

IESO 2010
Astronomy Practical Test
Yogyakarta, 19-28 September 2010

Plan A; Good weather

Time: 15 minutes

Problem:

Night observation using telescope with eye piece (coordinates of the location: South $07^{\circ} 55' .0144$, East $110^{\circ} 34' .344$). Find and look carefully Jupiter (RA: 23h 56m 32s; Dec: $-02^{\circ} 06' 59''$) and Galilean satellites

- a. Please select a suitable (provided) eye-piece for viewing all Galilean satellites in one field of view
(20 points)
- b. Draw the positions of Jupiter satellites with the proper orientation on the provided answer sheet. How many satellites of Jupiter are seen?
(60 points)
- c. Give marking the N-S and E-W directions on your answer sheet
(20 points)

Plan B: Bad weather

Time: 10 menit

Problem:

1. Mark by names or numbers (1, 2 and 3) on the printed sky map, the positions of the bright stars as listed below (15 minutes)

1. Antares (Alpha Scorpii)
(RA: 16h 29m 24.461s; Dec: $-26^{\circ} 25' 55.209''$)
 2. Vega (Alpha Lyra)
(RA: 18h 36m 56.336s; Dec: $+38^{\circ} 47' 01.290''$)
 3. Arcturus (Alpha Bootis)
(RA: 14h 15m 39.672s; Dec: $+19^{\circ} 10' 56.67''$)
- (total point for three stars 40)

2. Draw the ecliptic line in the map and identify the position of Mars
(10 for ecliptic and 10 for Mars)
3. Calculate the hour angle of Jupiter (RA: 23h 56m 32s; Dec: $-02^{\circ}06'59''$) in the sky at 8.00 PM local time. (coordinates of the location : South $07^{\circ}55'.0144$, East $110^{\circ}34'.344$)
(20)(5 minutes)
4. Point the telescope to the direction of Jupiter (RA: 23h 56m 32s; Dec: $-02^{\circ}06'59''$) and show to the jury (coordinates of the location : South $07^{\circ}55'.0144$, East $110^{\circ}34'.344$)
(20)

Practical Test – Atmosphere

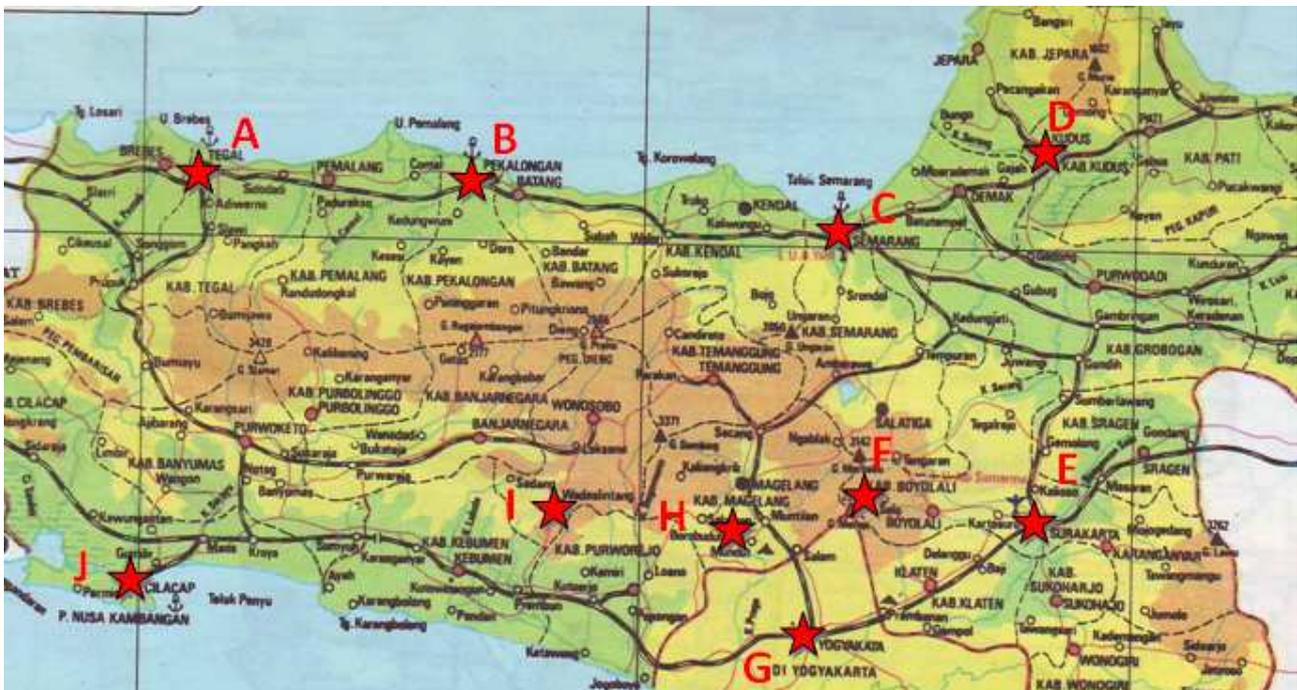
Meteorological observation is the basis of atmospheric science. Such observations are made for a variety of reasons. Observations made primarily for providing information for weather forecasts are termed ‘synoptic’.

Synoptic observations are more frequent and more detailed, and are encoded for immediate transmission to forecasting centres.

1. Inspect all instruments inside and outside the meteorological screen marked by A,B,C,D,and E and put check mark (✓) in the table below to match the instruments and meteorological parameters to measure. (20 points)

Parameters to measure	Instruments				
	A	B	C	D	E
Temperature					
Wind speed					
Wind direction					
Net Radiation					
Precipitation					
Relative Humidity					
Air pressure					

2. Observe at the Central Java map given below: (40 points)



The star marks are the locations of meteorological stations in central Java, and the table on the next page provides the synoptic data at these stations.

station	area	synoptic code					
		IIiii	Nddff	VVwwW	PPPTT	N _h C _L C _M C _H	T _d T _d 9RR
A	Tegal	96797	81115	/////	10130	/////	239//
B	Pekalongan		80910	/////	103//	/////	//9//
C	Semarang	96839	2/////	/////	10728	/////	209//
D	Kudus	96845	50510	/////	///27	/////	219//
E	Surakarta		31205	/////	02326	/////	209//
F	Solo	96633	21305	/////	99023	/////	209//
G	Yogyakarta	96853	11310	/////	030//	/////	//9//
H	Borobudur	96805	11110	/////	04527	/////	219//
I	Wadaslintang		41005	/////	99524	/////	199//
J	Cilacap	0/////	/////	11131	/////	259//	

Draw the synoptic symbol on the map given in the next page. Give the synoptic symbols only for those stations which have the index numbers.

Explanation of the code:

IIiii = Five digit of Country code

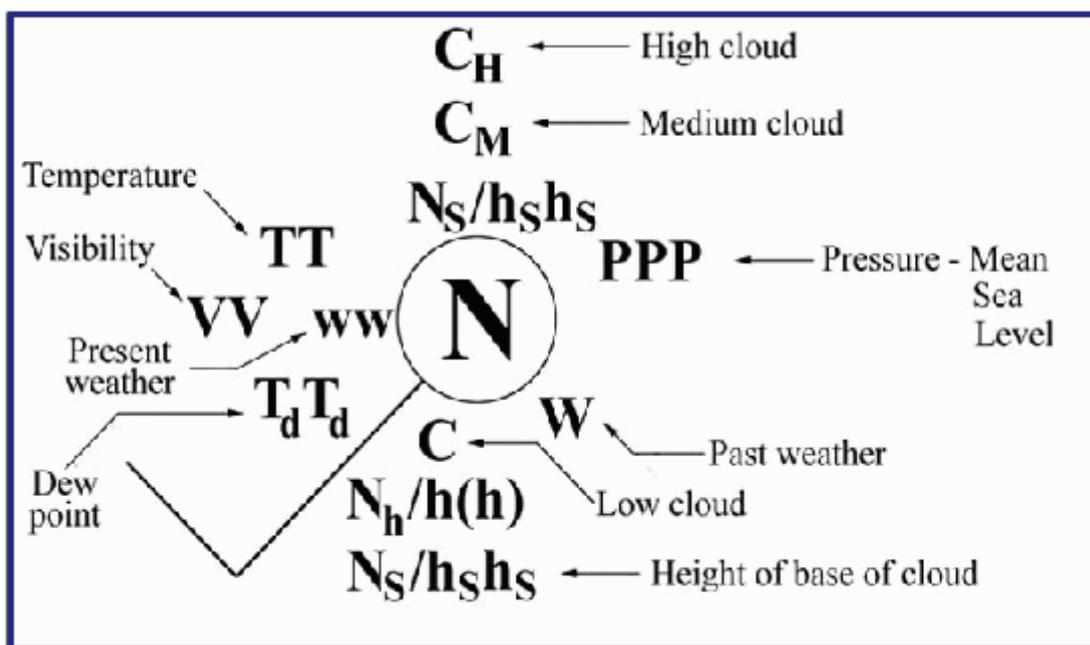
Nddff = Cloud Cover in octas, wind direction (x10 degree), wind speed (knots)
1 knots ~ 0.5 m/sec

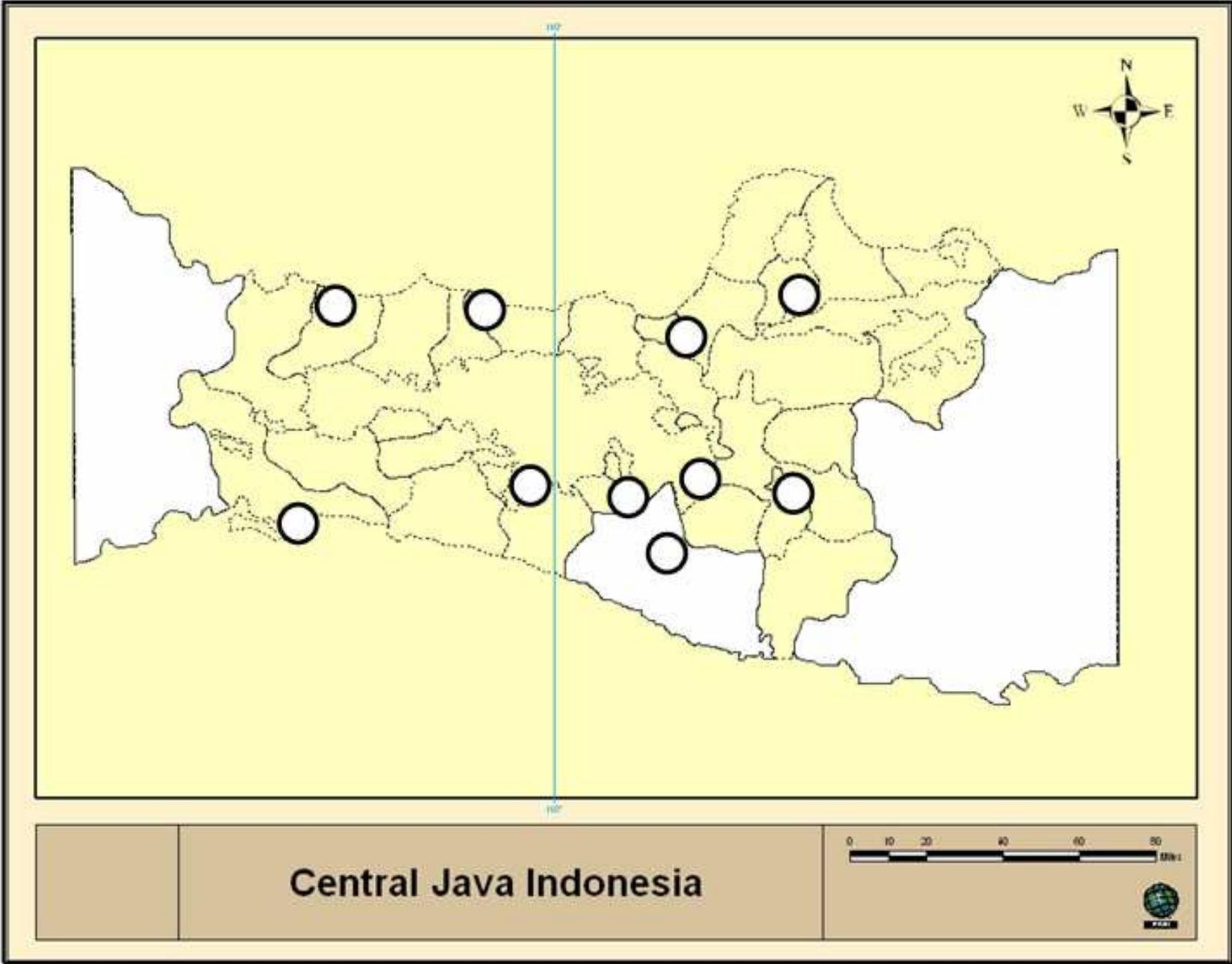
VVwwW = Visibility, current weather, past weather

PPPTT = Air Pressure, Surface Temperature (degree Celsius)

N_hC_LC_MC_H = Cloud Height from the ground

T_dT_d9RR = Dew point, No significant number, Rainfall





Central Java Indonesia

0 10 20 40 60 80
km



3. Tables 1 and 2 below provide on wind observations (wind direction and wind velocity) for Lapangan Pancasila observation station. Using these data, calculate the frequency distribution and draw on rose diagram for the site using 5 knots (1 knots ~ 0.5 m/sec) velocity intervals (40 points).

Table 2

DEGREE	DIRECTION
337.6 – 22.5	N
22.6 – 67.5	NE
67.6 – 112.5	E
112.6 – 157.5	SE
157.6 – 202.5	S
202.6 – 247.5	SW
247.6 – 292.5	W
292.6 – 337.5	NW

Table 1

no.	direction (degree)	velocity (knots)
1	250	13
2	200	8
3	-	0
4	290	2
5	249	18
6	123	9
7	284	7
8	266	3
9	135	13
10	-	0
11	-	0
12	-	0
13	271	14
14	137	12
15	141	9
16	189	3
17	277	7
18	253	4
19	289	3
20	255	17
21	283	9
22	154	8
23	193	7
24	-	0
25	263	12
26	259	2
27	-	0
28	275	1
29	120	13
30	280	19

Frequency count

	Directions / Wind Classes (knots)	1 - 5	6 - 10	11 - 15	16 - 20	Total
1	337.6 - 22.5					
2	22.6 - 67.5					
3	67.6 - 112.5					
4	112.6 - 157.5					
5	157.6 - 202.5					
6	202.6 - 247.5					
7	247.6 - 292.5					
8	292.6 - 337.5					
	Sub-Total					
	Calms					
	Total					

Frequency distribution in percents (%)

	Directions / Wind Classes (knots)	1 - 5	6 - 10	11 - 15	16 - 20	Total
1	337.6 - 22.5					
2	22.6 - 67.5					
3	67.6 - 112.5					
4	112.6 - 157.5					
5	157.6 - 202.5					
6	202.6 - 247.5					
7	247.6 - 292.5					
8	292.6 - 337.5					
	Sub-Total					
	Calms					
	Total					

PRACTICAL TEST FOR IESO 2010

DLINGO AREA, BANTUL REGENCY, YOGYAKARTA, INDONESIA

Wednesday, September 22, 2010

INSTRUCTIONS:

1. Please write your name and nationality in English on the cover pages
2. The total time allocated for this practical test is about 45 minutes for every student.
3. Please write your answer legibly. Illegible answers will be counted as incorrect.
4. Please write your answers only on this practical test sheet. Please encircle the most appropriate answer.
5. Read the entire question carefully before answering.
6. Please handover the completed practical test sheet to member of the organizing committee at the location.

PRACTICAL TEST FOR IESO 2010

DLINGO AREA, BANTUL REGENCY, YOGYAKARTA, INDONESIA

Wednesday, September 22, 2010

PROBLEM SETS

Location 1 (4 minutes):

8 points

1. Using the hand lens provided to you observe the igneous rock within the marked area and identify two main minerals in the rock.
 - a. Plagioclase and pyroxene
 - b. Plagioclase and biotite
 - c. Quartz and pyroxene
 - d. Quartz and hornblende
 - e. Hornblende and pyroxene

2. Observe the petrological characteristics and identify the igneous rock
 - a. Andesite
 - b. Rhyolite
 - c. Granite
 - d. Diorite
 - e. Gabbro

3. By observing the whole part of the outcrop in this area identify the igneous rock body
 - a. A fragment in conglomerate
 - b. An exotic block in meta-breccia
 - c. A part of groundmass of the igneous rock
 - d. An inclusion in the volcanic rock
 - e. A fragment in volcanic breccia

Location 2 (5 minutes):

10 points

4. Please observe the rock components at this Location. Identify at least two types of included rock fragments:
 - a. Basalt and dolomite
 - b. Andesite and tuff
 - c. Andesite and limestone
 - d. Basalt and quartzite
 - e. Basalt and shale

5. Please carefully observe by naked-eye and/or using the hand lens identify the rock fragment (*shown by arrow*).
 - a. Quartzite
 - b. Tuff
 - c. Coral
 - d. White marl
 - e. Phyllite

6. By observing the entire outcrop identify the rock type
 - a. Volcanic breccia
 - b. Brecciated andesite
 - c. Conglomerate
 - d. Fault breccia
 - e. Fanglomerate

Location 3 (6 minutes):

12 points

7. Identify the geological structure at this Location by careful observation.
 - a. Normal fault
 - b. Dextral strike-slip fault
 - c. Sheared joint
 - d. Thrust fault
 - e. Oblique fault

8. By using your compass, please measure the direction of dip of the plane of the geological structure identified in Question 7.
 - a. Northeast
 - b. Southwest
 - c. Southeast
 - d. Northwest
 - e. West

9. The strike/dip angle of the bedding plane is about (*Note: acceptable error is $\pm 5^\circ$*)
 - a. N 15° E/ 45°
 - b. N 50° W/ 45°
 - c. N 75° E/ 15°
 - d. N 60° W/ 45°
 - e. N 45° E/ 15°

Location 4 (3 minutes):

6 points

10. Sedimentary structures identified in the rock marked by *arrows* 'A', 'B', and 'C'.

- | | | |
|--------------------------|------------------------|------------------------|
| a. A = Scouring | B = ripple mark | C = lenticular bedding |
| b. A = Cast | B = lamination | C = Cross bedding |
| c. A = Convolute bedding | B = lamination | C = flame structure |
| d. A = Flame structure | B = lenticular bedding | C = burrow |
| e. A = Ripple mark | B = lenticular bedding | C = convolute bedding |

Location 5 (3 minutes):

6 points

11. Please observe the sedimentary structure present in the marked area and its vicinity, and identify it.
 - a. Ripple mark
 - b. Cross bedding
 - c. Flame structure
 - d. Convolute bedding
 - e. Slump structure

Location 6 (4 minutes):

8 points

12. The rock at this Location is predominantly composed of the following rock fragments
 - a. Andesite and dacite
 - b. Dacite and granite
 - c. Basalt and syenite
 - d. Diorite and gabbro
 - e. Rhyolite and basalt

13. Please identify the rock type at this Location.
 - a. Intrusive breccia
 - b. Fault breccia
 - c. Volcanic breccia
 - d. Agglomerate
 - e. Brecciated igneous rock

Location 7 (3 minutes):

6 points

14. Three types of rock fragment identified in the rock at this location are
- a. Marl, tuff and lignite
 - b. Tuff, claystone and charcoal
 - c. Limestone, tuff and coal
 - d. Tuff, lapilli and lignite
 - e. Tuff, chalk and charcoal

Location 8 (6 minutes):

12 points

15. Two main rock fragment types observed in the rock at this Location include
 - a. Tuff and lignite
 - b. Tuff and charcoal
 - c. Chalk and coal
 - d. Tuff and peat
 - e. Limestone and charcoal

16. Please observe the marked area on the outcrop and identify the rock type.
 - a. Agglomerate
 - b. Volcanic siltstone
 - c. Tuff-enriched siltstone
 - d. Coarse-grained sandstone
 - e. Pumice breccia

17. On the basis of the orientation measurement of rock fragments, the paleocurrent direction in the formation of this sedimentary rock was
 - a. Westward
 - b. Northward
 - c. Southeastward
 - d. Southwestward
 - e. Northeastward

LABORATORY TEST FOR IESO 2010

Wednesday, September 22, 2010

INSTRUCTIONS:

1. Please write your name and nationality in English on the cover pages
2. This laboratory test is conducted with an objective to test the skill of identifying specimens consisting of 5 minerals, 5 igneous rocks, 5 sedimentary rocks, 5 metamorphic rocks and 5 volcanic rocks as well as 10 fossils, 5 geological structures, and 6 geomorphological features.
3. The time allocated for identifying each specimen is 2 minutes.
4. Please write your answer legibly. Illegible answers will be counted as incorrect.
5. Please write your answers only on this laboratory test sheet, by choosing/matching the correct answer provided in the 'Choices' column of the 'Answer sheet'.

ANSWER SHEET

A. Minerals

5 points

No.	Sample Code	Name of Mineral	Choices
1	I		A. Gypsum
2	II		B. Apatite
3	III		C. Biotite
4	IV		D. Garnet
5	V		E. Muscovite
			F. Sulfur
			G. Quartz
			H. Phlogopite
			I. Plagioclase
			J. Anhydrite
			K. Orthoclase
			L. Hornblende
			M. Pyroxene
			N. Olivine
			O. Calcite

ANSWER SHEET

C. Fossils

16 points

No.	Sample Code	Name of Fossil	Choices
1	A		A. Balanus
2	B		B. Pelecypoda
3	C		C. Turitella
4	D		D. Ammonite
5	F		E. Heliophyllum
6	H		F. Brachiopoda
7	I		G. Arachnida
8	J		H. Echinodermata
			I. Busycon
			J. Murex
			K. Zaphrentis
			L. Nautilus
			M. Coral
			N. Scaphopoda
			O. Acropora
			P. Trilobita
			Q. Ostracoda

ANSWER SHEET

E. Geomorphology

6 points

No.	Sample Code	Name of Geomorphologic Unit	Choices
1	A		A. Incised River
2	B		B. Eroded Dome
3	C		C. Estuary
4	D		D. Karst Topography
5	E		E. Alluvial Fan
6	F		F. Cuesta
			G. Barrier Islands
			H. Meandering River
			I. Delta
			J. Eroded Anticline
			K. Spit
			L. Eroded volcano