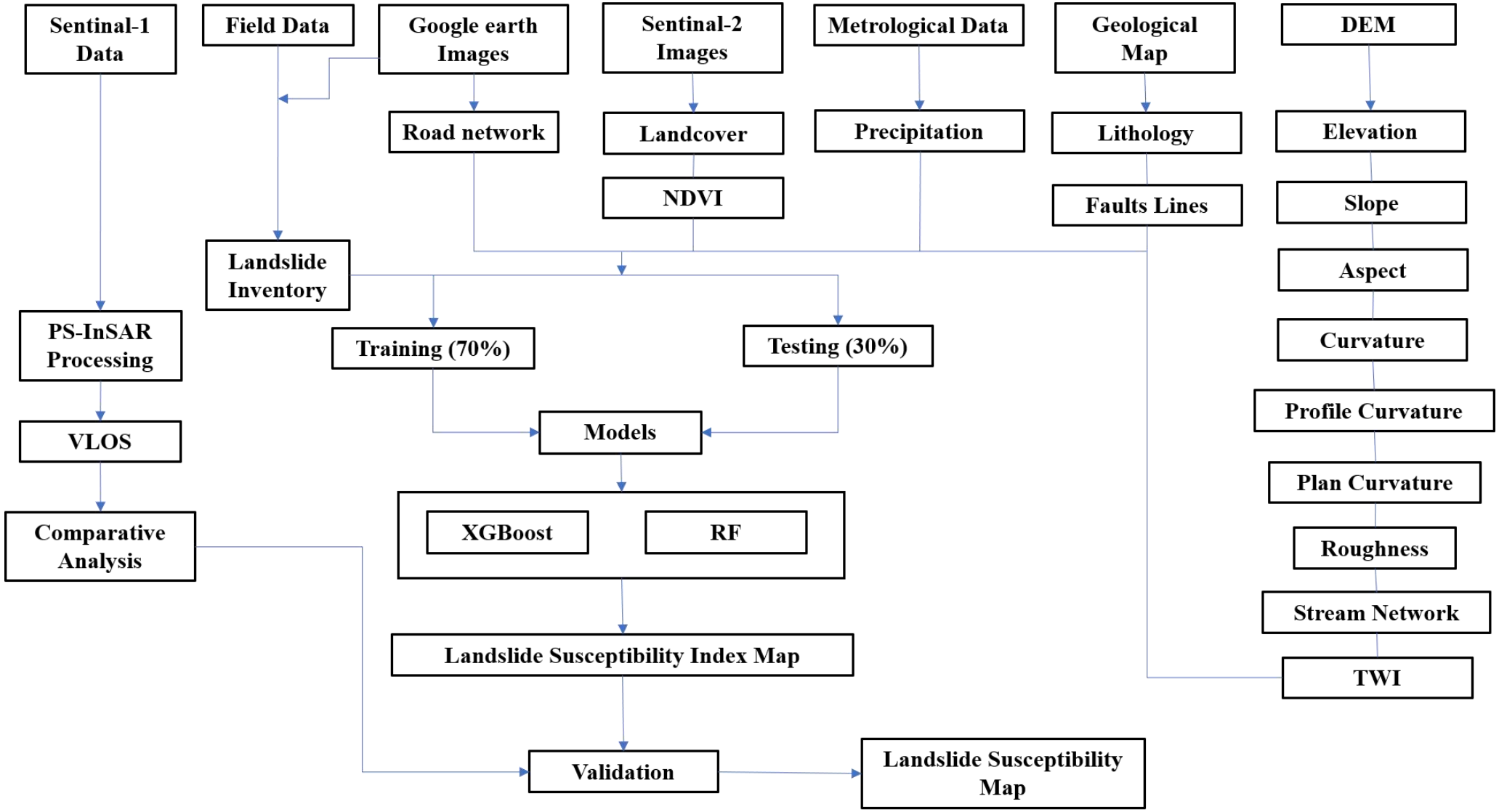




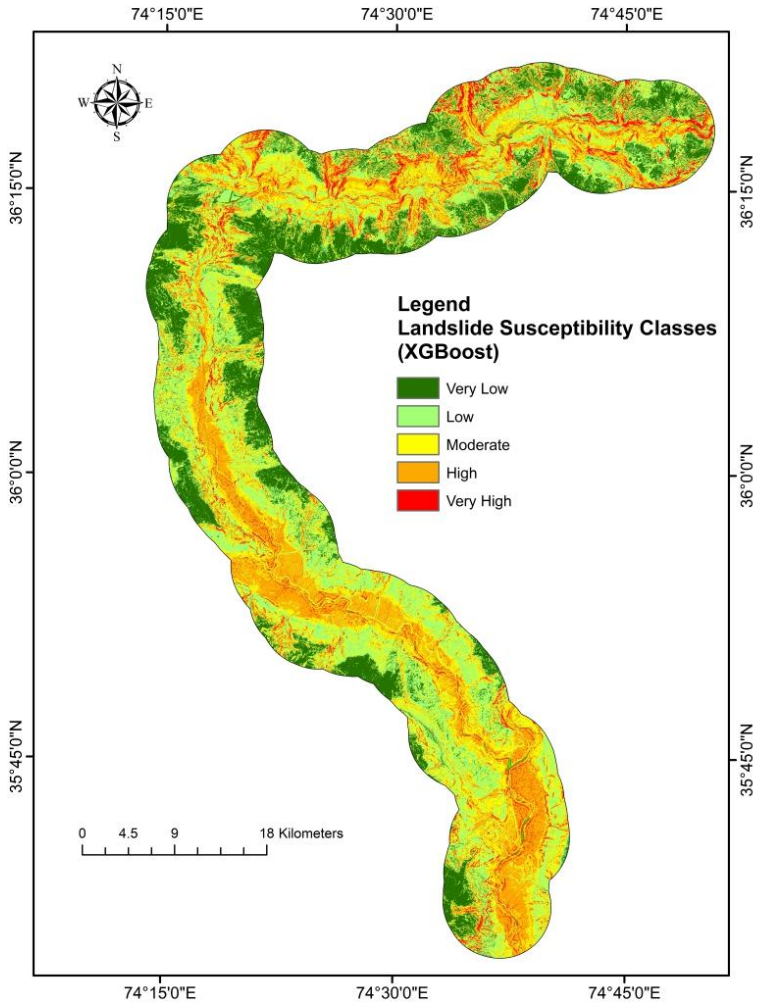


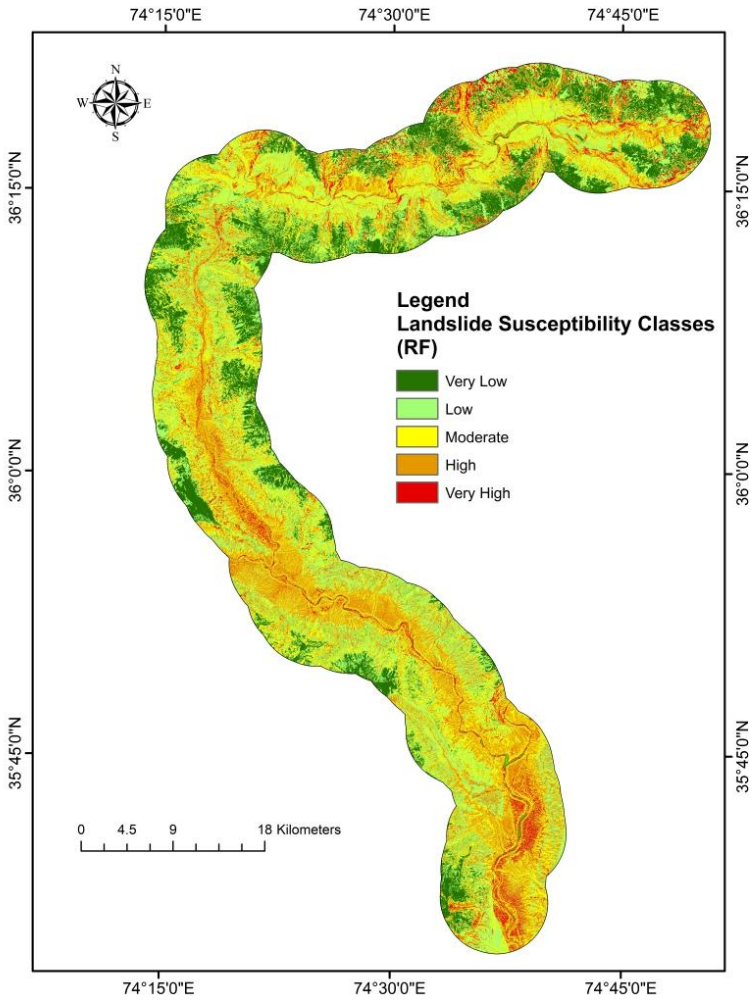


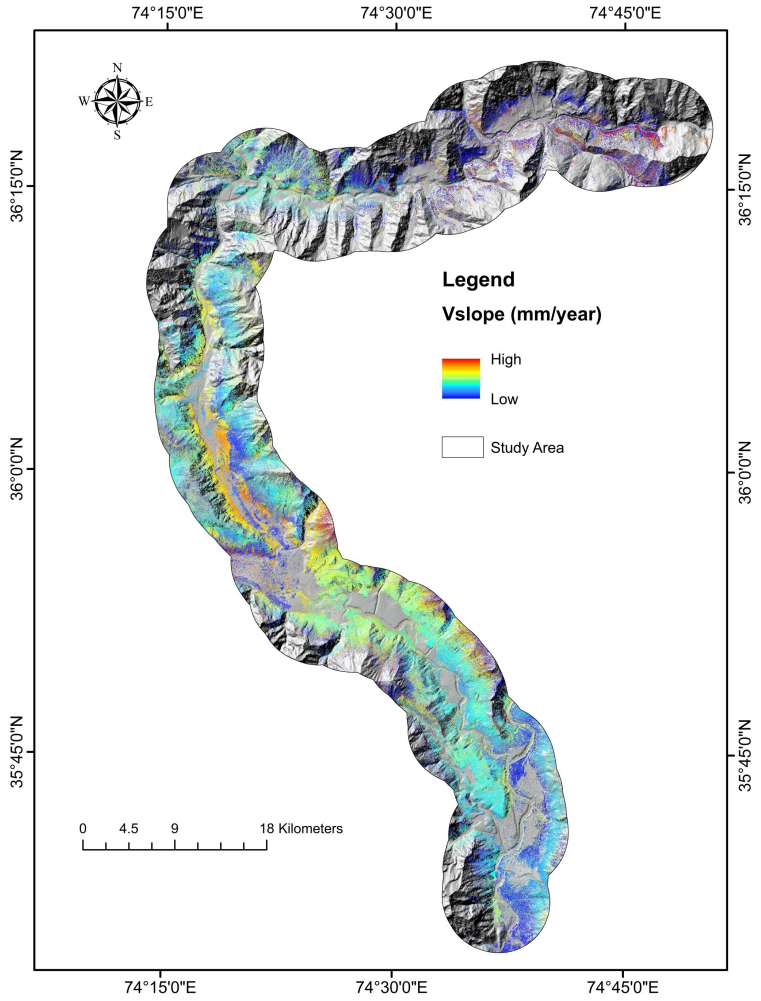
METHODOLOGY



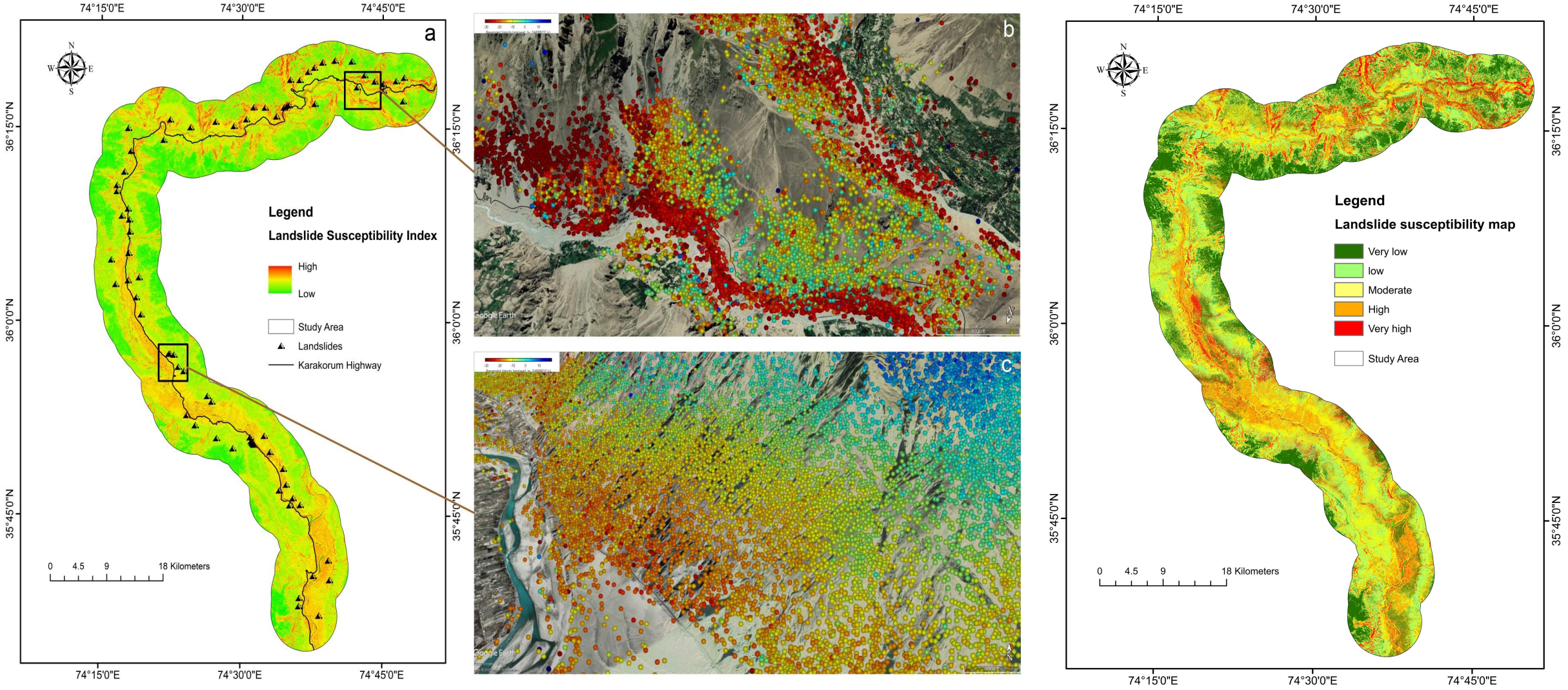
RESULTS







RESULTS



Thank you

谢谢！