THE MINERAL VEIN

Official Newsletter of

THE MINERAL SOCIETY OF MANITOBA

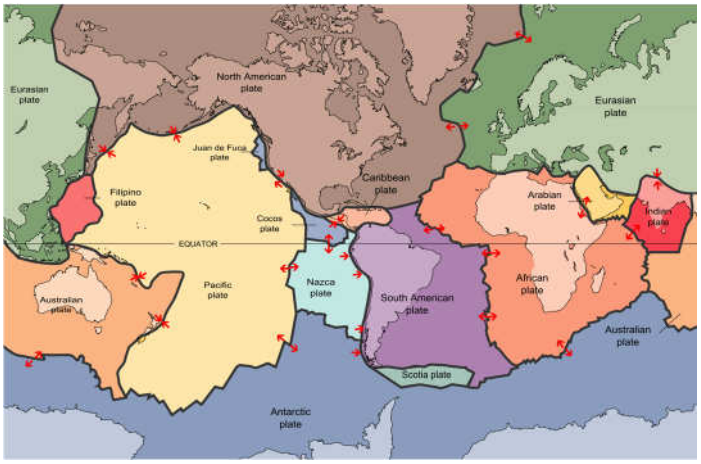
FEBRUARY 2017

JANUARY PRESENTATION SUMMARY

By Jacques Bourgeois

Our guest speaker in January was Marc Rinne, Geologist, Precambrian Geoscience Section from the Manitoba Geological Survey. He gave us a talk about plate tectonics, especially with reference to some work he did in New Guinea and comparing it to similar processes that took place in Big Stone Lake area, where he spent some time last summer.

Plate tectonic can be a very complex process. The Earth's lithosphere is composed of about seven major plates and many minor plates. Where the plates meet, their relative motion determines the type of boundary: convergent, divergent, or transform. Earthquakes, volcanic activity, mountain -building, and oceanic trench formation occur along these plate boundaries. The relative movement of the plates typically ranges from zero to 100 mm annually. Which is the same rate at which your fingernails grow!



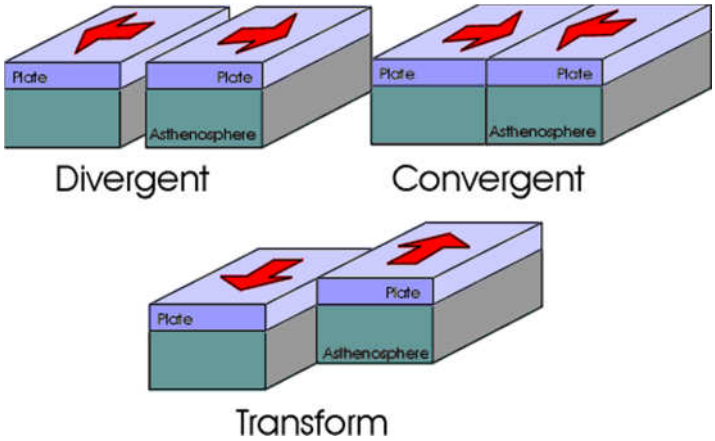
Tectonic plates of the world - USGS

The movement of the plates creates three types of tectonic boundaries: convergent, where plates move into one another; divergent, where plates move apart; and transform, where plates move sideways in relation to each other.

Marc Rinne - Manitoba Geological Survey

As the lithosphere is recycled and new crust is formed, the location, shapes and number of plates is constantly changing.

Although Winnipeg is located far from any modern plate margins, which means we are currently at almost zero risk of a large earthquake or volcanoes, much of Manitoba's bedrock was formed atop convergent plate tectonic margins.



Three types of tectonic boundaries

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The Mineral Vein is published monthly from September to June.

Meetings are held on the first Wednesday of each month from September to May inclusive at the Manitoba Museum in room P47 on the Planetarium level. They begin at 7:30 PM and feature announcements, an invited speaker and a raffle. Members are encouraged to bring along any new, interesting specimens, or specimens appropriate to the speaker's topic.

Field Trips take place from May to September to interesting sites in Manitoba or neighbouring provinces and states.

Membership: A single membership is $15 while a family membership is $20. Memberships run from October to October.

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UPCOMING EVENTS

February 1, 2017: MSM regular monthly meeting begins at 7:30 p.m. at the Manitoba Museum. Our guest speaker will be **Kathryn Lapenskie,** Sedimentary Geologist, with the Sedimentary Geoscience section at the Manitoba Geological Survey . She will speak about some general geology of Manitoba as well as some specific quarries including The Narrows and Lily Bay.

March 1, 2017: MSM regular monthly meeting begins at 7:30 p.m. at the Manitoba Museum.

Speaker to be announced.

April 5, 2017: MSM regular monthly meeting begins at 7:30 p.m. at the Manitoba Museum. This will be our Annual Mineral Auction hosted by none other than our very own auctioneer extraordinaire, **Tony Smith**. Please bring some mineral specimens you wish to donate for the event.

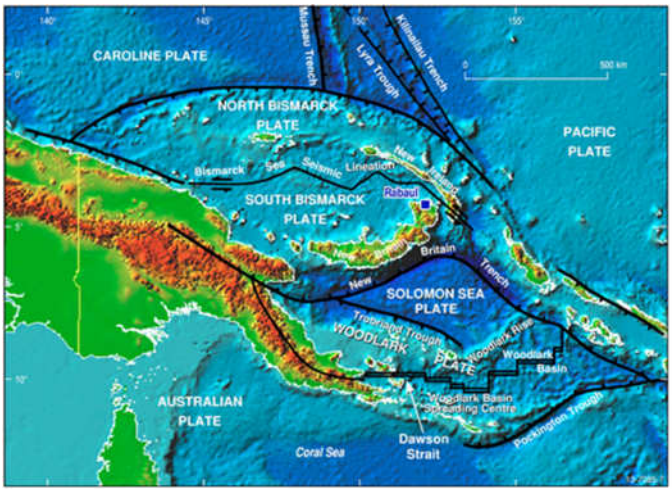
May 3, 2017: MSM regular monthly meeting begins at 7:30 p.m. at the Manitoba Museum. Our guest speaker this month will be **Jim Bamburak,** Sedimentary Geologist, with the Sedimentary Geoscience section at the Manitoba Geological Survey . He will speak about the geology of Shoulderblade Island.

Founded in 1971, the Mineral Society of Manitoba is dedicated to promoting the study of minerals, rocks and fossils for their scientific and recreational value.

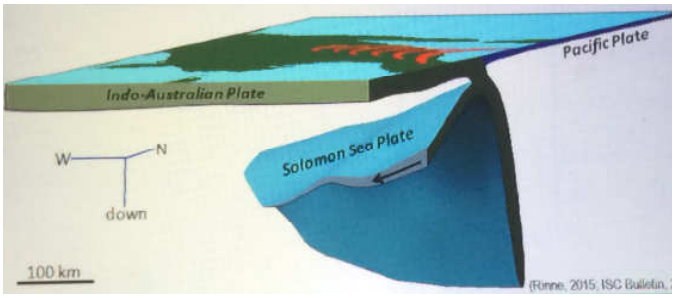
The Mineral Society of Manitoba hosts monthly meetings covering a variety of mineral related topics. In addition, the Mineral Society organizes summer field trips to collecting localities, and hosts educational exhibits about minerals and fossils.

JANUARY PRESENTATION (CONT.)

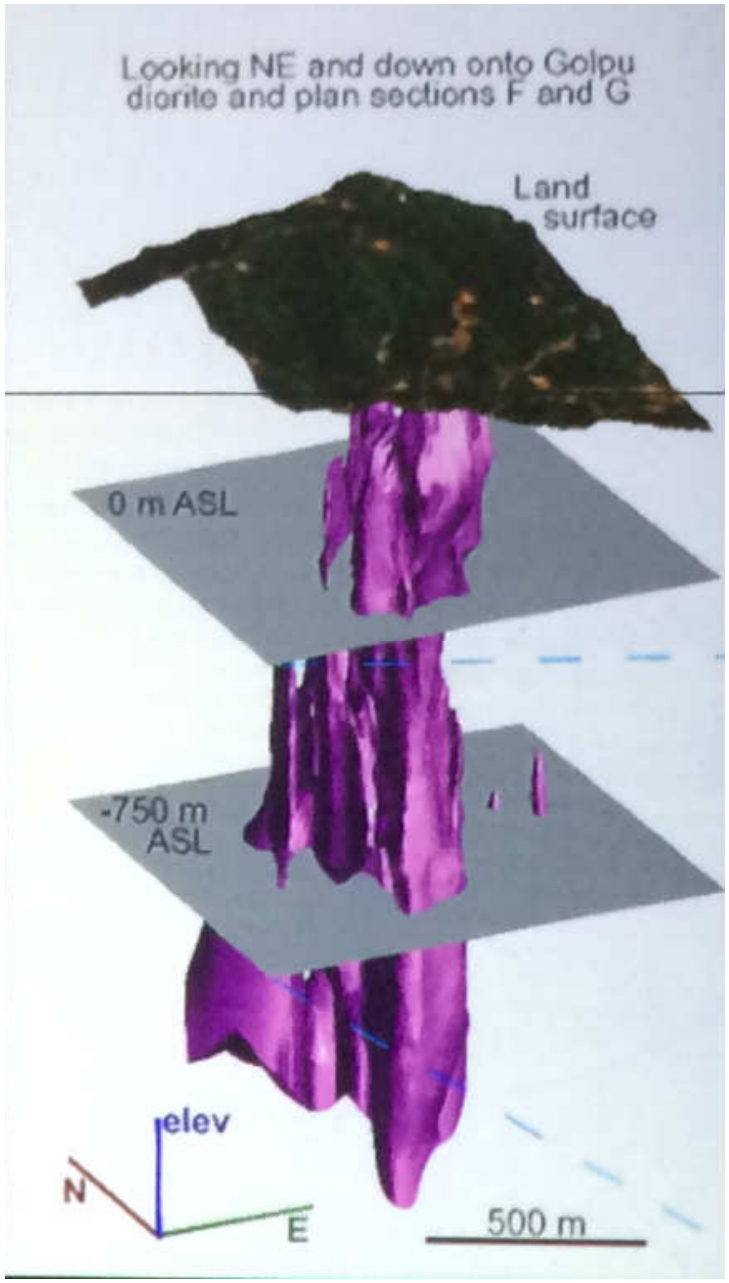
Marc went on to discuss the complex geodynamic settings currently taking place in New Guinea. The tectonic regime in this part of the world is extremely complex and involves a number of minor as well as major plates. The Solomon Sea Plate is an oceanic crustal plate remnant which is disappearing into two subduction zones, one to its north, the other on its southwest margin. Its southeast margin runs along the Woodlark Rise, an undefined compressive zone which may be a transform fault marking the boundary with the adjoining Woodlark Plate.

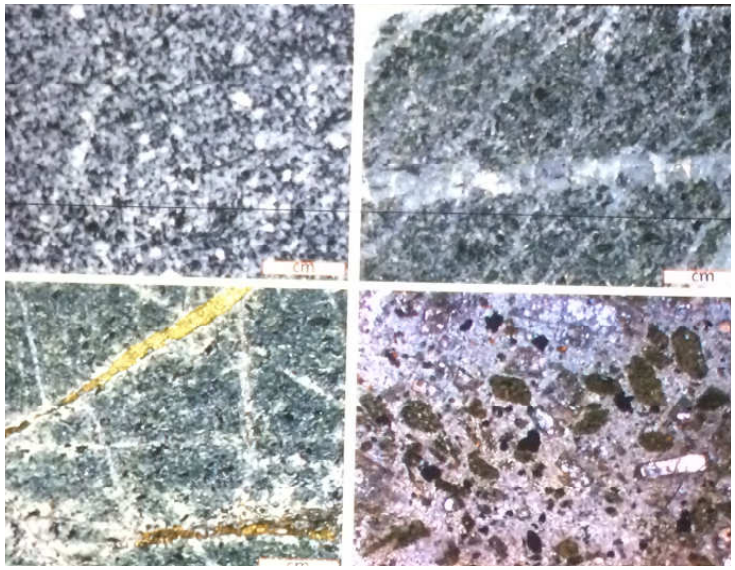


The northern subduction zone is located where the Solomon Plate is diving below the South Bismarck Plate to the northwest and the Pacific Plate to the northeast. The southwestern subduction zone is where the Solomon Plate is diving below the Indo-Australian Plate.



These massive subduction zones provokes heavy volcanism causing the Indo-Australia continent to currently be growing in Papua New Guinea. The growth is occurring by accretion of other plate material, including island arcs, onto its northern margin. This results in several bands of mineral–rich deposits similar to the greenstone belts in the Canadian Shield.





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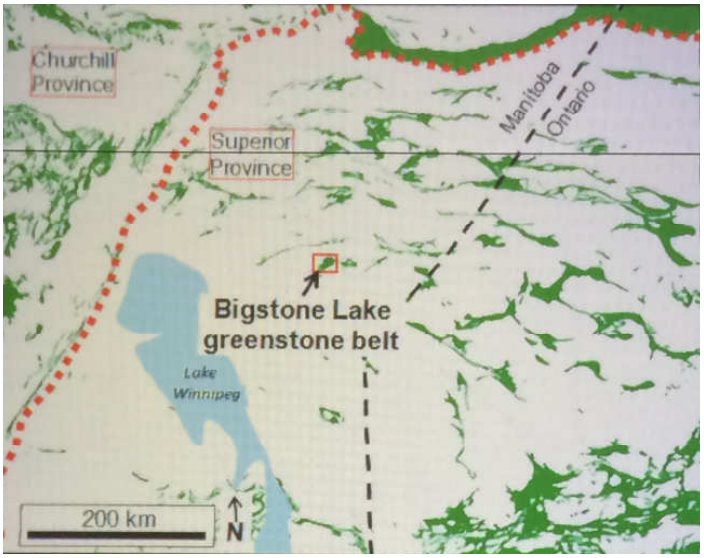
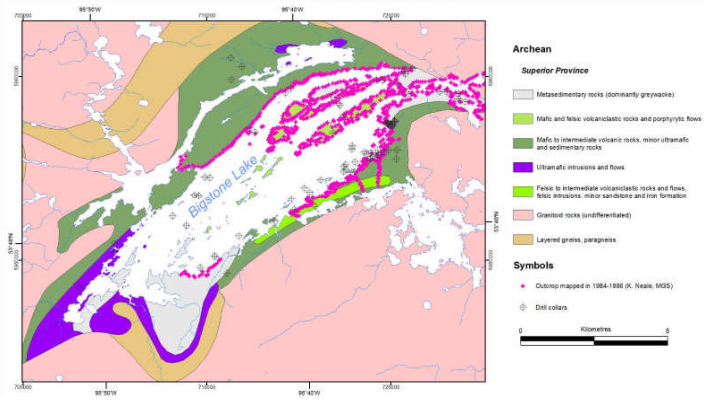
JANUARY PRESENTATION (CONT.)

The Canadian Shield was built over long periods of time by the exact same process. The Shield is built mostly of a series of greenstone belts and granite (or granite-like) intrusions. Most of these rocks were formed at convergent tectonic settings.



Bigstone Lake greenstone belt study site - Manitoba

Marc spent some time talking about the similarities between his study site in Manitoba, at Bigstone Lake, where he spent the summer doing shoreline mapping and inland traverses of the area with Josh Myers, and the sites in Papua New Guinea.



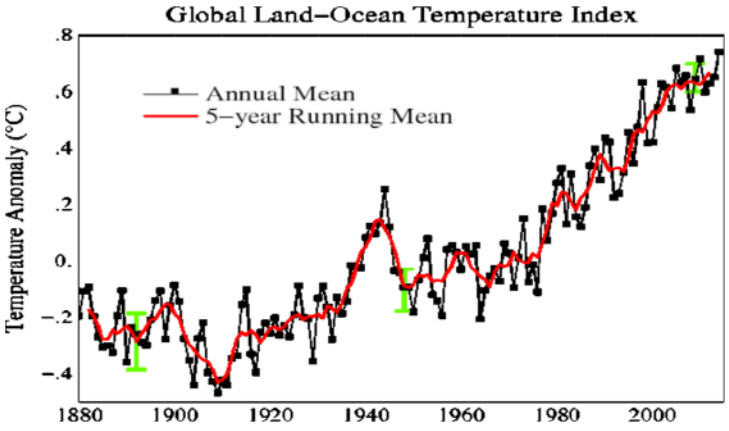
Geology of Bigstone Lake greenstone belt

Most of the rocks of the Canadian Shield, including the Bigstone Lake greenstone belt, were formed along convergent plate tectonic margins. Over long period of time (including several mountain-building episodes) the rocks were accreted by plate tectonic processes against the margin of the proto-Canadian Shield, very much like what we observe in the present day SW Pacific.

For the last part of his talk, Marc talked about a topic he feels very strongly about on a personal level: climate change.

There will always be aspects of climate change that requires more research, but the basic premise that human-caused climate change is real and of significant concern (particularly in terms of water, food and habitable land for many people) is a settled fact. There is now a wide set of independent lines of evidence, collected over long periods of time by countless independent researchers and organizations, all pointing to the same conclusion.

There is evidence for an increasing greenhouse effect. Over the past 200 years, particularly the last few decades, temperatures have been increasing but the temperature increase is uneven. For example, the lower atmosphere (troposphere) is getting hotter, while the upper atmosphere (stratosphere) is cooling. Worldwide, nights are warming more quickly than days. Polar regions are warming more quickly than the equator. These changes can only be explained by a change in the insulating properties of our atmosphere. Humans currently emits about 40 billion tonnes of CO_2 per year (all volcanoes together emit about 0.3 –1% of that amount). The rapid increase from <280 (pre-industrial) to ~403 ppm CO_2 has been directly measured from air sample and the added CO_2 in our atmosphere has the isotopic signature of burned fossil fuel.



Climate has changed in the past, sometimes drastically (albeit slowly), due to natural causes. This particular period of climate change, occurring measurably over the span of decades to centuries, is different: it is a greenhouse warming event that is driven by human CO_2 emission.