

April 10, 2023

News and notes

Before going on to the first part of a series on geology and the fate of societies, here are some news items that I thought were interesting.

Research

- From the Mineralogical Society of America: [New Mineral Names](#).
- Quantifying carbon dioxide removal from erosion: [New estimates of the storage permanence and ocean co-benefits of enhanced rock weathering](#); Eureka Alert summary [here](#).
- Sedimentology research: [Two distinct types of turbidity currents observed in the Manila Trench, South China Sea](#).
- Continental shelf geology: [Flexural Response to Erosional Unloading of Continental Margins: An Example From the Bering Sea, USA](#).

Plate Tectonics and Geophysics

- [New constraints on Cenozoic subduction between India and Tibet](#).
- The Earth's core: [Globally distributed subducted materials along the Earth's core-mantle boundary: Implications for ultralow velocity zones](#); Phys.org summary [here](#).
- Early plate tectonics: [Eoarchean and Hadean melts reveal arc-like trace element and isotopic signatures](#); Phys.org summary [here](#).
- [Mantle structure beneath the Macaronesian volcanic islands \(Cape Verde, Canary, Madeira and Azores\): A review and future directions](#).
- [New Middle Jurassic Paleomagnetic and Geochronologic Results From the Lhasa Terrane: Contributions to the Closure of the Meso-Tethys Ocean and Jurassic True Polar Wander](#).
- [Structure and Dynamics of Lithosphere and Asthenosphere in Asia: A Seismological Perspective](#).

Paleontology

- Mid-Permian Mass Extinction: [Global oceanic anoxia linked with the Capitanian \(Middle Permian\) marine mass extinction](#); Phys.org summary [here](#).
- Zircons and traces of ancient life: [Graphitic inclusions in zircon from early Phanerozoic S-type granite: Implications for the preservation of Hadean biosignatures](#); Phys.org summary [here](#).

Glaciers and Climate Change

- Precambrian Glaciation: [Mid-latitude habitable environment for marine eukaryotes during the waning stage of the Marinoan snowball glaciation](#).
- New Zealand glaciers: [Further loss for Aotearoa's glaciers](#).

- Glacial retreat: [Rapid, buoyancy-driven ice-sheet retreat of hundreds of metres per day](#); Phys.org summary [here](#).

Environmental Geology and Hydrogeology

- Remediation: [Performance of molybdenum vanadate loaded on bentonite for retention of cesium-134 from aqueous solutions](#).
- Historical contamination: [Isotope Compositions of Century-Long Corals Reveal Significant Dissolved Cu, Zn Fluxes From Human-Accelerated Weathering Into the Ocean](#).

Energy and Mining

- [Excess methane emissions from shallow water platforms elevate the carbon intensity of US Gulf of Mexico oil and gas production](#); Smithsonian Magazine summary [here](#)/
- [The Oil and Gas Sector's Contribution to Canada's Economy](#); no energy, no modern economy.
- Exploration activity: [U.S. Oil & Gas Rig Count Falls for Second Week in a Row – Baker Hughes](#).
- Georgia, USA: [Vogtle Nuclear Unit Begins Producing Power](#).
- [Labrador Uranium completes \\$9.2 million financing](#).
- Ontario: [Kenora-area nickel deposit progressing towards production, says company](#).
- Northwest Territories: [Osisko Metals, Appian complete JV to advance Pine Point zinc project](#).
- [Vietnam aims to build advanced mining industry](#).
- Coal mining is dangerous, safety research: [Research on the dynamic evolution law of fissures in shallow-buried and short-distance coal seam mining in Lijiahao Coal Mine](#).
- [Hochschild Mining walks away from Canadian gold project](#).
- Meanwhile in Ecuador: [Lundin Gold posts record quarterly production from Fruta del Norte](#).
- [Central banks are buying gold at a record pace so far in 2023](#).

Oooo Shiny

- [De Beers finds diamond within a diamond, names it the “Beating Heart”](#).

From Out of this World

- From the Mineralogical Society of America: [Mineralogy and geochemistry of hot spring deposits at Námafjall, Iceland: Analog for sulfate soils at Gusev crater, Mars](#); sorry, behind a paywall.
- Bolide strikes: [Structural changes in shocked tektite and their implications to impact-induced glass formation](#); sorry, behind a paywall.
- [MASCOT's in situ analysis of asteroid Ryugu in the context of regolith samples and remote sensing data returned by Hayabusa2](#).

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Geology and the Fate of Societies



Figure 1 – The Blue Marble

Credit: NASA/Apollo 17 crew; taken by either [Harrison Schmitt](#) or [Ron Evans](#), [public domain](#)

This week I am going to start a new series of postings on the effect of a country’s geology on its development and culture. It should be clear to anyone that different places have different climates, different available resources, and different neighbours to interact with. Any location on the Earth will present different opportunities and challenges. Analysing these should help us the understand the history and development of any human society. I’ll be using the terms nation and society fairly interchangeably. Yes, I know that they can be given more precise definitions, its just that the line between a society in general and a “nation” is often fairly imprecise.

In future postings, we will look at particular cases. First, however, I want to present the various criteria we will look at when assessing the effect a society's geology has had upon its fate in the past, present and foreseeable future.

Geology and Geological History



Figure 2 – Dumont's 1875 Geological map of Europe

Credit: André Dumont, Creative Commons Attribution 3.0 Unported license

Human events occur on a stage built by geology and geological history. We are creatures of a place and its history. The forces of geology set the [boundary conditions](#) where a person “[struts and frets his hour upon the stage](#)”, as [Shakespeare](#) would have it.

The geology and geological history of a place creates the various natural resources available to the people living there. The most important resources in any place are those that create food resources – you can't have much of a nation if you can't feed them. [Orogeny](#) (mountain building), [erosion](#) and [deposition](#) will create different landscaped with different potential biological productivity. For example, a broad alluvial plain may be ideal for growing food crops while a rocky mountain may be limited in the food it can produce. The geological history of a place will also affect the kinds of plants and animals available for human domestication.

Secondary geological resources include metallic minerals and dimension stone. This is where the variety of landscapes under a nation's control is important. The food producing areas of a nation may be deficient in many geological resources. The development opportunities of a nation may depend on nearby regions that have things like metal ores, useful dimension stone and timber resources. A granite mountain may be limited in its ability to produce a lot of food but it may be just what you need for making engineering works. As well, some areas will be better than others for producing different crops. A nation with a variety of resources will be more resilient and have some things of value for internal and external trade.

Climate and Climate History

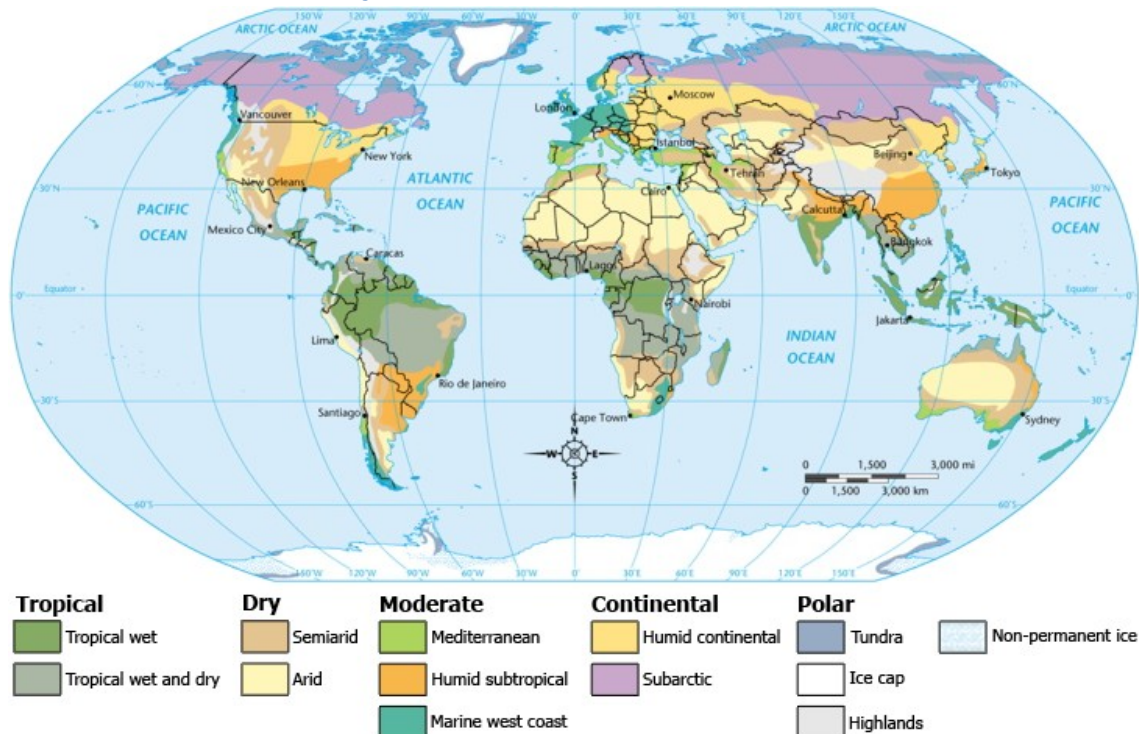


Figure 3 – World Climate Map

Credit: Waitak, [Creative Commons Attribution 3.0 Unported](#) license

The climate of a place will affect what kind of food resources can be grown there. It may also affect the kinds of metallic ores available, for example, [bauxite](#), the ore of aluminum, is [formed](#) by the tropical or subtropical weathering of various rocks.

Climate history is also important in understanding the history of a nation. For example, during the [Holocene Climatic Optimum](#), North Africa was a relatively well water savanna that later dried out to form the [Sahara Desert](#). The origins of Egyptian civilization may lie in the [migration of people from the desiccating Sahara to the Nile Valley](#).

The Neighbours

Few nations or societies exist in isolation, most have neighbours. The geology of a place creates the geography and this will determine its [geopolitics](#), that is, the relations between neighbouring societies.

A place, its people and history will be effected by such things as:

- Is a society in easy communication with neighbouring societies or is communication difficult?
- What are the means of transportation available; e.g. by water or by land?
- What has driven changes in the relationships between societies; e.g. population growth, climate change; disease?

Human history has shown that interactions between different nations and societies have ranged from peaceful trade to endemic warfare. Trade itself is complicated, involving not only material goods but ideas and diseases. War can destroy societies or stimulate technical and organizational development. Overall, it's a complicated and fascinating interplay of people and the places they inhabit.

Summary

In future postings we will look at a few different nations and societies. First we will look at the geological history and setting of the nation's territory. We'll look at the available resources that come from that geological history. We'll look at a place's climate and climate history, especially during the [Holocene](#). We'll look at the overall geopolitics that result from a society's place in the world. Finally, we'll relate the geological background of a society to its history and current condition.

Check next week's entry for the first instalment in the series.

Standard Caveat

The purpose of my weblog postings is to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If I have sparked your curiosity in the subject of this posting, follow up with some of the links provided here. If you want to, go out into the field and examine some rocks on your own with the help of a good field guide. Follow the evidence and make up your own mind.

In science, the only authority is the evidence.