Vietnam National University
Ho Chi Minh city University of Technology
Faculty of Computer Science and Engineering

Field Trip Vung Tau

EARTH SCIENCE
Group 5 - CC01

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1 INTRODUCTION

1.1 Purpose of Preparing the Field Trip Report

The purpose of this field trip report is to summarize and evaluate the geological, hydrological, biological, and environmental observations made during the field trip to Vung Tau, Viet Nam. This trip provided students with hands-on experiences to apply theoretical knowledge gained in the classroom to real-world geological formations and natural environments. Through this excursion, participants practiced essential field skills such as using a geological compass, measuring strikes and dips, identifying rock types (basalt, granite, diabase, and rhyolite), and interpreting geological structures in relation to tectonic processes. Additionally, the field trip served as a practical assessment to test students' comprehension of fieldwork techniques, observational accuracy, and teamwork in a professional geoscientific context.

1.2 Task Assignment Table of Group Members (L.O.3)

Name	**Student ID**	**Email**	**Assigned Section(s)**
Ho Minh Hoang	2211073	hoang.hominh230304@hcmut.edu.vn	Introduction & Conclusion & Field Diary
Nguyen Hoang Quan	2252681	quan.nguyenmedabanh@hcmut.edu.vn	I–III: Geosphere, Hydrosphere, Biosphere
Nguyen Hong Phuc	2252639	phuc.nguyencsck22@hcmut.edu.vn	IV–V: Atmosphere, Natural Resources
Pham Hoang Ha	2252176	ha.pham1104@hcmut.edu.vn	Reflection Post & Field Diary

Table 1: Group Members and Task Assignments

1.3 Task Allocation

- **Ho Minh Hoang:** Edited field trip diary, wrote the *Introduction* and *Conclusion*.
- **Nguyen Hoang Quan:** Responsible for Sections I–III:
  - I. **GEOSPHERE (L.O.1)** — Weathering, erosion, magma eruption, granitic and dyke intrusion.
  - II. **HYDROSPHERE (L.O.2)** — Groundwater in coastal dunes, riverbank and coastal erosion.
  - III. **BIOSPHERE (L.O.4)** — Biological weathering, mangrove ecosystems and coastal protection.
- **Nguyen Hong Phuc:** Responsible for Sections IV–V:
  - I. **ATMOSPHERE (L.O.3)** — Typhoons, rainfall characteristics, and their impacts.
  - II. **NATURAL RESOURCES (L.O.5)** — VNU-HCM quarry, basalt quarry, and petroleum industry in Vung Tau.
- **Pham Hoang Ha:** Edited field diary and composed the reflective post for social media summarizing key experiences and learning outcomes.

1.4 Natural, Technical, and Socio-Economic Characteristics of the Study Area

Vung Tau, located in southern Viet Nam, is a coastal city characterized by diverse geological formations and dynamic natural processes. The region features notable igneous rocks such as *basalt*, *granite*, *diabase*, and *rhyolite*, representing a rich geological history of volcanic and intrusive activities associated with the Cenozoic tectonic setting of Southeast Asia.

From a technical and scientific perspective, Vung Tau provides an ideal environment for field-based geoscience education. Students can directly observe phenomena such as weathering, coastal erosion, dyke intrusions, and groundwater dynamics in coastal dunes. The field trip encouraged the application of geological tools, compass measurements, and field mapping techniques essential for professional practice.

Socio-economically, Vung Tau serves as a vital industrial and tourism hub. It hosts major petroleum operations (notably the Vietsovpetro Joint Venture), basalt and granite quarries, and rapidly expanding infrastructure supporting maritime trade and tourism. These human activities have direct interactions with the local environment, emphasizing the importance of sustainable resource management and environmental protection.

Overall, the Vung Tau field trip allowed students to experience the role of a geologist in the field—combining scientific observation, environmental awareness, and teamwork. The activities, such as rock identification, slope measurements, and competitive group challenges (like mountain climbing and final-day assessments), fostered not only technical proficiency but also essential soft skills, collaboration, and enthusiasm for geological exploration.

2 GEOSPHERE (L.O.1)

2.1 Weathering in Laterite – Theory of Formation Mechanisms

Laterite forms through intense chemical weathering of silicate rocks in hot, humid tropical climates. Under these conditions, prolonged leaching removes soluble components such as silica and alkalis, leaving behind insoluble oxides of iron and aluminum (Fe2O3, Al2O3). The resulting red-brown soil profile is rich in iron and often shows pisolitic textures. At the *Hoi Son Pagoda outcrop*, this process is clearly observed through the deep reddish coloration, hardened crust, and nodular lateritic structure, indicative of prolonged subaerial exposure and oxidation.

Figure 1: Laterite

2.2 Erosion – Coastal Erosion Processes

Coastal erosion results from the continuous action of waves, tides, and currents acting upon unconsolidated or weakly lithified sediments. At the Cua Lap area, evidence of wave-cut notches, sand scouring, and shoreline retreat can be seen. The dominant erosional mechanisms include hydraulic action, abrasion, and longshore drift, which collectively reshape the coastline. Human activities such as tourism infrastructure and sand extraction have further accelerated erosion in this region.

Figure 2: Bien Cua Lap

2.3 Magma Eruption Processes – Rhyolite, Nha Trang Formation

Rhyolite, a fine-grained volcanic rock, represents the extrusive equivalent of granite and forms from high-silica magma that erupts explosively. During the eruption, rapid cooling near the Earth's surface leads to glassy textures and flow banding. In Vung Tau, rhyolitic outcrops belonging to the Nha Trang Formation reveal these features, highlighting the area's ancient volcanic activity and providing evidence of the magmatic differentiation and silica enrichment typical of continental crust volcanism.

Figure 3: Ryolite Bai Sau

2.4 Granitic Intrusion and Dyke Intrusion Processes

At Vung Tau, numerous diabase dykes are observed cutting through older granitic and rhyolitic formations, clearly illustrating the principle of cross-cutting relationships in igneous geology. These dykes were formed when mafic magma intruded along pre-existing fractures in the crust during later tectonic events.

Due to rapid cooling at shallow depths, the resulting rock exhibits a fine-grained, dark-colored texture, typically composed of plagioclase and pyroxene. The orientation of the dykes—mostly vertical or steeply inclined—reflects the regional stress field that facilitated magma injection. Over time, weathering and coastal exposure have made these intrusive bodies visible along outcrops near Bai Sau and the Vung Tau headlands.

These dykes provide strong evidence of multi-phase magmatic activity in the region, following earlier rhyolitic eruptions. Their composition and structure indicate a transition from felsic to mafic magmatism, marking the late stages of volcanic evolution in southern Vietnam's tectonic history.

3 HYDROSPHERE (L.O.2)

3.1 Groundwater in Coastal Sand Dunes

At *Cua Lap*, groundwater occurs within the porous sand dunes along the coastal zone, forming an unconfined aquifer system. The aquifer is primarily recharged by rainfall infiltration, with additional minor contributions from lateral subsurface flow. Physico-chemical analysis indicates that the groundwater is generally fresh to slightly brackish, depending on seasonal variations and proximity to the shoreline. In some local wells, signs of **saltwater intrusion** have been recorded due to over-extraction and tidal influence. This phenomenon highlights the vulnerability of coastal aquifers to anthropogenic pressures and emphasizes the need for sustainable groundwater management in coastal environments.

Figure 4: Sand at Cua Lap

3.2 Riverbank and Coastal Erosion

Riverbank and coastal erosion processes are prominently observed around the *Cua Lap estuary* and adjacent shorelines. The combined action of waves, tides, and river currents continuously reshapes the coastline through hydraulic action, abrasion, and longshore drift. Evidence of erosion includes scoured embankments, collapsing riverbanks, and exposed tree roots along the shore. Human activities such as sand mining and tourism infrastructure development have further intensified these natural processes. Coastal protection measures—such as vegetative stabilization and seawall construction—have been implemented to mitigate erosion and preserve the regional landscape.

Figure 5: Mangrove area near Cua Lap

4 BIOSPHERE (L.O.4)

4.1 Biological Weathering

Biological weathering was observed in several outcrops near *Vung Tau*, where plant roots penetrate rock fractures and joints. As the roots grow and expand, they exert mechanical pressure on the rock, gradually widening cracks and causing disintegration. This process, combined with biochemical reactions from root exudates, accelerates the breakdown of minerals and contributes to soil formation. The observed features clearly demonstrate the significant role of living organisms in shaping the Earth's surface through both physical and chemical weathering mechanisms.

4.2 Mangrove Forests and Coastal Protection

5 ATMOSPHERE (L.O.3)

5.1 Description of Typhoon Characteristics in Vietnam

Typhoon Intensity Classification and Distribution Vietnam uses its own tropical cyclone intensity scale based on sustained wind speeds measured on the Beaufort scale:

Vietnam's Tropical Cyclone Intensity Scale

Category	Sustained winds	Beaufort number
Tropical Depression	≤33 knots ≤61 km/h	6-7
Tropical Storm	34–47 knots 62–88 km/h	8-9
Severe Tropical Storm	48–63 knots 89–117 km/h	10-11
Typhoon	64–99 knots 118–183 km/h	12-15
Super Typhoon	≥100 knots ≥184 km/h	≥16

Figure 6: Scale

Annual Frequency of Typhoons and Tropical Cyclones Vietnam experiences a significant number of tropical cyclones annually due to its location along the western edge of the Pacific typhoon corridor. The frequency of storms directly affecting Vietnam varies based on regional factors and climatic conditions.

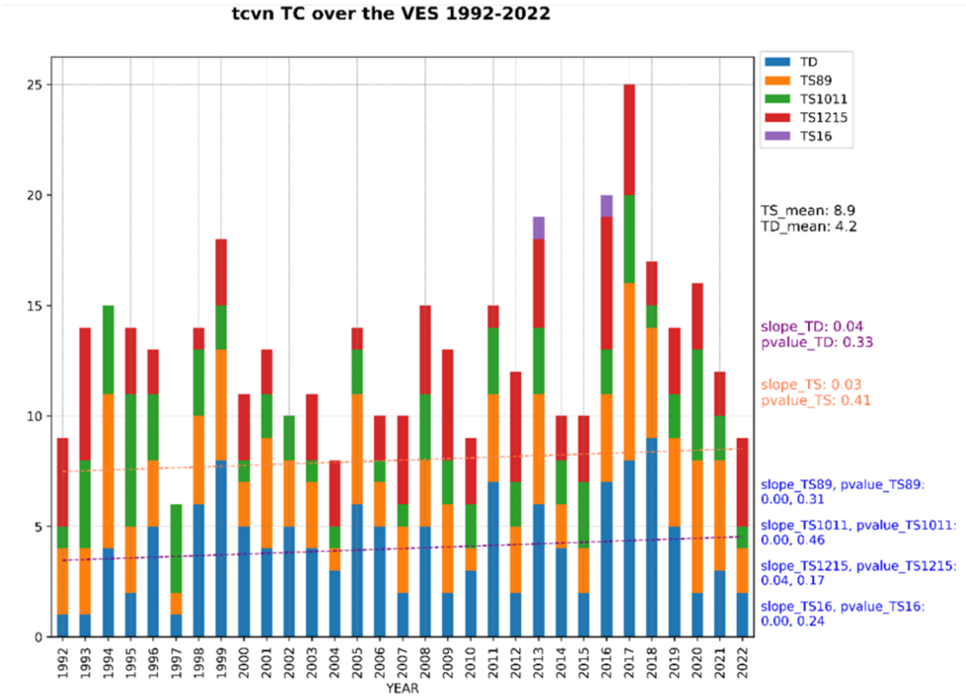

Figure 7: Typhoons count by year

Based on the statistical analysis for 31 years from 1992 to 2002, on average, there are approximately 13 Tropical Cs active over the EVS, consisting of 9 tropical storms and 4 tropical depressions. 1994, 1999, 2008, 2011, 2013,2016, 2017, 2018, and 2020 witnessed more Tropical Cyclones(TCs) than the average, especially in 2017 with a history record of 25 TCs over the EVS. On the other hand, there have been several years with the total annual TCs below 10, for instance, 1997, which had only 6 TCs . During the studied period, increasing trends with slopes of 0.03–0.04 TC/31 years are seen in the number of tropical depressions and tropical storms. In addition, in terms of tropical storms, the rise mainly occurs in the case of TS12-15, while the other classes have slight fluctuation. Since the "pvalue" suggests that the significant level of statistical analysis does not meet the 90% confidence level despite increasing trends in quantities of tropical depressions and typhoons, it is necessary to study further to as sure about these tendencies. Of the 406 TCs mentioned above, 130 TCs make landfall in Vietnam, accounting for about 32%. Most of them directly affect the Northern region and Thanh Hoa - Nghe An provinces in the early tropical storm season (from June to August), then expand the impacting location to Ha Tinh - Quang Ngai and the Central Highland region (from September to November). From December to January, TCs impact mostly to Binh Dinh - Binh Thuan and the Southern region; however, they rarely make landfall in February and March (not shown in Figure).Hence, these trajectories of TCs still follow well with climatological characteristics.

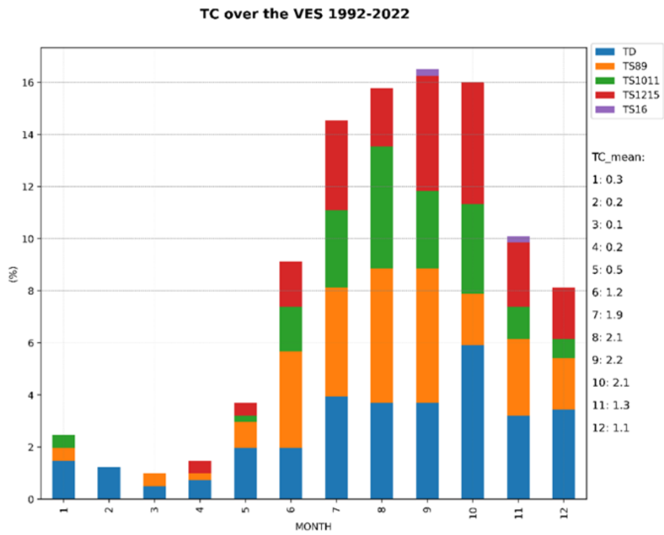

Figure 4. Percentage of Tropical Depression (TD), Tropical Storm Force 8–9 (TS89), Severe Tropical Storm Force 10–11 (TS1011), Typhoons Force 12–15 (TS1215), và Super Typhoons Force 16 or higher (TS16) active over the EVS during 1992–2022 based on monthly analysis. TC_mean represents the calculated average of tropical cyclones by month

There are the least number of TCs active over the Northwestern Pacific and EVS in February and March (Fig. 4), before a soar in June and the following months until October, then a drop since November. On average, from June to December, more than one TC appears per month, of which the most occurrence is 2.2 TCs in September, followed by August and October with 2.1 TCs. From January to May, the quantity reduces to under 0.5TCs .Typhoons with the maximum sustained wind force of 12–15 Beaufort only happen from April to December, while super typhoons with wind speeds of force 16 or higher are observed in September and November over the EVS. Figure 4. Percentage of Tropical Depression (TD), Tropical Storm Force 8–9 (TS89), Severe Tropical Storm Force 10–11 (TS1011), Typhoons Force 12–15 (TS1215), và Super Typhoons Force 16 or higher (TS16) active over the EVS during 1992–2022 based on monthly analysis. TC_mean represents the calculated average of tropical cyclones by month
Recent Trends: In the first 9 months of 2025, natural disasters in Vietnam have developed in a complex, unusual and more extreme manner than the average of many years and are concentrated with a high level of danger in the Northern, North Central and Central regions, showing a clear trend of seasonal shifts in natural disasters (extreme rains not only occur in the rainy season but also in the dry season), with severe intensity and wide range of impact.

The 2025 storm season recorded rare extreme numbers in terms of intensity, frequency and scope of influence. In the first 9 months of 2025 alone, the East Sea witnessed 14 storms and tropical depressions (10 storms, 4 tropical depressions), much higher than the average of many years. Of these, 6 storms (numbers 1, 3, 5, 6, 9, 10) directly and indirectly affected our country, creating a series of consecutive natural disasters, with almost no break long enough to overcome the consequences, significantly higher than the long-term average.

5.2 Description of Rainfall Characteristics in Vietnam by Region

Overall Rainfall Overview

Vietnam experiences diverse rainfall patterns across its three main regions due to its complex topography and exposure to multiple monsoon systems. The country's precipitation is characterized by strong seasonal variations, significant regional differences, and the dominant influence of monsoon circulation. Vietnam receives substantial annual rainfall ranging from 700 mm to 5,000 mm, with most locations receiving between 1,400 to 2,400 mm per year. The national average annual rainfall is 1,500 to 2,000 mm, with approximately 100 rainy days per year and high humidity levels around 80%. Importantly, 80 to 90 percent of the annual precipitation occurs during the rainy season, with the monsoon climate patterns orchestrating rainfall distribution throughout the country.

Northern Vietnam

Northern Vietnam is characterized by a tropical monsoon climate with four distinct seasons: spring, summer, autumn, and winter. The region experiences one of the highest rainfall totals in the country due to its exposure to multiple monsoon systems and complex terrain. Annual Rainfall: The northern region receives 1,611 to 2,836 mm annually, with specific locations varying significantly. Key stations show:

- Hanoi: 1,611 mm annually
- Sa Pa: 2,836 mm annually (one of the wettest areas)
- Ha Giang: 2,492 mm annually
- Tam Đao: 2,491 mm annually
- Cao Bang: 1,422 mm annually

Seasonal Pattern: The rainy season in Northern Vietnam begins in May and lasts until October, with the wettest months occurring from June to August. The Red River Delta and northern mountain regions experience average monthly rainfall of approximately 200-300 mm, with highest rainfall in July-August and lowest in January.

Central Vietnam

Central Vietnam exhibits the most complex rainfall patterns due to its transitional location between northern and southern climatic zones, separated by the Hai Van mountain pass. The region demonstrates distinct seasonal characteristics varying between the North Central and South Central coastal areas. North Central Coast (Quang Bình to Thua Thien-Hue) Annual Rainfall: The North Central region receives 1,500 to 3,000 mm annually, with concentrated precipitation during the rainy season. Specific stations show:

- Vinh: 2,113 mm annually
- Đong Hoi: 2,238 mm annually
- Hue: 2,798 mm annually (one of the wettest coastal cities)
- Quang Ngai: 2,466 mm annually

Seasonal Pattern: The rainy season coincides with the northeast monsoon (September-December), with the peak activity in October-November. Approximately 80% of annual precipitation falls during the rainy months. The region experiences particularly severe rain events during October and November, frequently accompanied by severe storms and floods, with average temperatures around 20°C during the rainy season. South Central Coast (Danang to Bình Thụn) Annual

Rainfall: The South Central region receives 1,072 to 2,206 mm annually, with rainfall distribution differing from the north.

- Đa Nang: Transitions between regional patterns
- Phan Thiet: 1,072 mm annually (one of the driest coastal regions)
- Pleiku (Central Highlands): 2,206 mm annually
- Qui Nhon: 1,807 mm annually

Seasonal Pattern: Unlike the North Central region, the South Central coast experiences a longer dry season (January-September), with the rainy season starting in mid-October and lasting until early December. This reversed pattern from northern central Vietnam is due to the region's transitional location and complex terrain interactions.

Southern Vietnam

Southern Vietnam exhibits a tropical monsoon climate with two main seasons: a rainy season and a dry season, with hot and humid conditions throughout the year. Southeast Region and Mekong Delta Annual Rainfall: The southern region receives 1,674 to 1,979 mm annually, with the Mekong Delta averaging 1,533.9 mm in recent years (2014-2020), representing a decline from the long-term average of 1,590 mm (1984-2013). Station data shows:

- Ho Chi Minh City: 1,926 mm annually
- Can Tho: 1,674 mm annually
- My Tho: 1,384 mm annually
- Phuoc Long: 2,665 mm annually
- Vung Tau: 1,437 mm annually

Seasonal Pattern: The rainy season in Southern Vietnam occurs from May to October, with the dry season from November to April. Approximately 90 percent of annual precipitation falls during the rainy season, with minimal rainfall during dry months. Monthly rainfall in major southern cities averages around 190 mm, with the highest peaks slightly exceeding 400-500 mm during June. And for more detail, we divide our country into 7 sub-regions, colors indicate average annual precipitation (mm) over seven sub–regions of Vietnam during the 1981–2001 period. Circles show meteorological observation sites and lines display the boundaries of seven sub–regions.

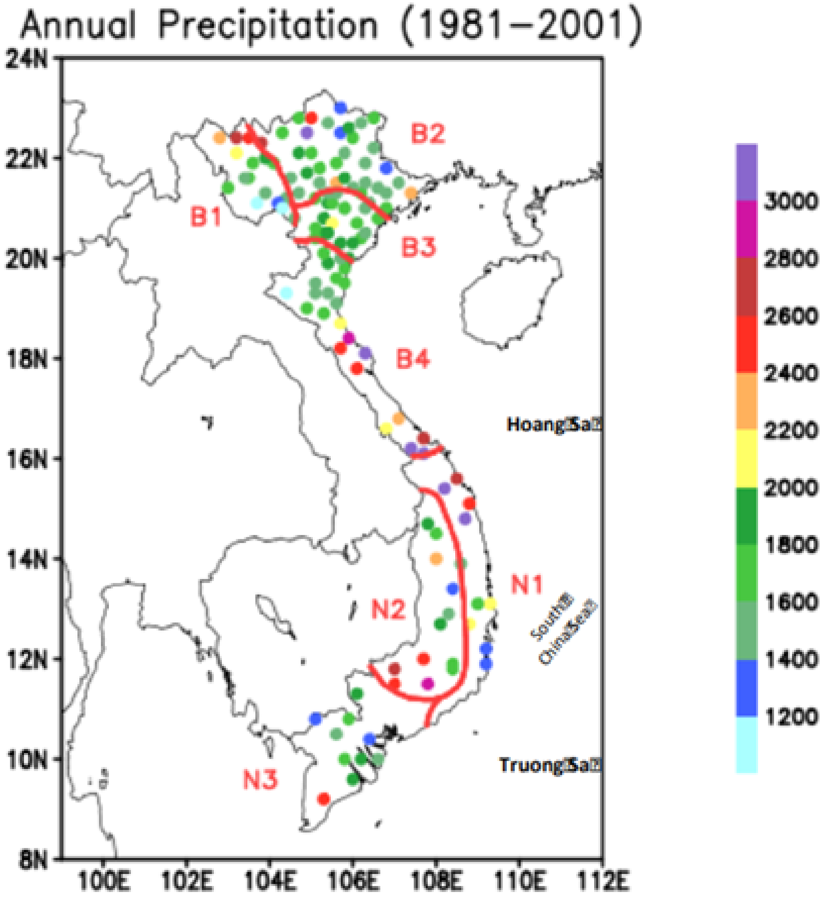

Figure 8

These figures below describe the monthly average daily rainfall in seven sub–regions of Vietnam of the reanalysis (ERA), model (NHRCM), and observation (OBS) data. It is clear that the maximum average daily rainfall occurs in autumn in B4, N1, and N3 sub–regions while in summer in other sub–regions. The delay of the rainy season in B4 and N1 is due to the barrier effect of topography on prevailing winds during SON, causing heavy rainfall on the windward side of Truong Son Mountains (Figure 3c). According to the observations, the daily rainfall is commonly from 10 mm/day to 15 mm/day in almost all sub–regions, however, rainfall amounts can frequently reach 20 mm/day in B4 and N1 sub–regions (Figure 4a). The average daily rainfall is well captured in terms of the evolution but a little underestimated by NHRCM in all sub–regions except for N1 (Figure 4b). Figure 4c shows that the ERA average daily rainfall also has a good agreement with the observations in the annual march but is much overestimated in all sub–regions.

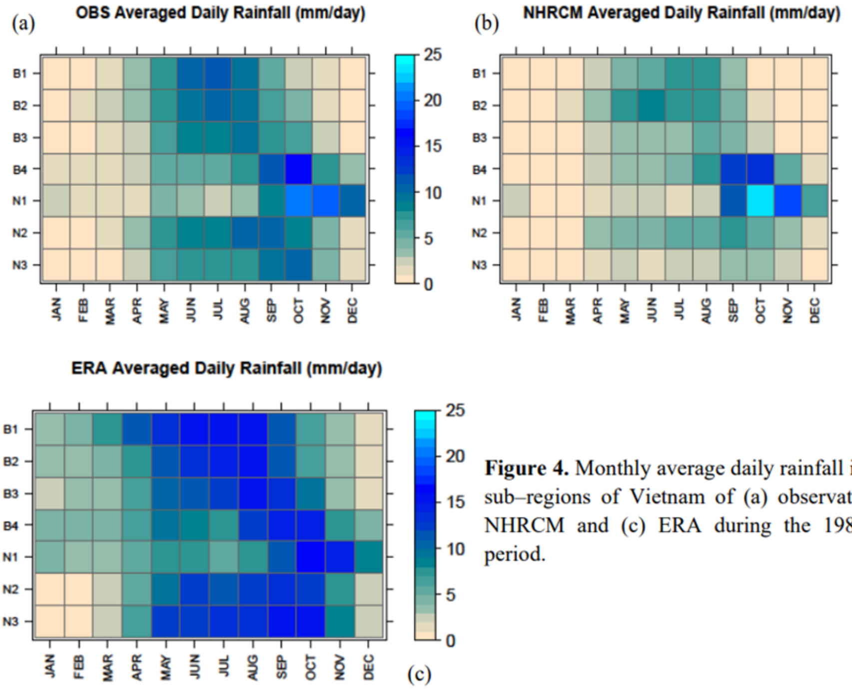

Figure 4. Monthly average daily rainfall in seven sub–regions of Vietnam of (a) observation, (b) NHRCM and (c) ERA during the 1981–2001 period.

The differences in the monthly average daily rainfall between the ERA and NHRCM data and the observations in seven sub–regions are displayed in Figure 5. Accordingly, positive differences between ERA and the observations are found in almost all sub–regions except in October–November for B4, and in October–December for N1. In general, these differences tend to be higher in the rainy season, and the highest ones of 8 mm/day between ERA and the observations can be seen in B1. Conversely, negative differences are detected in almost all sub–regions when comparing the NHRCM and observation data. It is clear that higher differences occurred in higher rainfall months, and the most underestimated rainfall area is N3.

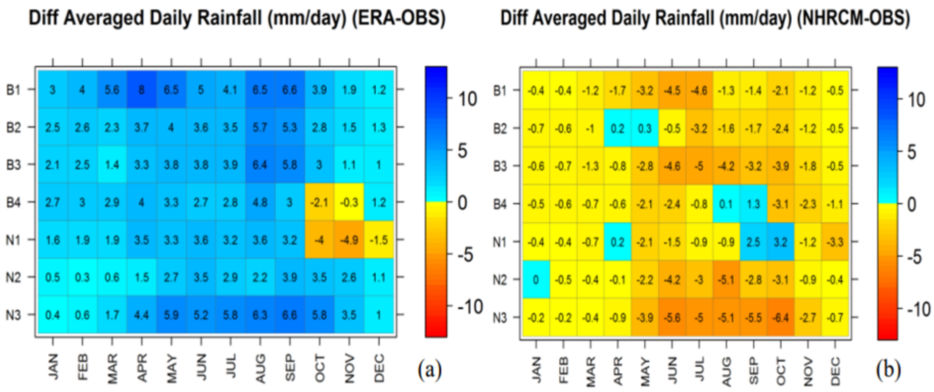

Figure 5. Monthly average daily rainfall differences between (a) ERA and (b) NHRCM and the observations in seven sub–regions of Vietnam during the 1981–2001 period.

5.3 Impacts of Storms and Rainfall on Landslides and Flooding Hazards

Storms and heavy rainfall have severe impacts on landslides and flooding hazards in Vietnam, particularly in the central and mountainous regions. Prolonged intense rainfall from typhoons and monsoons triggers widespread floods and landslides. For example, in late October 2025, continuous heavy rain caused flooding and landslides across central Vietnam, with rainfall ranging from 150–700 mm and peaks exceeding 1,000 mm in some locations. This led to over 10 deaths, several missing, thousands of houses flooded or damaged, and major disruptions to transport infrastructure such as blocked highways due to landslides and flooding.

Landslides are commonly initiated by multi-day heavy rainfall saturating soils on steep slopes, especially in the Truong Son Mountain Range and windward mountain slopes where rainfall is amplified by orographic effects. These landslides damage roads, housing, and agricultural land, often forcing evacuations. Research highlights that rainfall duration combined with accumulated rainfall thresholds plays a critical role in slope failures, even before soil saturation is complete.

Floods from such storms lead to devastating consequences including loss of life, destruction of homes, submersion of rice fields and crops, and displacement of tens of thousands of people. The October-November 2025 floods caused at least 42 deaths, hundreds injured, thousands of homes submerged, and tens of thousands of hectares of cropland damaged. Transportation and power infrastructure suffered heavy impact, with highways blocked and prolonged power outages reported.

Storm surge associated with typhoons worsens coastal flooding, causing seawater intrusion, erosion, and reduced drainage capacity in low-lying zones. In the Mekong Delta, flooding compounded by sea level rise threatens agricultural productivity through saltwater intrusion, exacerbating economic losses.

Vietnam has responded by implementing early warning systems integrating rainfall monitoring, slope stability models, and automatic alert networks to forecast landslides and flash floods, providing critical lead times to communities at risk.

In summary, storms and heavy rainfall in Vietnam significantly elevate landslide and flooding hazards, leading to loss of lives, severe damage to housing, infrastructure and agriculture, and economic losses running into billions of dollars annually. These hazards are most acute in central mountainous and coastal areas, where terrain and climate convergence exacerbate impacts and demand robust monitoring and disaster response systems.

6 NATURAL RESOURCES (L.O.5)

6.1 VNU-HCM Quarry and Environmental Restoration Efforts

Vietnam National University, Ho Chi Minh City (VNU-HCM) owns a quarry site known locally as Ho Đa (Lake of Stones), a remnant of historic limestone and basalt extraction activities. The quarry, now a deep water body, has generated significant environmental and safety concerns due to its industrial past and current legacy within the university campus.

The environmental impacts from quarrying were considerable, including disturbances to the land and ecosystem imbalance. The excavation created a lake with considerable depth, sometimes reaching up to 100 meters, disrupting natural groundwater flow and leading to challenges with water quality management. The area suffered from habitat loss, soil destabilization, increased erosion risks, and pollution from quarry operations. Additionally, the lake became a safety hazard, with a history of fatal drownings due to the steep drop-offs and cold water temperatures.

In response, the university and local authorities have engaged in restoration and mitigation efforts aimed at both improving the environmental condition and enhancing safety. Measures include installation of fencing and warning signage to restrict access and prevent accidents. There are ongoing monitoring programs to evaluate water quality and ecological health, with efforts directed at stabilizing the surrounding land to prevent further erosion and promote vegetation regrowth. These actions reflect a comprehensive approach to managing the post-quarry landscape—emphasizing safety, ecological restoration, and responsible stewardship.

While full ecological restoration is challenged by the depth and altered hydrology of the former quarry, the focus remains on mitigating risks and improving environmental quality over time. This approach acknowledges the site's historical significance and current use as part of the university campus, balancing heritage preservation, public safety, and environmental responsibility.

Overall, Ho Đa at VNU-HCM exemplifies the complexities of rehabilitating quarry sites within urban or institutional settings, demonstrating the importance of integrated environmental management and community engagement to ensure sustainable outcomes.

6.2 Basalt Quarry at Nui Dat – Dat Do District, Ba Ria – Vung Tau Province

Figure 9: Nui Dat

The basalt quarrying at Nui Dat historically impacted the local landscape, causing disturbances such as vegetation loss, soil erosion, and alteration of natural landforms. Quarrying activities, by removing surface rock and overburden, exposed the area to increased erosion risk and potential sediment runoff, which could affect nearby water bodies and soil quality. The extraction process also likely contributed to dust and noise pollution affecting local ecosystems.

However, environmental concerns and cultural-historical significance have led to restrictions and cessation of active quarrying. This shift has helped reduce further environmental degradation. Since cessation, there have been efforts to allow natural regeneration of vegetation and stabilize soil to prevent erosion. The area's transition toward a historical and memorial tourism site has also contributed to environmental protection priorities, balancing preservation of war-related landmarks with ecological restoration.

In summary, the basalt quarry at Nui Dat posed typical quarrying environmental impacts including land disturbance, erosion, and pollution. Current status prioritizes ecosystem recovery and cultural-historical preservation, effectively reducing industrial environmental pressure and fostering a landscape more integrated with natural and historical heritage conservation efforts in Ba Ria – Vung Tau.

6.3 Petroleum Service Industry in Vung Tau (Vietsovpetro Joint Venture)

The petroleum service industry in Vung Tau, specifically the Vietsovpetro Joint Venture, is a major contributor to Vietnam's oil and gas sector. Vietsovpetro, established in 1981 as a Vietnam-Russia joint venture, operates primarily offshore in the Ba Ria-Vung Tau region. It has a comprehensive operation covering oil exploration, drilling, field development, engineering, offshore facility installation, production, and crude oil export. The venture owns advanced oil rigs like the ThTC-02, capable of operating multiple wells and producing substantial daily oil output.

Vietsovpetro has been a historical leader in Vietnam's petroleum production, marking milestones such as extracting 250 million tonnes of oil by 2024 and contributing nearly 60% of the country's total oil output. The company has generated significant revenue and state budget contributions, and it plays a strategic role in energy security and economic growth. Innovation is emphasized, with thousands of patents registered to improve efficiency and production.

Besides production, since 2005, Vietsovpetro has expanded into providing technical petroleum services to other companies, both domestic and international, boosting its service profile and brand recognition. In summary, the petroleum service industry in Vung Tau via Vietsovpetro is characterized by its long-standing Vietnam-Russia cooperation, advanced offshore oil operations, major economic contributions, continuous innovation, and expanding service scope beyond production.

7 CONCLUSION

The Vung Tau field trip was a valuable academic experience that allowed students to act as true geologists—observing, measuring, and interpreting natural processes directly in the field. Each group member actively contributed to documenting geological evidence, discussing hypotheses, and applying field methods. Through activities such as rock identification, compass navigation, and structural measurement, students developed both technical and soft skills, including teamwork, problem-solving, and scientific communication. The final assessment at the end of the trip helped evaluate students' understanding of geological theories and practical methods. Moreover, the group challenges, such as climbing activities and quiz competitions, promoted enthusiasm and friendly competition, enhancing the collaborative learning atmosphere. In conclusion, the field trip not only deepened our geological knowledge but also fostered curiosity, teamwork, and appreciation for the natural and geological heritage of Viet Nam.