Barcelona Field Studies Centre

IGCSE Coastal Environments Fieldwork: Sitges

• **Do not walk out onto the breakwaters**	• **Do not enter the water at any time**

Task 1: Test the hypothesis that longshore drift affects the shape of the sandy beaches in Sitges.
Method: select one sandy beach (number 1-5) and complete the recording sheet on pages 3 and 4.

1a. Identify the number of the beach on the recording sheet.

1b. Measure and record the beach widths C, F and H, from the water line to the sea wall. Record in the boxes provided.

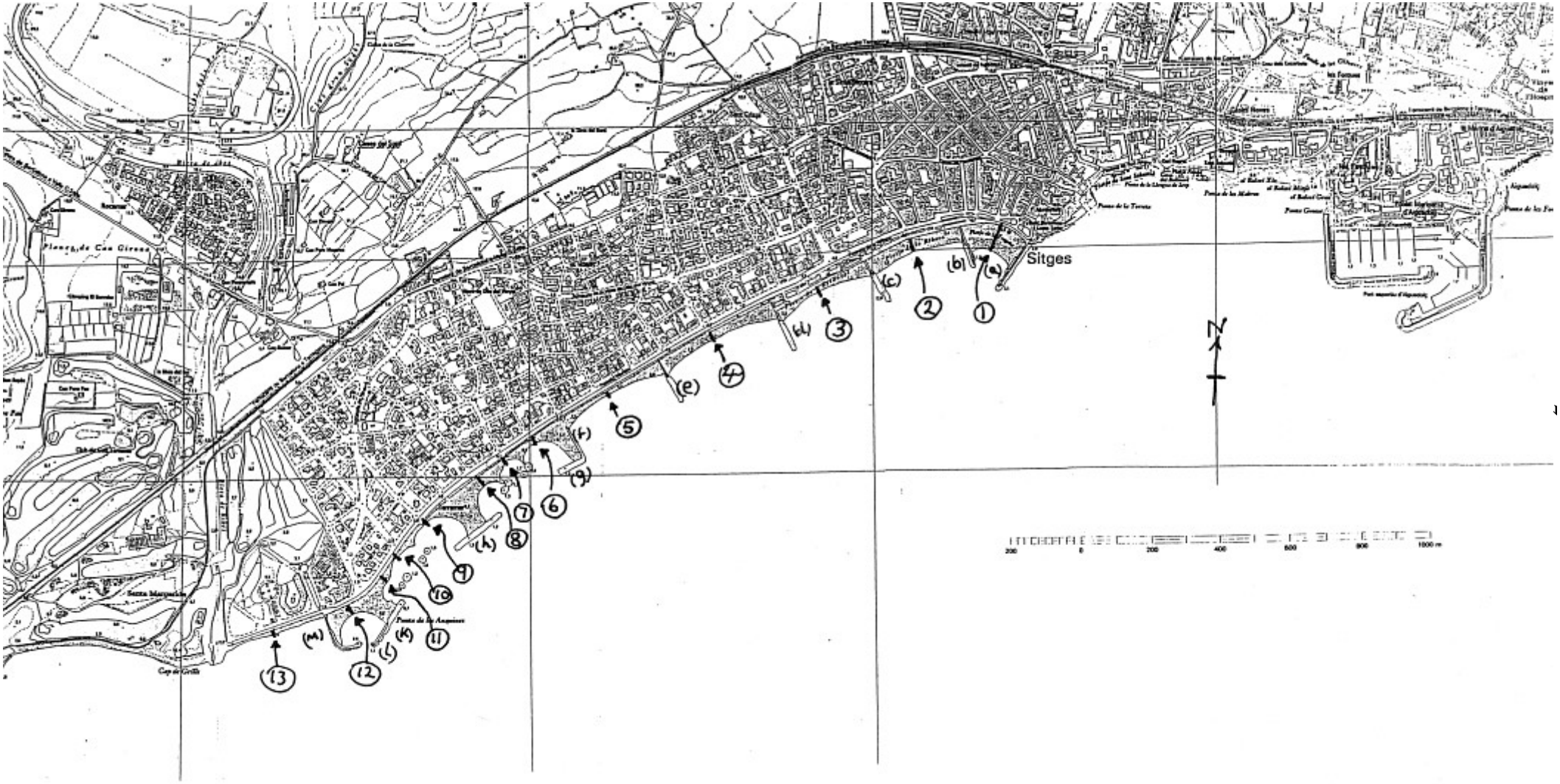
1c. Measure the beach depths either side of the groynes, choosing the location closest to the sea with both sides of the groyne above the water. Record in boxes A and B, I and J

Task 2. Test the hypothesis that the most effective or most expensive coastal defences are located where the sea front land use is of highest value.

The value of the land use can be determined by considering the properties that would be affected by coastal erosion, especially their economic value or worth if damaged.

Choose a small number of categories for the types of land use. Sample a representative number of locations behind the coastal defences. At each location, tally the number of different types of sea front land use found. Use your tally chart to find the most common land use at each location. (i.e. the mode). This modal land use and its associated score can then be used in the erosion risk calculation.

Land Use type	Tally	Score
High-status services e.g. central hotels and restaurants		5
High value apartment blocks, holiday lets, less central hotels and restaurants		4
Large detached mansion-style properties with extensive grounds		3.5
Medium detached mansion-style properties with extensive grounds		2.5
Smaller sea front properties with less extensive grounds		2
Open space (golf course)		1


Sitges
N
(a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)
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(l)
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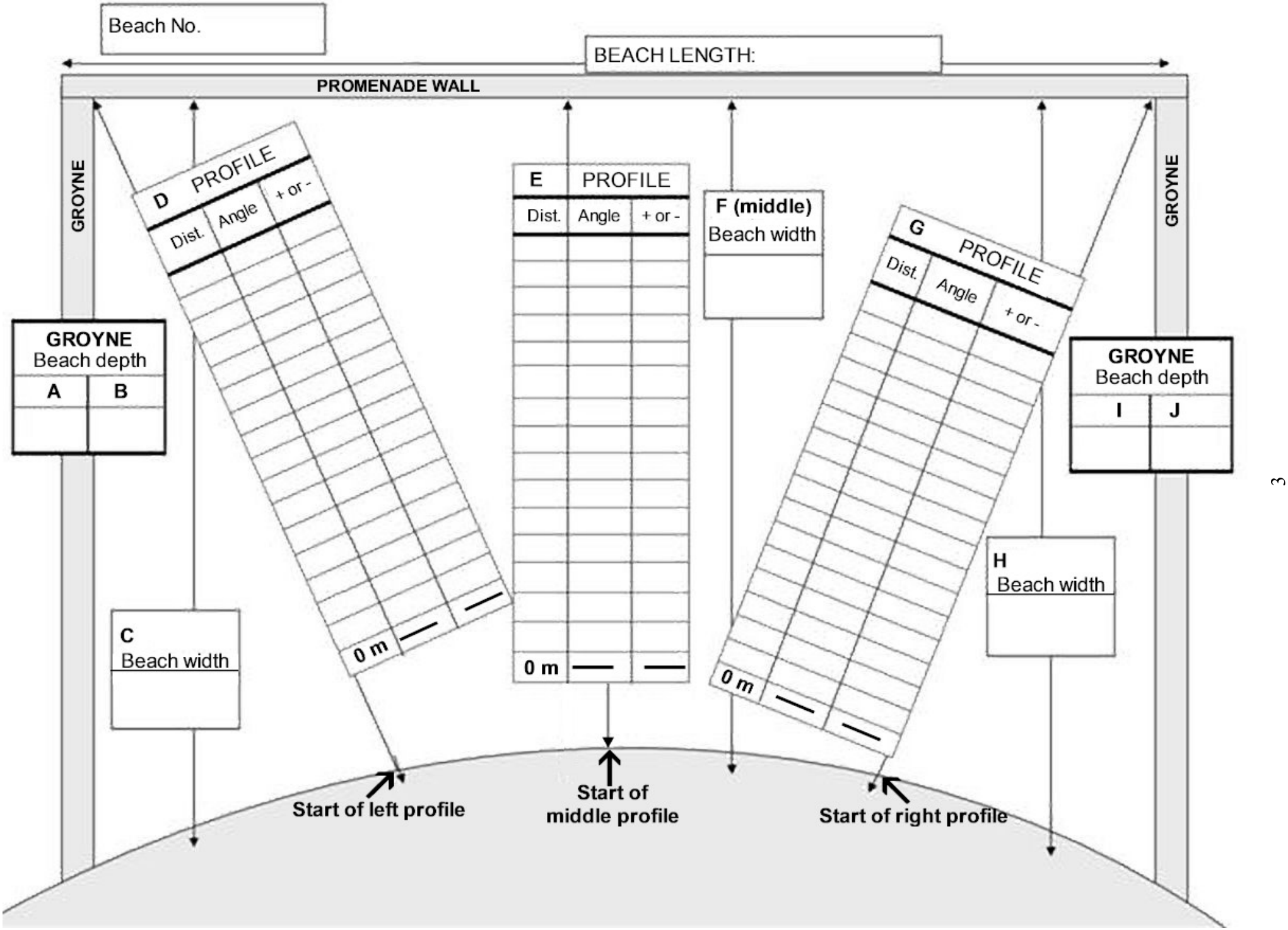
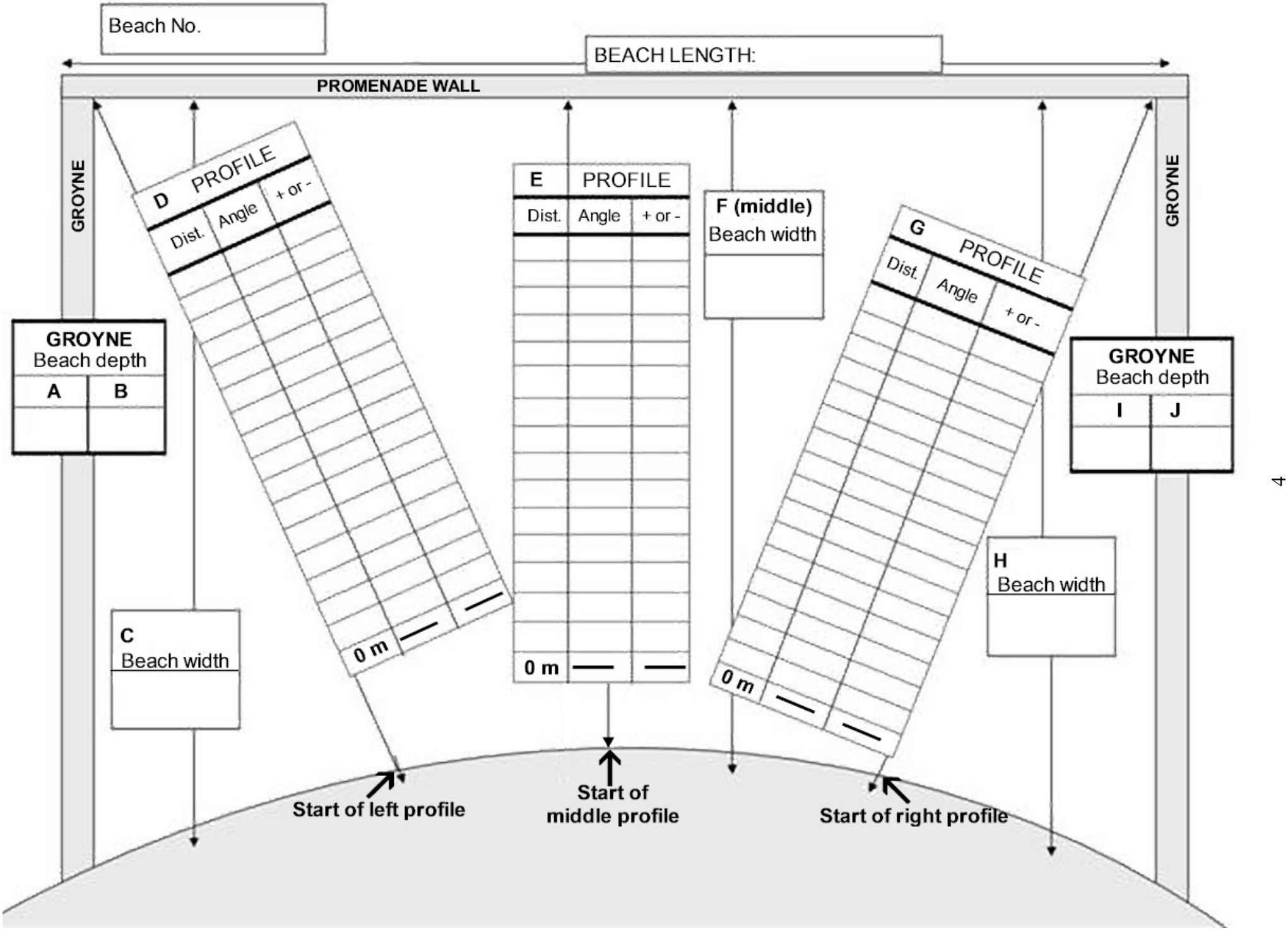

Beach No.
BEACH LENGTH:
PROMENADE WALL
GROYNE
GROYNE
D PROFILE
Dist.
Angle
+ or -
0 m
E PROFILE
Dist.
Angle
+ or -
0 m
F (middle)
Beach width
G PROFILE
Dist.
Angle
+ or -
0 m
GROYNE
Beach depth
A
B
GROYNE
Beach depth
I
J
C
Beach width
H
Beach width
Start of left profile
Start of
middle profile
Start of right profile


Beach No.
BEACH LENGTH:
PROMENADE WALL
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0 m
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0 m
F (middle)
Beach width
G PROFILE
Dist.
Angle
+ or -
0 m
GROYNE
Beach depth
A
B
GROYNE
Beach depth
I
J
C
Beach width
H
Beach width
Start of left profile
Start of
middle profile
Start of right profile

Task 3: For each sandy beach 1-5, Complete a bipolar evaluation of the sea wall, with a focus on the specific beach where the sea is in contact with the sea wall and damage has occurred.

Beach Number………… Type of defence(s):………………………………………….. Total Score……….

	Score						
Negative evaluation factor	-3	-2	-1	1	2	3	**Positive evaluation factor**
Vulnerable to erosion (unable to 'hold the line')							Effective protection against erosion (able to 'hold the line')
Vulnerable to overtopping (unable to control flooding)							Effective against overtopping (good flood defence)
Ugly (poor aesthetic value)							Enhances natural environment (high aesthetic value)
Poor access to beach							Good provision made for access to beach
Very narrow beach – carries low numbers							Very wide beach – carries high numbers
High-risk safety hazard to general public							No obvious safety risk to general public
Short lifespan and/or high maintenance costs							Good life expectancy and/or low maintenance costs
Disturbs natural coastal processes and habitats							Maintains natural coastal processes and habitats

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Task 4: Complete a bipolar evaluation of the breakwaters and their impacts.

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	Score						
Negative evaluation factor	-3	-2	-1	1	2	3	**Positive evaluation factor**
Vulnerable to erosion (unable to 'hold the line')							Effective protection against erosion (able to 'hold the line')
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Task 5: Complete a bipolar evaluation of the rock islets and their impacts.

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Task 6: Field Sketch
Annotate the sketch with at detailed descriptions and explanations of physical processes

Task 7: How does longshore drift affect sediment size?

Longshore drift is the movement of particles parallel to the coast. The rate of longshore drift is greatest when waves approach a beach at an angle. The swash, produced by breaking waves, moves diagonally up the beach at the same angle as the wave. In contrast, the backwash moves down the beach perpendicular to the shoreline.
If the wind drives waves from one direction more frequently than others, longshore drift will also move in one direction more frequently than others.

<u>Hypothesis to test</u>:

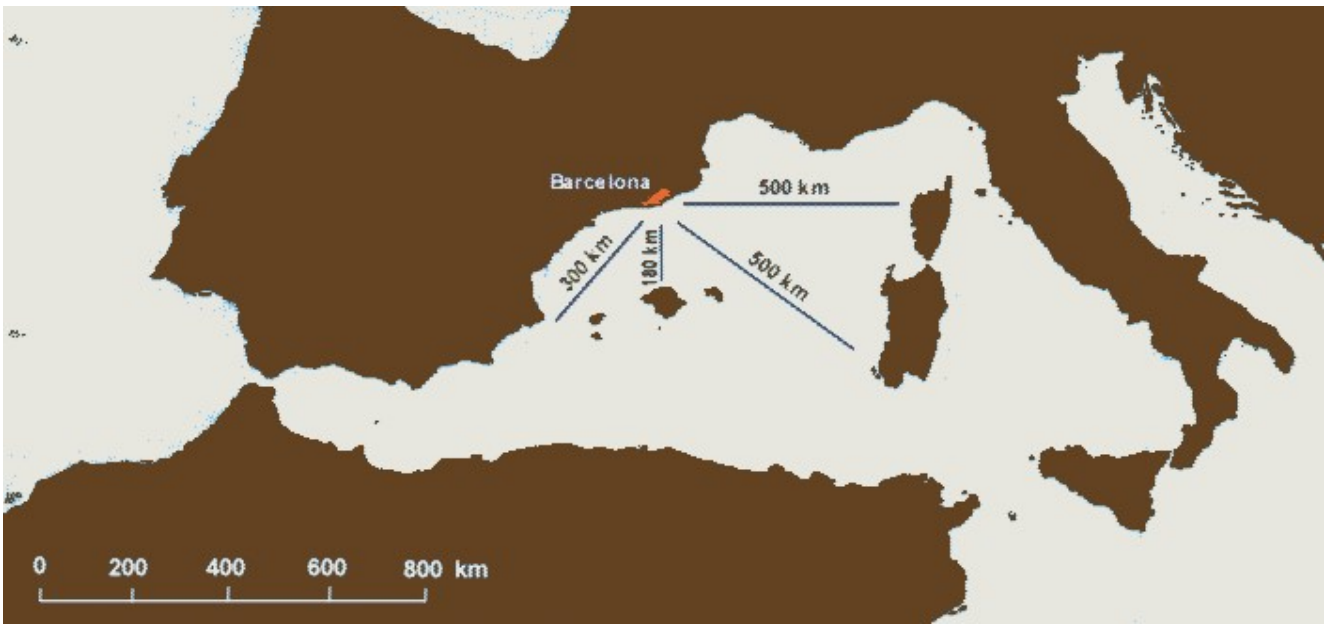
Pebbles will become smaller in the direction of longshore drift

Method: Students work in groups at a minimum of 10 locations spread evenly between the club and the sewage works to record: the long axes lengths of 30 pebbles collected from the **swash zone** (record in cms)

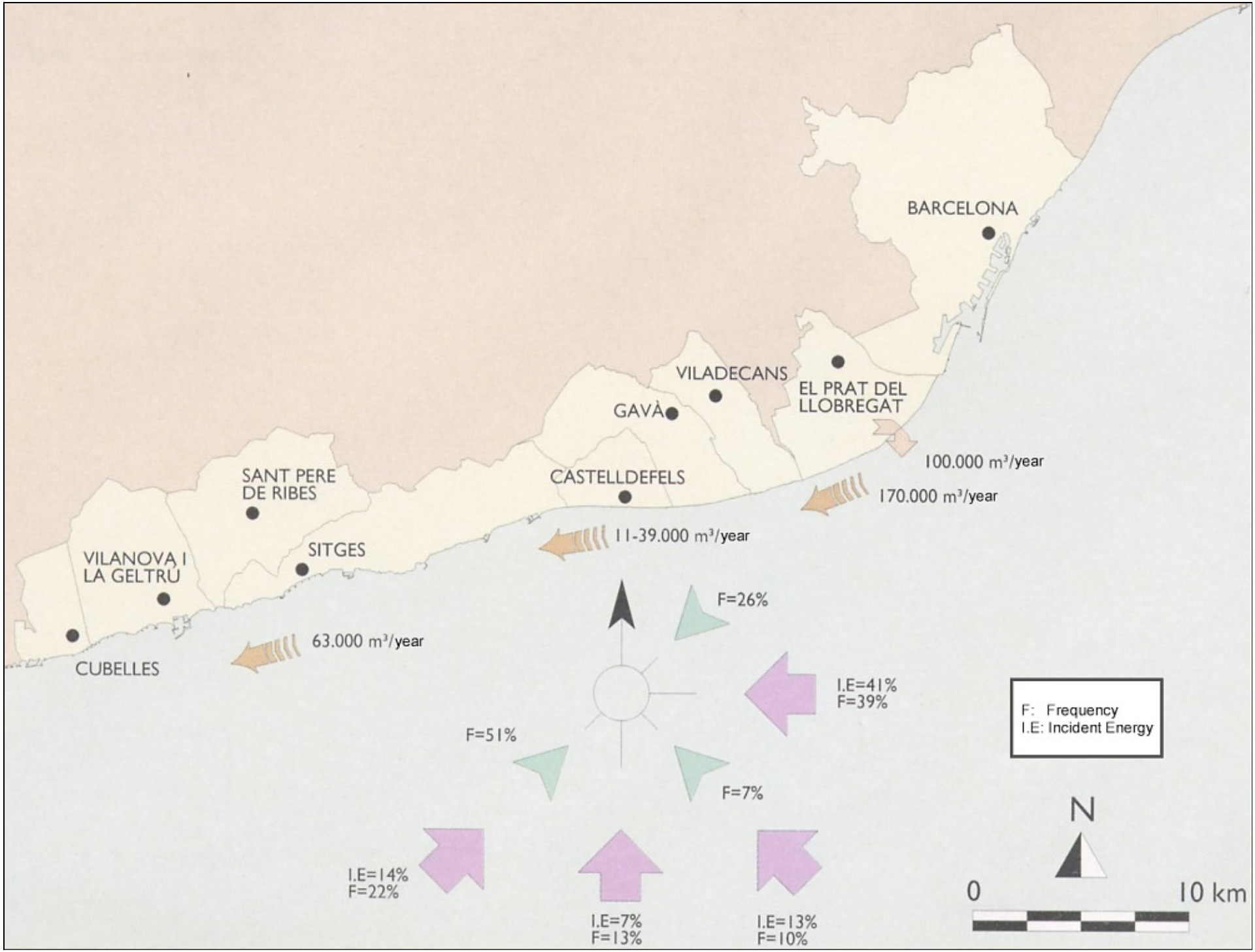
Pebbles to be collected systematically or randomly.

Beach Location Number _____ Swash zone pebble average axis length (cms)

Fetch



From which direction are the waves most likely to be destructive?


BARCELONA
VILADECANS
EL PRAT DEL LLOBREGAT
GAVÀ
CASTELLDEFELS
SANT PERE DE RIBES
SITGES
VILANOVA I LA GELTRÚ
CUBELLES
100.000 m³/year
170.000 m³/year
11-39.000 m³/year
63.000 m³/year
F=26%
I.E=41%
F=39%
F=51%
F=7%
I.E=14%
F=22%
I.E=7%
F=13%
I.E=13%
F=10%
F: Frequency
I.E: Incident Energy
N
0
10 km