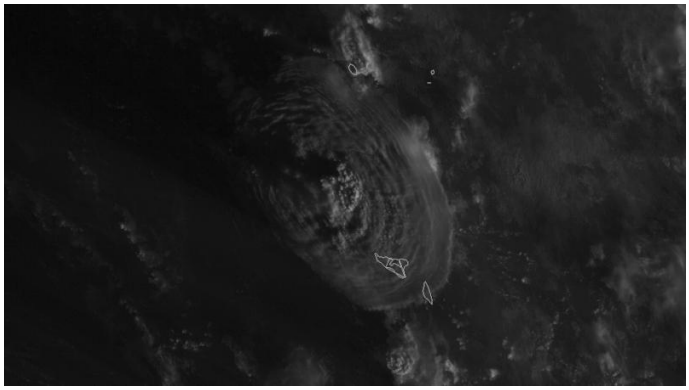
**January 17, 2022**

**News and views**

Before going on with this week's posting, here are some news items that I thought were interesting.

**Hunga Tonga-Hunga Ha'apai Volcano**



**Hunga Tonga-Hunga Ha'apai - January 13, 2022**
**Credit: NOAA's GOES West satellite, public domain**

The big news is the Hunga Tonga-Hunga Ha'apai in the Kingdom of Tonga, here are a few of the stories:

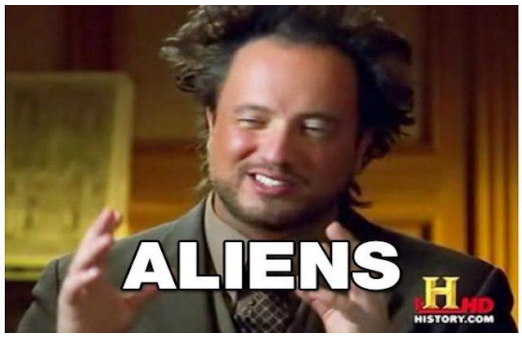
- Flights sent to assess Tonga damage after volcanic eruption.
- Huge Tonga volcanic eruption caused 'significant damage'.
- Volcano eruption in Tonga was a once-in-a-millennium event.
- Tonga volcano: a visual guide to the eruption and its aftermath.
- Tonga volcanic eruption: What happened, what we know and the aftermath of destruction.
- Tsunami damage: Videos show flooding, damage after tsunami waves hit San Francisco Bay Area.
- 'Jaw-dropping' eruption triggered tsunami waves in South Pacific.

**Research**

- Megaripple mechanics: bimodal transport ingrained in bimodal sands; a more accessible article on the research is here.
- Playing in the mud of Tokyo Bay, Japan: Recycling of clastics in coastal areas inferred from quantitative analysis of reworked radiocarbon samples.
- It was really hell like during the Hadean: We May Have Seriously Underestimated How Hostile Conditions on Early Earth Were.

- Two-pronged kill mechanism at the end-Triassic mass extinction.
- Earliest human remains in eastern Africa dated to more than 230,000 years ago.

**Aliens**




**Giorgio A. Tsoukalos, star of "Ancient Aliens"**

- Latest Study Finds No Trace of Aliens in 4-Billion-Year-Old Martian Meteorite.
- Image: Rolling stones on Mars.
- An asteroid estimated to be a kilometer (3,451 feet) wide will fly by Earth on January 18.

**Paleontology and Fossils**

- An ichthyosaur: Giant 'Sea Dragon' Unearthed From Mud Is The Largest Ever Found in The UK.
- World's earliest fossil record of flower buds discovered.
- 99 Million-year-old Spider Mummies Reveal Moms Cared for Teeny Spiderlings; preserved in amber.
- Modern humans lived in eastern Africa 38,000 years earlier than thought.

**Landslides**

- The devastating mudslides that follow forest fires.

**Earthquakes**

- Strong quake shakes Indonesia's capital; no tsunami alert.
- Magnitude 6.6 earthquake 48 km WNW of Pólis, Cyprus.

**Mining and Energy**

- Labour shortage threatens to put mining industry on shaky ground.
- Tesla signs deal to buy nickel from proposed mine in Aitkin County, MN.

- For your electric (i.e. coal powered) vehicle: Coal will account for 85% of U.S. electric generating capacity retirements in 2022; from the US Energy Information Administration (USEIA).
- Also from the USEIA: EIA expects gasoline and diesel prices to fall in 2022 and 2023 as demand growth slows; related, they expect crude oil prices to fall.
- From the United States Geological Survey (USGS): Oil and Gas Estimate for the Bakken and Three Forks Formations in Montana and North Dakota.
- Also from the USGS: Risk from Earthquakes to the Nation's Gas Transmission Pipelines.
- Dammed if you do, dammed if you don't: IEA says Canada can be a key global oil supplier if emissions promises kept.

**Popular Culture and Geology**

- What The Curse Of Oak Island Gets Wrong About Geology.

**Upcoming Events**

**January 17, 2022**

## The Silurian Period

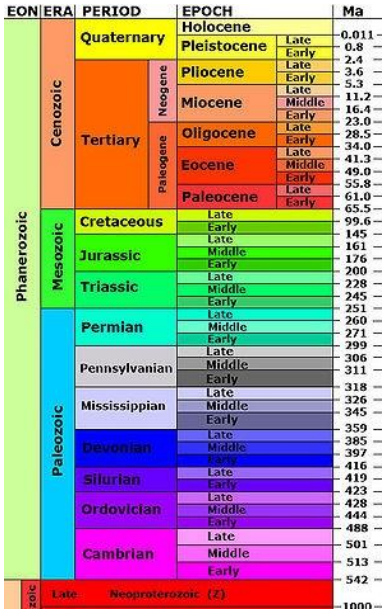



**Figure 1 - Phanerozoic Time Scale**
**Credit: Modified from File: Geologic time scale.jpg, United States Geological Survey, public domain**

Moving on through the geological time scale, let's go on to a look at the Silurian Period. In this week's post we'll look at how the Silurian Period came to be defined followed by an overview of the major events of the Period. Next week we'll look at life during the Silurian.

## Defining the Silurian

**Figure 2 - Marine Transgression Sequence, Late Ordovician - Early Silurian, Hovedøya, Norway**
**Credit: Petter Bøckman, Creative Commons Attribution-Share Alike 3.0 Unported license**

The Silurian Period began 443.8 million years ago (Mya) with the Ordovician-Silurian extinction event and ended  419.2 Mya with the beginning of the Devonian Period.

The Silurian Period was named by British geologist Roderick Murchison in a paper published in 1835 co-authored with geologist Adam Sedgwick.  Sedgwick had previously named the Cambrian Period after the Roman name for Wales and so Murchison named the period he identified after a Welsh tribe, the Silures.

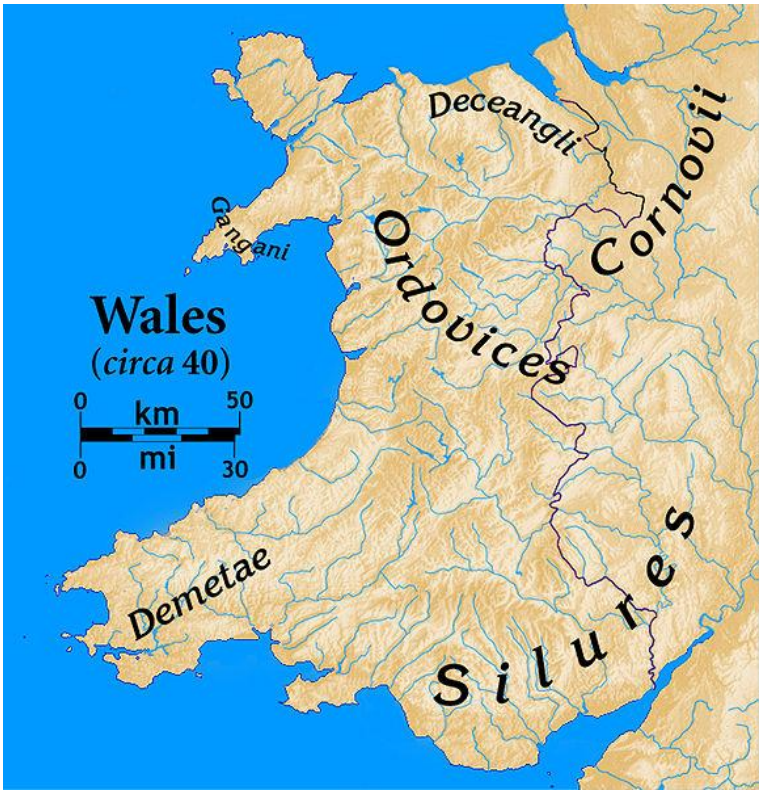



**Figure 3 - British Tribes in Cambria, circa 40 AD**
**Credit: John Edward Lloyd, Creative Commons Attribution-Share Alike 3.0 Unported license**

So far, so good. The problem came when Sedgwick, Murchison and other geologists continued studying and mapping the rocks of the British Isles.  Murchison, and his followers often classified rocks as Silurian that Sedgwick and his coterie would classify as Cambrian.  The dispute became acrimonious, ending the previously close friendship of Sedgwick and Murchison and dividing the geological community into rival camps.  It got so bad that the London Geological Society banned further discussion of the topic.  There is no word, however, of any duel fought over the dispute.

The disagreement over the boundary between the Silurian and Cambrian was resolved by Charles Lapworth, who proposed the Ordovician Period to be placed between the two.  This was a good call given the extinction events that bracketed the Ordovician.  Lapworth named the

Ordovician after another Welsh tribe, the Ordovices. For more info on the Silurian-Cambrian controversy , see Discovering the Ordovician by Nick Davidson.

**Subdivisions of the Silurian**

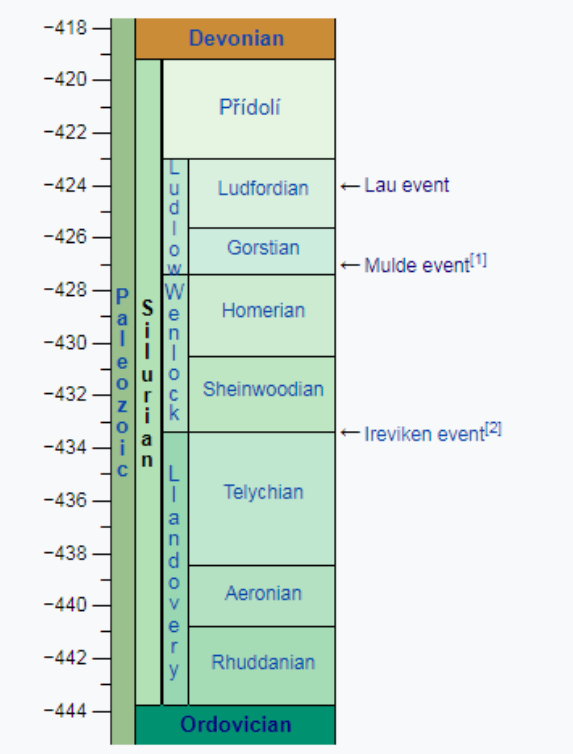



**Figure 4 - Divisions of the Silurian**
**Credit: from the International Commission on Stratigraphy**

The four main subdivisions of the Silurian are as follows:

The Llandovery Epoch lasted from ~443.8 to ~433.4 Mya and is divided into the Telychian, Aeronian, Rhuddanian stages. Following the Ordovician-Silurian extinction event, the Llandovery was marked by recovery from the mass extinction. The Ireviken event marks the end of the Llandovery.

The Wenlock Epoch lasted from ~433.4 to ~427.4 Mya and is divided into the Sheinwoodian and Homerian stages. The name was first used in the term "Wenlock and Dudley rocks" by Roderick Murchison.

The Ludlow Epoch lasted from ~427.4 to ~423 Mya and is divided into the Gorstian and Ludfordian stages. Two minor extinction events, the Mulde event and the Lau event occurred during the Ludlow Epoch.

The Přídolí Epoch lasted from ~423 to ~419.2 Mya and is not further divided into stages. The earliest known simple vascular land plants, of the genus *Cooksonia*, typically occur in the lower portions of the Přídolí in many parts of the world.

**Paleogeography of the Silurian**

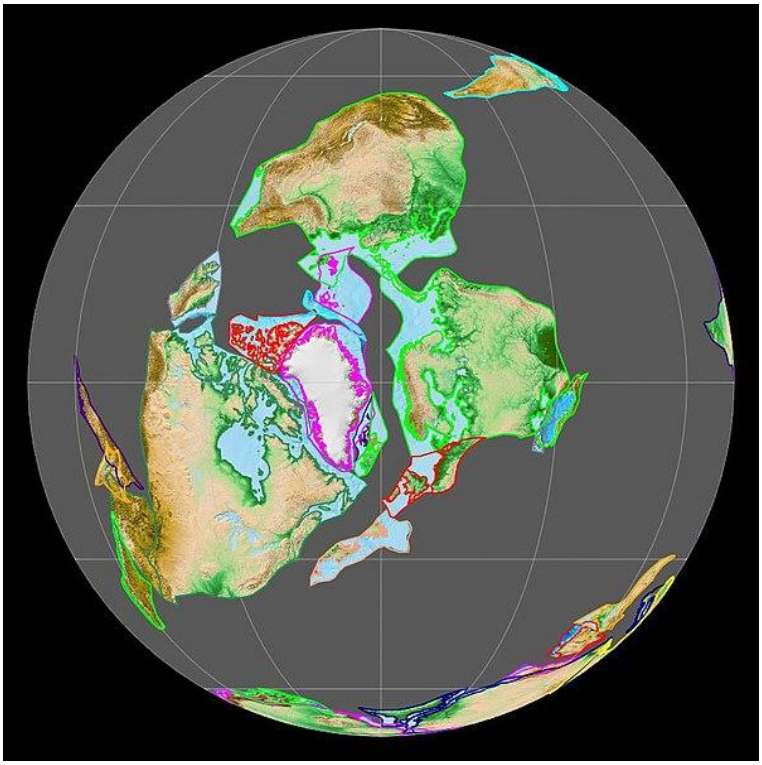


**Figure 5 - Mid Silurian Paleogeography**
**Credit: Fama Clamosa, Creative Commons Attribution-Share Alike 4.0 International license.**

We can sum up the paleogeography of the Silurian Period as follows:

- There was a continued slow southward drift of Gondwana.
- Icecaps and glaciers melted contributing to a rise in sea level as shown by Silurian sediments that often overlie eroded Ordovician sediments in an unconformity.
- The drift of other cratons and continent fragments to locations near the equator; this began the formation of a second Supercontinent sometimes called Euramerica.
- As part of the creation of Euramerica, the Caledonian orogeny occurred when proto-Europe collided with North American craton creating the mountain chains now in eastern North America and northwestern Europe.
- There was a drop sea levels at the end of the Silurian, leaving evaporite deposits in places such as the Michigan Basin.
- The vast Panthalassa Ocean covered most of the northern hemisphere. Other minor oceans include the Tethys Ocean, Rheic Ocean, the Iapetus Ocean and the Ural Ocean.

- There was a fairly stable climate during the Silurian with warm shallow seas. However, violent storms led to the deposition of abundant coquina rock made up of broken shells.

So that's the Silurian Period in a nutshell, we'll look at life during the Silurian next week.

**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.