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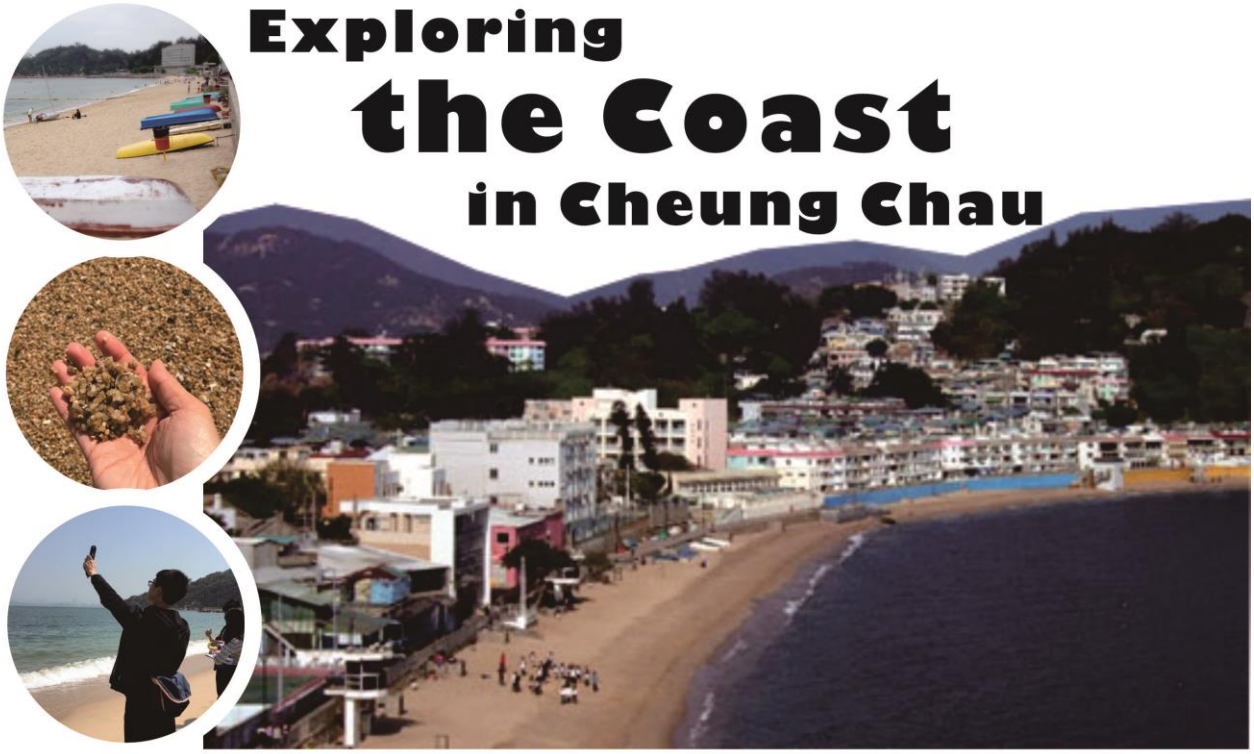


Student Name: _____ **Group no.:** _____

Course Date: _____

OBJECTIVES

- Knowledge:
  - To identify the characteristics of coast and the coastal landform features
  - To examine the factors and processes in shaping the coast
- Skills:
  - To exercise the sampling methods
  - To apply various data collection methods e.g. drawing field sketches and using field equipment for measurement
  - To draw beach profile for processing and presenting the morphological data

EQUIPMENT & MATERIALS

FIELDWORK

	Equipment/ materials	Quantity (for each group)	Check-in	Check-out
1	Compass	1		
2	Anemometer	1		
3	Measuring tape (30m)	1		
4	Measuring tape (15m)	1		
5	Meter rulers (marked as back/fore)	2		
6	Spirit level	1		
7	Abney level	1		
8	Sticks	6		
9	Sampling bottle (small) with plastic bag	1		
10	Transect holders	2		
11	Float: plastic bottle with string	1		
12	Stop watch	1		
13	Clipboard	1		
14	Swingometer	Share		

LABORATORY WORK & DATA PROCESSING

	Equipment / Materials	Quantity (for each group)	Check-in	Check-out
1	Hand lens	1		
2	Small circle plates	3		
3	Metal bowl	1		
4	Forceps	2		
5	Caliper	1		
6	Template ruler	1		
7	Grain sizing chart	1		
8	Sedimentation ware: Measuring cylinder (100ml), parafilm, filter funnel, water bottle	1		
9	Graph papers	2		
10	Ruler	1		
11	Protractor	1		

Relevance to the DSE geography curriculum

1. Managing Coastal Environment : A continuing challenge
2. Dynamic Earth: The building of Hong Kong

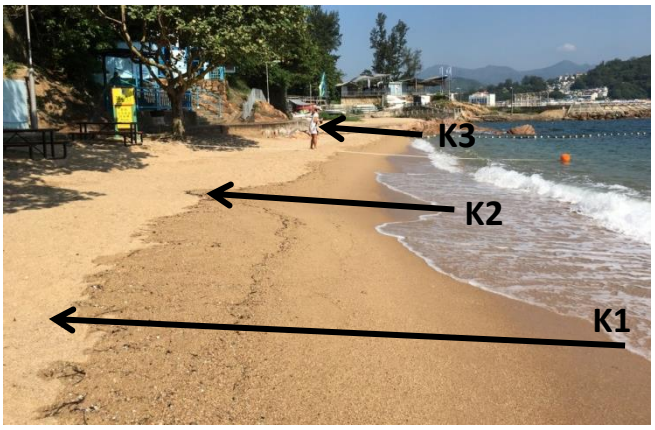
PLANNING & PREPARATION

➢ When to collect data?

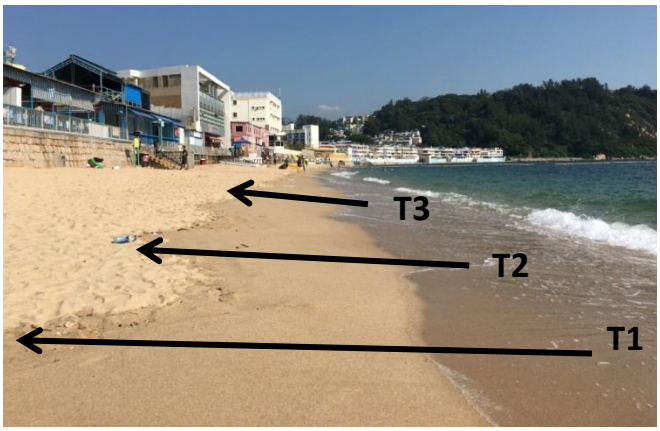
Date: _____	Time:_____ to _____
Tidal level: Current: _____m (time:) Previous Highest: _____m (time:)	
Weather warning and signals within last 2 days: ☐Strong Monsoon Signal ☐Rainstorm Warnings ☐Tropical Cyclone Warning Signals	
Precipitation within last 2 days: heavy rain / drizzle / never rain	

➢ Where to collect data?

Study area:	Kwun Yam Wan Beach / Tung Wan Beach
Direction which the beach faces:	
Transect (_____m):	



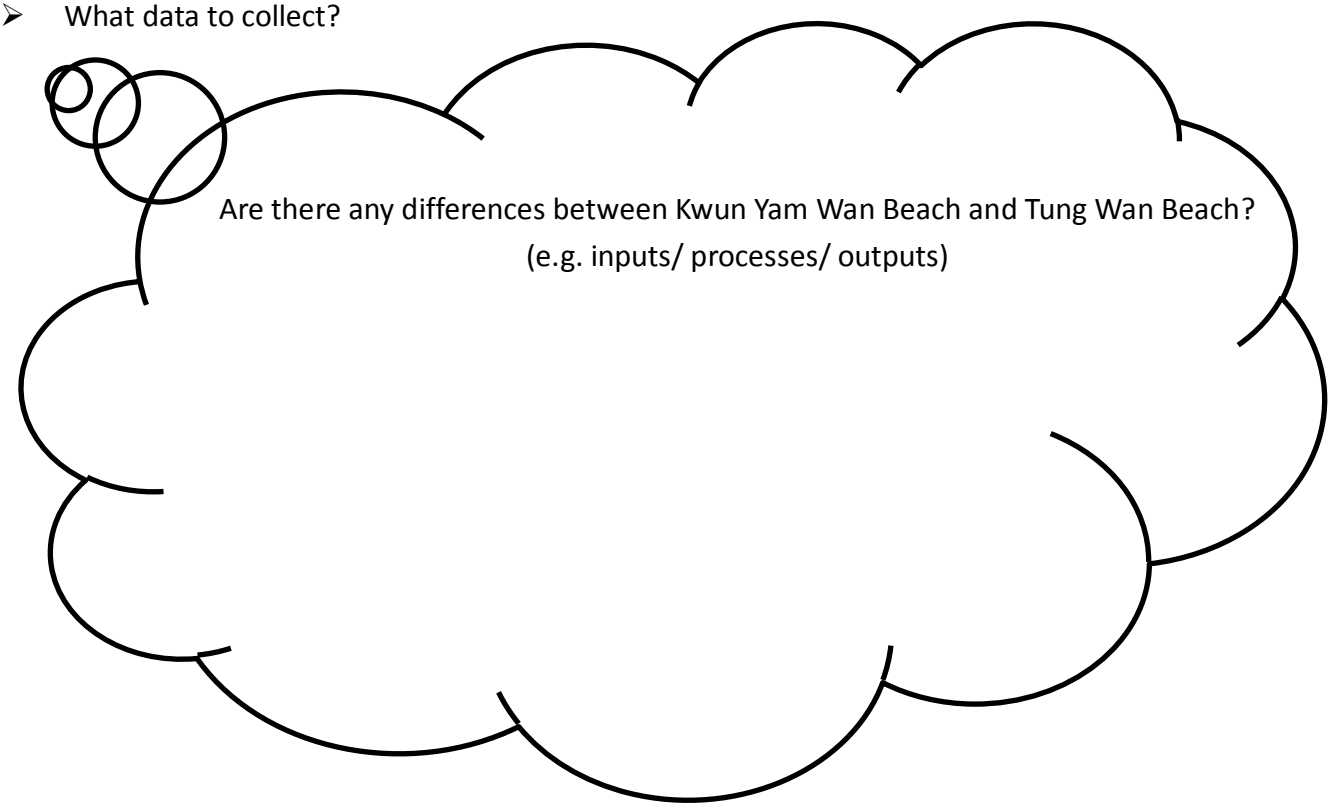
Kwun Yam Wan Beach



Tung Wan Beach

List one merit and one demerit of conducting a field study on coast in Cheung Chau today.

- What data to collect?



- How to collect the data?

Research items	Fieldwork skills ("✓" as appropriate)			
	measurement	**count**	**observation**	**drawing field sketches**

Field site: _____
Transect: _____

DATA COLLECTION

Wind direction and wind speed

Equipment: ✓ Anemometer x 1
✓ Compass x 1

Wind direction	Wind speed (m/s)

Procedures:

1. Make sure you are not shielded from the wind in any direction. Hold a string over your head to observe the wind direction with a compass.
2. Face directly to the wind direction and hold an anemometer in the air. Observe the anemometer for about 30 seconds and determine the sustained wind speed. It does not include sudden gusts or short calm periods of wind.

Difficulties in collecting data (if any):

Beach morphology

Method 1---Levelling method

Equipment: ✓ measuring tape (transect line) x 1 ✓ transect holders x 2
✓ meter rulers x 2 (with a 50 cm metal rod) ✓ spirit level x 1

Interval (Horizontal distance towards backshore)	Gradient		
	Height of foresight (cm)	Height difference (+/- cm) (=backsight – foresight)	Height above sea level* (cm)
Starting point	----------	----------	0 cm
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

**Cumulative value*

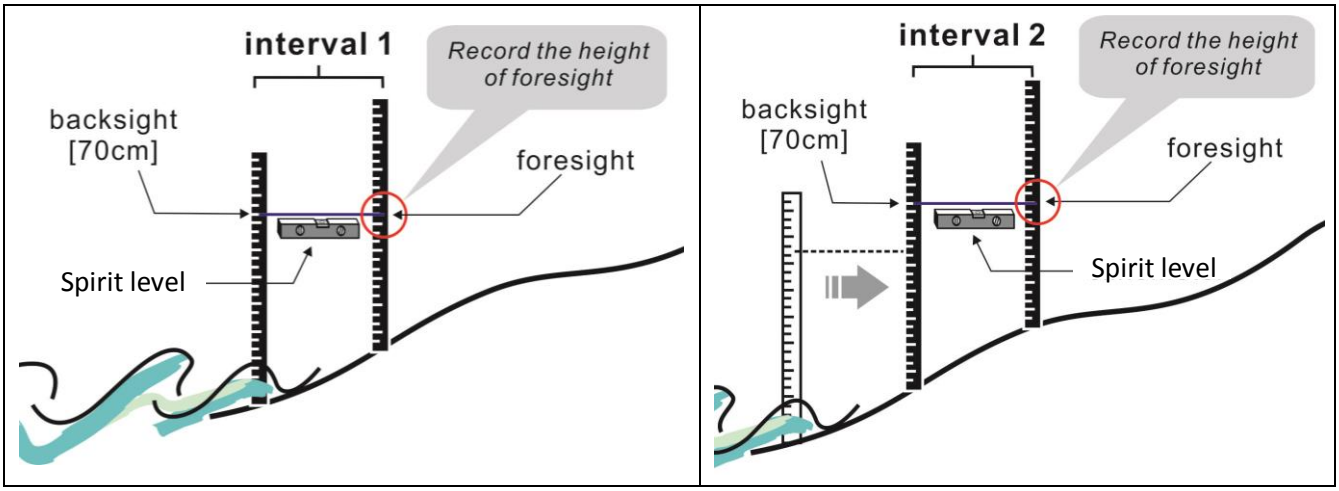


Figure 1: Levelling method

Procedures (refer to Figure 1):

1. Use a measuring tape to set a transect line from swash and backwash zone to backshore.
2. Hold two meter rulers upright on beach surface at **0.5m** horizontal intervals.
3. Tie a metal rod to each meter ruler above the ground. For easy calculation, set the **height of backsight to be 70cm**.
4. Follow the transect line, raise or lower the string at foresight to ensure the metal rod is horizontal by using a clinometer. Mark the height of foresight.
5. Calculate the height difference between each interval. Record any drop or rise of the relief as "+" or "-" in centimeter.

P.S.

- ✪ *Never insert the meter rulers into beach sediments.*
- ✪ *Do not measure along slopes when using levelling method.*

Difficulties in collecting data (if any):

Method 2---Measure slope angle

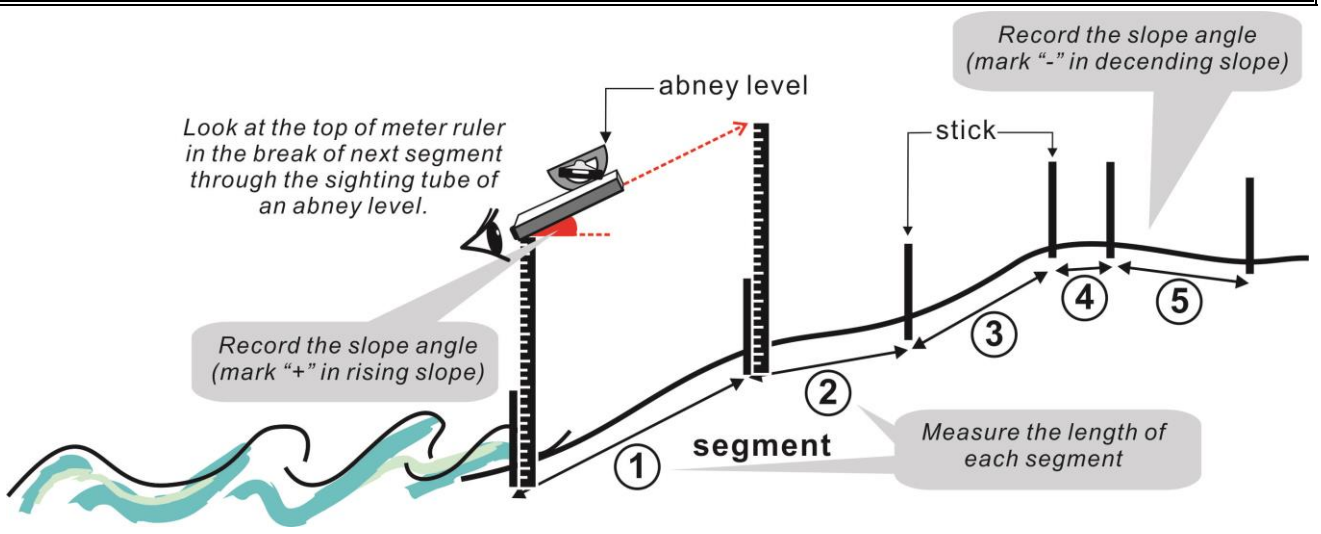
Equipment: ✓ measuring tape x 1 ✓ transect holders x 2 ✓ meter rulers x 2
✓ sticks x 6 ✓ abney level x 1

Segment (from foreshore to backshore)	Position of transect (e.g.2m-3.8m)	Distance of segment along slopes(cm)	Distance of segment represent on the graph*(cm)	Angle of slope segment(˚)	Description of steepness
1					
2					
3					
4					
5					
6					
7					

**Refer to the scale shown in the corresponding graph.*

🡻 Table 1: Description of slope steepness

Slope angle (˚)	Typical gradient	Description of steepness
< 1˚	---	Level
1˚-3˚	1 in 60 (1.7%)	Flat
3˚-6˚	1 in 20 (5%)	Gentle
6˚-12˚	1 in 10 (10%)	Moderate
12˚-20˚	1 in 3 (33%)	Fairly steep
20˚-35˚	1 in 2 (50%)	Steep
35˚-45˚	1 in 1	Extremely steep

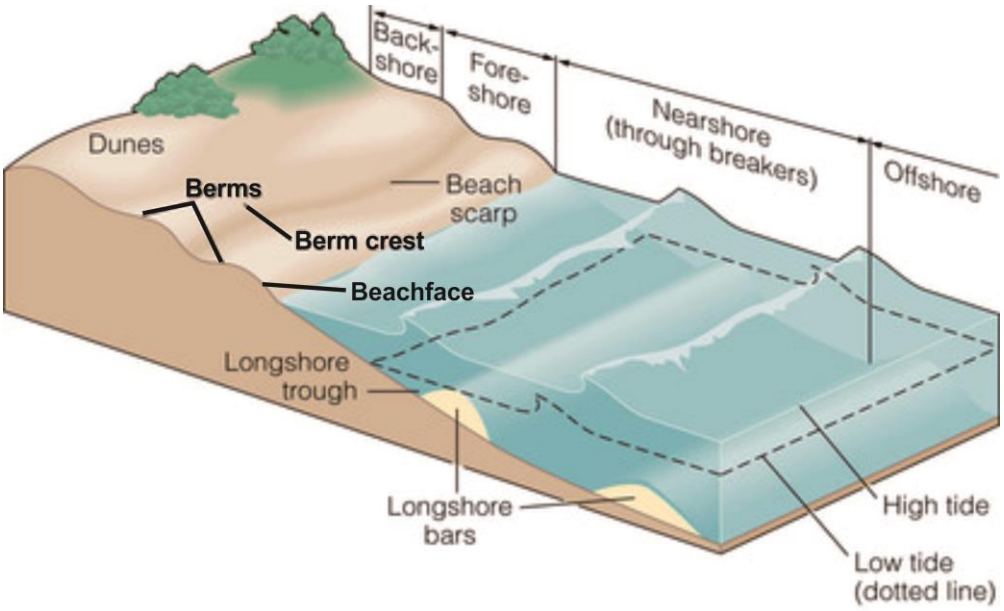


🡹 Figure 2: measure slope angle

Procedures (refer to Figure 2):

1. Use a measuring tape to set a transect line from swash and backwash zone to backshore.
2. Identify any breaks along slope (refer to Figure 3). Mark each break of slope with a stick.
3. Measure the length between each break of slope.
4. Hold two meter rulers upright on the breaks of a segment. Place an abney level on the top of a meter ruler and look at the top of another one through the sighting tube of an abney level.
5. Measure the slope angle and take the reading of each segment.
6. Refer to Table 1, describe the steepness of slope.

🡻 Figure 3: Beach morphology



List the merits of using levelling method and measure slope angle for collecting data of beach morphology respectively.

Difficulties in collecting data (if any):

Particle size and roundness of beach sediments <LAB WORK>

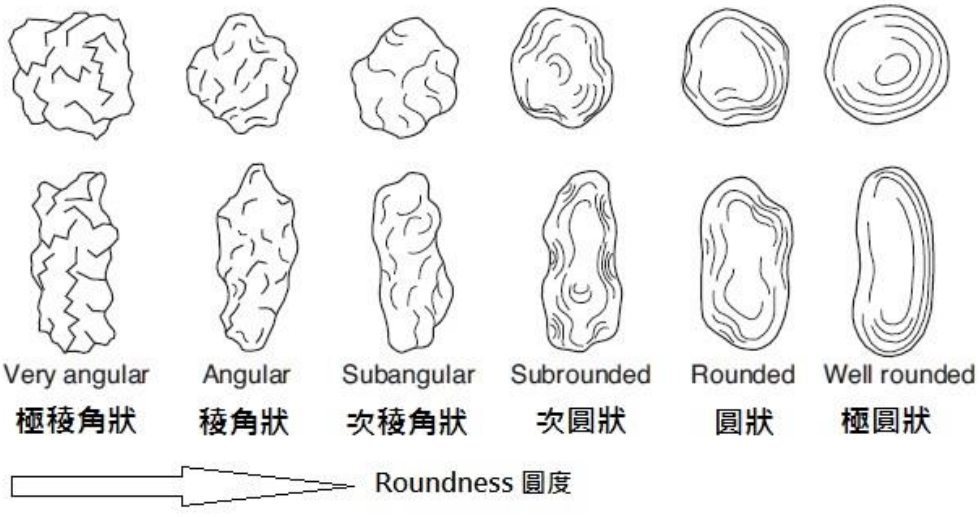
Equipment: ✓ sampling bottle x 1 ✓ Hand lens x 1
✓ caliper/ template ruler/ grain sizing chart x 1 (to be provided during laboratory work)

Sample	1	2	3	4	5	*Refer to table 2 and figure 4*
Diameter (mm)						Average diameter (mm):_____ Type of sediments:_____
Roundness class						Average roundness class: _____

Table 2: Classification of beach sediments

沉積物類別 **Type of sediments**		**直徑(毫米) diameter (mm)**
礫 gravel	巨礫 boulders	>256
	中礫 cobbles	>64-256
	卵石 pebbles	>4-64
	細礫 granules	>2-4
砂 sand	極粗砂 very coarse sand	>1-2
	粗砂 coarse sand	>0.5-1
	中砂 medium sand	>0.25-0.5
	細砂 fine sand	>0.125-0.25
	極細砂 very fine sand	>0.06-0.125

Figure 4: Power's Scale of Roundness



Procedures:

1. Take a core of beach sediments of about 5-8cm on swash zone by pushing a sampling bottle into the sand. Carefully pull the bottle out with the sediments in it to avoid spillage of sediments.
2. Take 5 grains from the bottle of beach sediments. Measure the diameter by using a caliper, a template ruler or grain sizing chart.
3. Refer to table 2 and figure 4, identify the type and roundness class of beach sediments.

P.S.

- ✪ *Do not just scrap the surface of the beach which often represents the last few moments of deposition or erosion.*
- ✪ *If the beach sediments are too large to be collected by the sampling bottle, measure in the position where sediments deposited by a meter ruler.*

- *What kind of sampling methods did you use in choosing the grains of beach sediments today?*
- *Which one do you think is the most appropriate instrument to measure the size of beach sediments, caliper, template ruler or grain sizing chart? Why?*
- *Given the following hypothesis: "Beach sediments become coarser from foreshore towards backshore".*
  Explain how to collect data in proving the hypothesis.

Composition of beach sediments <LAB WORK>

Equipment:
(to be provided during laboratory work)

- ✓ Hand lens x 1
- ✓ Forceps x 1

Composition with the largest proportion	
Other composition	

Procedures:

1. Identify different types of composition from the beach sediment samples.
2. Compare the proportion of each composition.

Difficulties in collecting data (if any):

Wave frequency

Equipment: ✓ Stop watch x 1

Number of wave (per minute)	
Wave type	☐ Constructive wave (≤ 8 waves per minute) ☐ Destructive wave (≥ 12 waves per minute) ☐ Undefined (9-11 waves per minute)

Procedures:

1. Focus on the point where the first breaker of wave passes.
2. As the crest of a wave passes, time by stopwatch. The next wave is wave number one.
3. Counting the number of waves that pass a certain point in one minute. To be more accurate, count over a 5-minute period and take an average. Determine the wave type.

Evidence of longshore drift

Equipment: ✓ A float (e.g. plastic bottle)
✓ Measuring tape x 1

Distance of longshore drift (cm)	Direction of longshore drift

Procedures:

1. Place a float along swash and backwash zone and mark the starting point.
2. Observe how the waves approach the shore.
3. Measure the distance and direction of longshore drift from the starting point towards the end point after 1 minute.

P.S.

✪ *To fill the water to the marked level of the plastic bottle. This can reduce the influence of air current.*

Difficulties in collecting data (if any):

Strength of swash and backwash

Equipment: ✓ Swingometer x1 (share)

Wave	1	2	3	Average level
Strength of swash				
Strength of backwash				

Procedures (refer to Figure 5):

1. Insert a swingometer into the beach sediments in the swash and backwash zone.
2. Estimate the relative strength of swash and backwash by how far the arm is tilted by the two forces.
3. Record the balance of forces for 3 times and take an average.

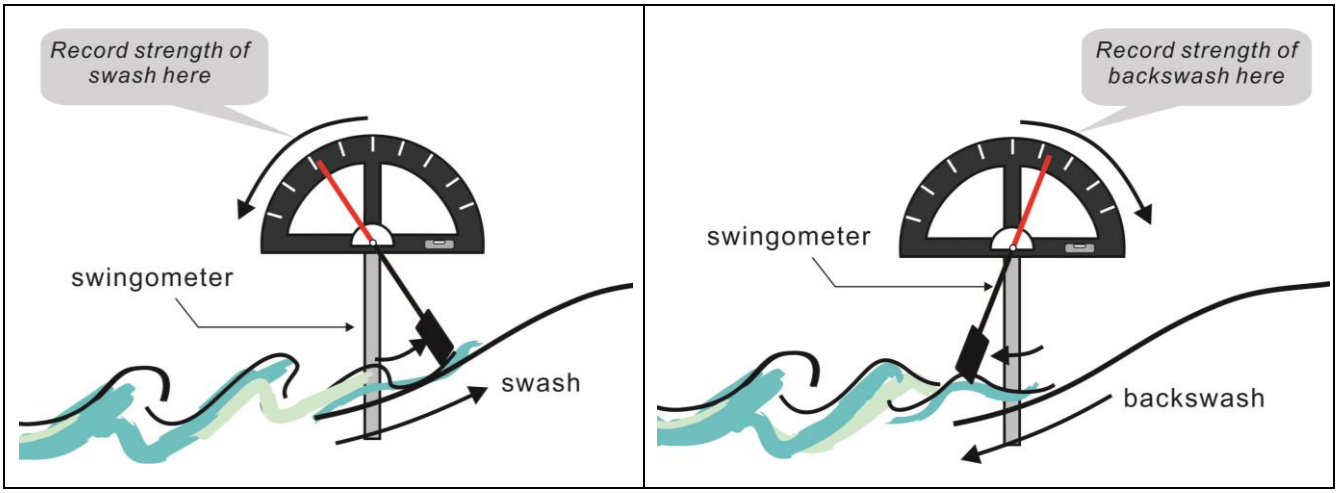


Figure 5: Measure the strength of swash and backwash

Difficulties in collecting data (if any):

Coastal landforms and human influences along the coast

Field sketch of the coastal landforms and human influences

along Kwun Yam Wan / Tung Wan (East Bay) at Cheung Chau

Procedures:

1. Identify a frame for the sketch.
2. Divide a paper roughly into thirds. The upper (sky and horizon), the middle ground (central part of the "view") and foreground (lower part).
3. Draw the skyline and simple lines showing the foreground.
4. Start by sketching the things furthest away, and work towards the foreground, adding detail as you go.
5. **Annotate the sketch**, including the main features and details that might not be obvious in a photograph.
6. Remark the location and direction of view.
7. Take pictures of the view for reference.

Difficulties in collecting data (if any):

DATA ANALYSIS & INTERPRETATION

1. Draw the wind direction and the direction of longshore drift on the map (P.17). Explain how did they affect the processes of a coast system.
2. With reference to the locations of Tung Wan Beach and Kwun Yam Wan Beach, account for the differences in their size and shape of sediments.
3. Compare and contrast the beach profile of Tung Wan Beach and Kwun Yam Wan Beach. To what extent the similarities and differences are explained by the energy of swash and backwash.
4. Describe the particle zonation of beach profile and explain the reasons for the formation.
5. How does the geology of Cheung Chau contribute to the formation of coastal landforms? Illustrate with the field sketch.

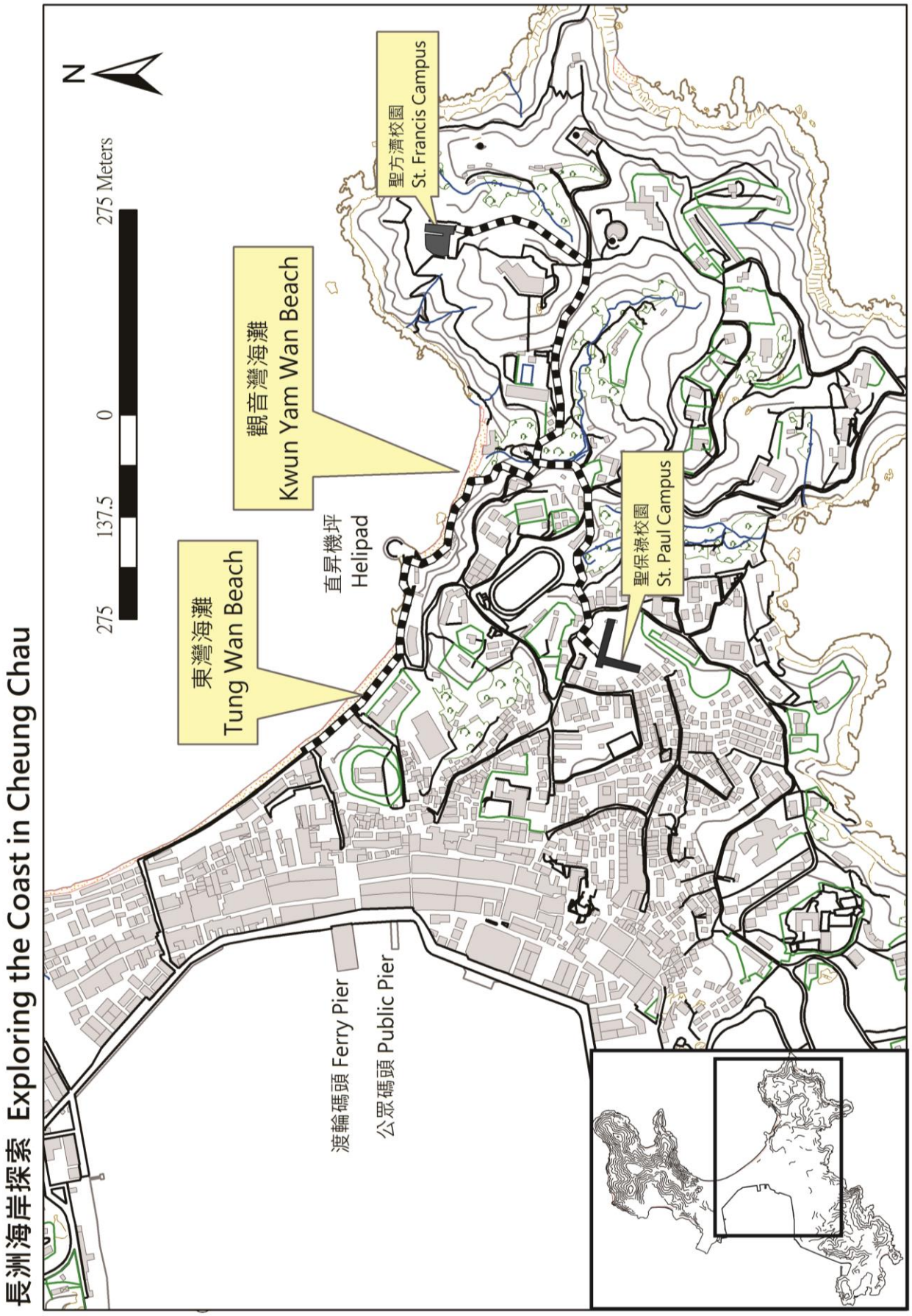
EVALUATION

Fieldwork:

1. Review the difficulties in data collection. Propose ways to improve the data accuracy in any one of the research item.

Further investigation:

2. Other than Kwun Yam Wan Beach and Tung Wan Beach, suggest other location in Cheung Chau necessary for a further study on coastal processes.
3. Other than primary data, suggest other secondary data and information you might need to further investigate the degree of human impacts on the coast in Cheung Chau.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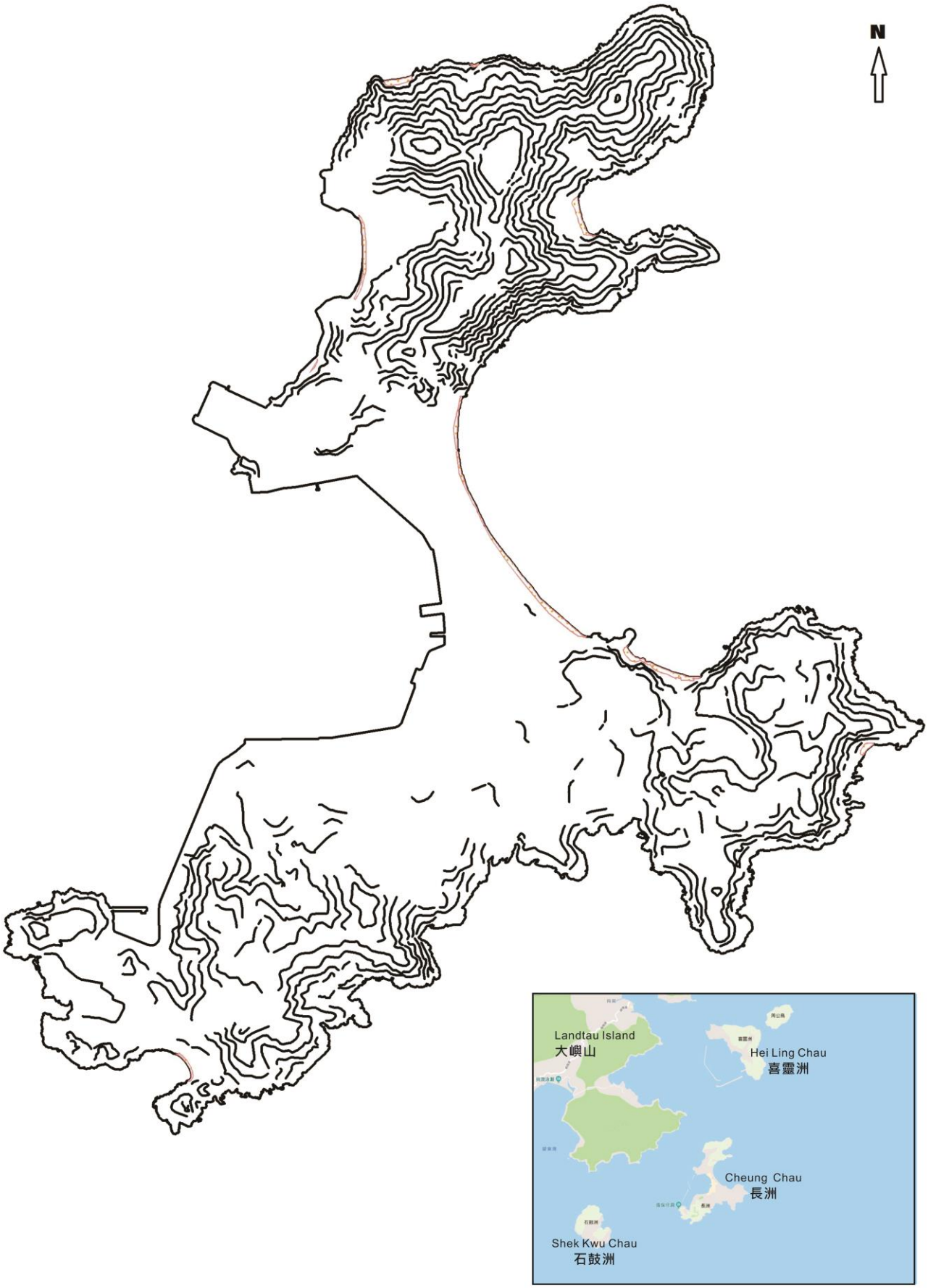
Tung Wan Beach
觀音灣海灘
Kwun Yam Wan Beach
聖方濟校園
St. Francis Campus
直昇機坪
Helipad
聖保祿校園
St. Paul Campus
渡輪碼頭 Ferry Pier
公眾碼頭 Public Pier
明愛陳震夏郊野學園 Caritas Chan Chun Ha Field Studies Centre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