San Francisco Coastal Geology Field Class - GEOL 21A FIELD DAY 1 EXERCISES

RODEO BEACH OBSERVATION DATA SHEET

For each site, complete the following data table with observations of the beach, its sand, and the surrounding rocks. Also collect and label a sample.

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SITE OBSERVER:								
DATE								
and time								
	Dolotice Humidite	Mind Co.		Wind direction	C	anda / alamiter		
Temperature	Relative Humidity	Wind Spe	eea			louds/clarity		
				(from?)				
Estimated tidal height					<u> </u>			
(from tide tables):								
,	(circle): Flood High	Tide Ebb	Low Tide					
Estimated tidal current (circle): Flood High Tide Ebb Low Tide Maximum wave height Direction waves are								
O .				from (circle): North South Variable				
Estimated longshore cu	rrent direction: North	South V	ariable	on (circle).	Ttorur Boutin	· · · · · · · · · · · · · · · · · · ·		
)	th sand composition (es			er from most to le	ast resistant:			
	hert Magnetite Feld					ohric		
Quartz Ci	nert Magnetite Felo	ispai Shen	s Granic	Diack Horiniagric	tic Tiastic/ D	CDIIS		
Beach sand size (es	stimate %): Mud (<1/16	6 mm) Fin	e Sand Med	lium Sand Coar	se Sand Gra	vel (>2 mm)		
bederi saria size (et	70). Wida (17 10	5 mm, 1 m	e saria ivica	irani baria coar	se sana Gra	ver (* 2 mm)		
From the above compo	ositional data only, doe	es this sand	From the a	above size data o	nlv , does this s	sand appear to		
appear to have been tra				From the above size data only , does this sand appear to have been transported a great distance?				
Trong to an and a second				1 0 1 0				
Back of beach material:	Sand Dunes Cliff	Lagoon O	ther – describ	e:				
	ı ı	0 1						
Rocks in cliff (circle): M	Iudstones Sandstones	s Serpentii	nite Chert	Basalt Granite	Other - descr	ribe:		
,	·			·				
What do the rocks in	the cliff say about the p	ast environi	ment (be sure	to look for rock t	ype AND fossi	ils, if possible)?		
	•							
	Using all above data	as evidence	e, indicate sou	rce of this beach	sand.			
Local sources Longshore transport from Local biologic reef Other (describ				be below):				
	rivers							
%		%		%		%		
CHALLENGE: Can you	u CHALLENGE:	Can you fin	d evidence of	f past landslides o	on this beach? I	How? Where?		
find any Carnelian on t	he What was the li	kely cause?						
beach today? Jade? Bot								
semi-precious gem stor								
commonly found on this								
beach.								

RODEO BEACH QUARRY WORKSHEET

MARIN HEADLANDS RIBBON CHERT

In the cliff face in front of you, observe (with a handlens – close up – and from a distance) the two different rock types
found. Name and describe them below.
Find a fold structure in the rocks and a fracture. Pick one and sketch it below. Show textures, fractures, etc. Label each
rock type and feature. DON'T FORGET SCALE.

The youngest ribbon chert in the Marin Headlands is 100 Ma – the oldest is 200 Ma. Can you tell which layers in the cliff face are the oldest and which the youngest? Why or why not?
Observe the sediment produced at the base of the cliff. How does the chert sediment differ from the shale sediment? (Describe below – texture, size, etc.)
What hypothesis can you develop about the relative resistance to weathering of these two rock types in this particular
climate?

BAKER BEACH OBSERVATION DATA SHEET

For each site, complete the following data table with observations of the beach, its sand, and the surrounding rocks. Also collect and label a sample.

SITE OBSERVER:							
DATE							
and time							
Temperature	Relative Humidity	Wind Speed		Wind direction (from?)		Clouds/clarity	
Estimated tidal height (from tide tables):							
Estimated tidal current	(circle): Flood High T	ïde Ebb	Low Tide				
Maximum wave height Direction waves are coming from (circle): North South Variable					South Variable		
Estimated longshore cu	ırrent direction: North	South Var					
Beach sand composition (estimate %) – listed in order from most to least resistant: Quartz Chert Magnetite Feldspar Shells Granite Black nonmagnetic Plastic/Debris							
Beach sand size (es	stimate %): Mud (<1/16	mm) Fine	Sand Med	ium Sand Coar	se Sand	Gravel (>2 mm)	
	ositional data only, does		From the a	bove size data o	nly, does	this sand appear to	
appear to have been transported a great distance? have been transported a great distance?							
Back of beach material: Sand Dunes Cliff Lagoon Other - describe:							
Rocks in cliff (circle): Mudstones Sandstones Serpentinite Chert Basalt Granite Other - describe:							
What do the rocks in the cliff say about the past environment (be sure to look for rock type AND fossils, if possible)?							
Local sources	Using all <u>above data</u> a Longshore transport fr	1	indicate sou l biologic ree		1	lescribe below):	
%		%		%		%	
CHALLENGE: Can you find evidence here of the sand dunes that covered San Francisco before we built a city atop them? What is that evidence?							

LAND'S END WORKSHEET

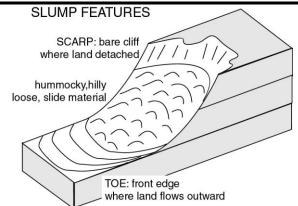
LANDS END - Trail in the middle of the landslide behind Sutro Baths

CHALLENGE: Describe the serpentinite soil: Grain size, texture, color, and other observations. Compare with fresh samples. How long did it take the fresh, exposed serpentinite to change into the soil before you? What does that mean for using this serpentinite as a possible building material?

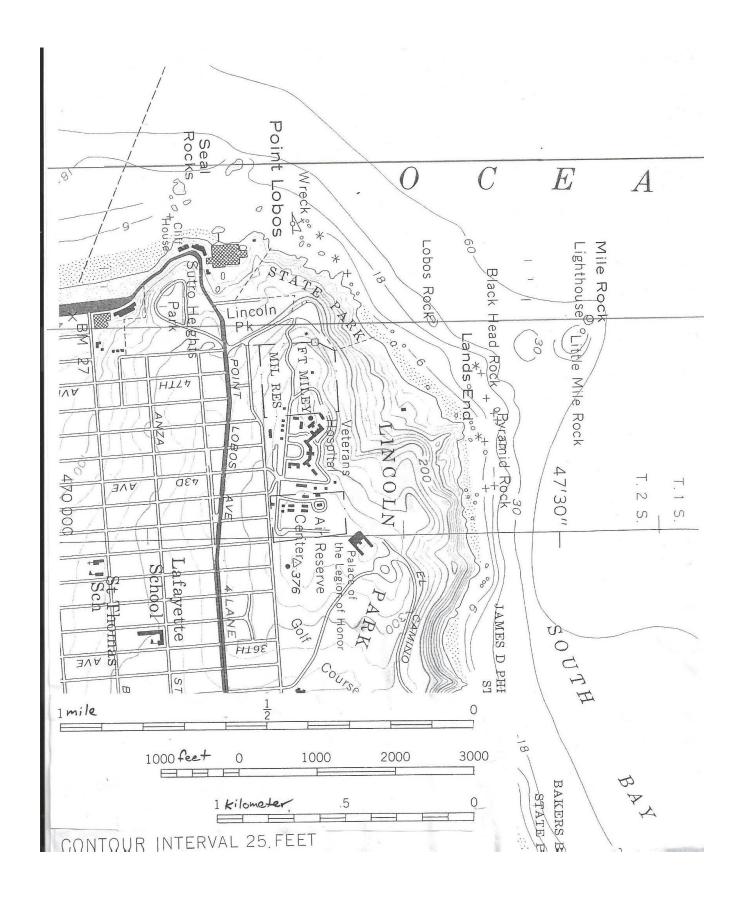
Landslide overlook (under golf course access road)

As we walk along the coastal trail through the City College mélange, we are also walking across a massive landslide, right under the Veterans Hospital, behind the Legion of Honor. The landslide was caused by wave action undercutting the City College mélange. In the early 1880s, a rail line used this same route to take people between downtown and the Cliff House. It was abandoned because of the huge maintenance costs resulting from the unstable roadbed.

CHALLENGE: What is the approximate size of this landslide (height, width, depth)?



Hint: take something you know – like a football field length or a city block – and compare it with the magnitude of the depth, height, and width. Which is the largest number? Smallest? – Estimating distances in the field is a tough skill. Be patient!



OCEAN BEACH OBSERVATION DATA SHEET

For each site, complete the following data table with observations of the beach, its sand, and the surrounding rocks. Also collect and label a sample.

SITE OBSERVER:								
DATE								
and time								
Temperature	Relative Humidity	Wind Speed		Speed Wind direction (from?)		Clouds/clarity		
Estimated tidal height (from tide tables):								
Estimated tidal current	(circle): Flood High T	ide Ebb	Low Tide					
Maximum wave height (estimate) Direction waves are coming from (circle): North South Variable						South Variable		
Estimated longshore cu	rrent direction: North	South Vai	riable					
Beach sand composition (estimate %) – listed in order from most to least resistant: Quartz Chert Magnetite Feldspar Shells Granite Black nonmagnetic Plastic/Debris								
Beach sand size (estimate %): Mud (<1/16 mm) Fine Sand Medium Sand Coarse Sand Gravel (>2 mm)								
From the above compositional data only, does this sand appear to have been transported a great distance? From the above size data only, does this sand appear to have been transported a great distance? have been transported a great distance?								
Back of beach material: Sand Dunes Cliff Lagoon Other - describe:								
Rocks in cliff (circle): Mudstones Sandstones Serpentinite Chert Basalt Granite Other - describe:								
What do the rocks in the cliff say about the past environment (be sure to look for rock type AND fossils, if possible)?								
Using all above data as evidence, indicate source of this beach sand.								
Local sources	Longshore transport fr	om Local	1			(describe below):		
		01						
%		%		%		%		