HISTORICAL GEOLOGY SEMESTER PROJECT

Introduction

The purpose of the project is for you to produce a paper on the historical geology of a county of your choice. The county must be in Texas and must have at least **five prominent** different rocks outcropping at the surface (rock types e.g. limestone, sandstone, shale, etc. – can include multiple layers of one rock type e.g. different layers of limestone) (Note: there are counties in Texas that do NOT meet this criterion – e.g. many counties in the Panhandle are dominated by 1 or 2 rock types – these counties cannot be used. Also, Quaternary surficial deposits (recent sediments) **do not count as rock types**. The objective is to provide the reader with a description of what the county was like at times in the past when the rocks formed (e.g. shallow tropical ocean with abundant coral reefs... hot, dry desert with blowing sand dunes... wet coastal plain with sandy rivers and lush forests, etc.) and explain how these different environmental conditions are recorded by the different layers of rock. Also include events not recorded by layers of rock e.g. a long period of terrestrial erosion could be recorded by an erosional unconformity; tectonic activity could be recorded by folds and faults. The **hardcopy** paper **must include a legible color map and legible color legend of the county's geology** and the following information in a single summary table – see attached example for format:

1. Time period (from the youngest to the oldest in your county).
2. Age range in millions of years (if several rocks are from the same time period, you can estimate the age range for each).
3. Outcrop name.
4. Lithologic description and approximate thickness.
5. Fossils.
6. Environment of deposition.
7. Modern-day analog (should be a well-known place e.g. Padre Island beaches, Texas; Louisiana coastal marshes; Mojave Desert; Brazos River floodplain; Bahamas sea floor; muddy floor of the Gulf of Mexico, etc.).

Your paper must have the following sections: Introduction (brief), geology (describe outcrops, refer to geology map), geologic history, bibliography.

Your section on geologic history of the county (starting with the oldest outcrop and ending with the youngest) should be **at least 2 pages long** (not including figures) and is the most important part of the project. All text must be in your OWN words; text copied word for word will not receive high marks.

Sources of Information

For this project, you must use the following online map source: Geologic Atlas of Texas scanned 1:250,000 scale geology map https://data.tnris.org/ key word search for "geologic", click on Geologic Atlas of Texas, click on a map sheet on the map of Texas and you should get the option to download an image of the map (see 3020 web page for a link showing how to download maps). At this scale, each map covers about 5 to 6 counties, but this level of detail should be sufficient. You must crop the map so that it shows only your county (approximately). You should make the map fill a whole page (either portrait or landscape format). Also crop the legend to show only rock outcrops in your county and put the legend (showing only rock outcrops in your county) on a separate page. Text on the map and legend must be readable. See me if you need help cropping a map. These maps show the rock outcrops in each county and library copies have a booklet describing the age, lithology, fossils and thickness of each rock type (review Lab 2 if needed).

The class textbook contains paleogeographic maps of North America for each time period; these provide an approximate guide to environmental conditions in different parts of Texas at these times. The textbook also describes environmental conditions in different parts of the U.S. (including Texas) during these time periods. If desired, library and internet searches may yield additional information. Visiting the county to view and photograph rock outcrops, collect rock samples, fossils, etc., may also provide more insight, although this is optional and not a requirement of the project.

Quality of writing **WILL** be taken into consideration during grading. All text must be typed. ALL work must be completely INDEPENDENT. Due date: in class December 7, late penalty 10%/day up to a maximum of 4 days.

WILLIAMS COUNTY

TIME PERIOD	AGE	OUTCROP NAME	LITHOLOGY	FOSSILS	ENVIR. OF DEPOSITION	MODERN ANALOGY
NEOGENE/ MIOCENE	5-23 MIL	CATAHOULA FORMATION	CLAYS, SHALES. 100-150 feet thick.	RUSHES, SNAILS, REEDS, GRASSES.	COASTAL PLAIN, SWAMPS	GULF COAST COASTAL PLAIN
PALEOGENE	23-65 MIL	WHITSETT FORMATION	CLAYS, SANDSTONES, SHALES. 200-250 feet thick.	*OPHIOMORPHA* (SHRIMP BURROWS)	SHALLOW MARINE, NEARSHORE/OFFSHORE	GULF COAST (NEAR -OFF SHORE)
CRETACEOUS	~65-75 MIL	MANNING FORMATION	CARBONATES. 50 feet thick.	BIVALVES, CORALS	EPEIRIC SEA, TROPICAL	BAHAMAS DEEPER OFFSHORE
CRETACEOUS	~75-90 MIL	JONES FORMATION	CLAYS, SANDSTONES, SHALES. 100 feet thick	*OPHIOMORPHA* (SHRIMP BURROWS), MOLLUSKS	SHALLOW MARINE, NEARSHORE	GULF COAST (NEAR -OFF SHORE)
CRETACEOUS	~90-120 MIL	SMITH FORMATION	SANDSTONES, 75 feet thick	*BIVALVES, CLAMS*	BEACHES, TIDAL FLATS, DELTAS	GULF COAST SHORELINE
PENNSYLVANIAN	~299-318 MIL	WELLBORN FORMATION	CARBONATES, REEFS, MARLS. 50-200 feet thick. Capped by erosional unconformity	BIVALVES, CORALS	EPEIRIC SEA, TROPICAL, NEAR RIVER MOUTH AT TIMES	CARIBBEAN DEEPER OFFSHORE

Hints: your choice of county can make this a fairly easy project or a fairly difficult project. Some counties are very complicated (e.g. in the Big Bend area and around Austin) and you should avoid them unless you're willing to put a lot more work into the project. Try to pick a county that has interesting features and some big changes in the past e.g. a mix of terrestrial and marine rock types, a major unconformity. etc. **Try to incorporate material from class** e.g. paleogeography, effect of transgressions and regressions, effect of orogenies. If you are uncertain if your county has five distinct prominent rock outcrops, check with me before proceeding.

Grading Rubric:

REQUIREMENT	YES √ / NO x
Selected a suitable county	
Typed	
Figures and tables integrated into text (not all lumped together in the back)	
Information on figures readable	
Figures and tables numbered consecutively	
Figures and tables have captions	
Figures and tables referred to in text	
Required color geology map and legend	
Factual data properly referenced	
Required reference list	
Description of historical geology in own words	
Neat and well-written	