

Arctic Tectonics: Animations to Seismic Refraction, the Impact of Whaling Captains and UNCLOS on Arctic Research

University and College Students Please Note: the first 14 students can attend for free, compliments of Swift and ConocoPhillips. Additional students will be charged the emeritus rate, half the regular member rate. Students are encouraged to call the HGS office in advance of the meeting they wish to attend and to make a reservation; but walk-ins are also accepted at events. Students will need to identify themselves and provide school name and ID.

Tectonically, the Amerasian Basin of the Arctic Ocean is in many ways the last unknown in the global system. In the Eurasia Basin of the Arctic Ocean, to the east of the Lomonosov Ridge, Karasik (1973) was the first to identify very slow spreading, Cenozoic-age magnetic anomalies that connect to the North Atlantic spreading center. In about 1970, Irv Tailleir and Warren Hamilton deduced a rotational opening of the Canada Basin about a pivot point in the Mackenzie Delta based on matching geological histories of the Alaskan Arctic margin and the Canadian Arctic Islands. Aerogeophysical data collected by the Naval Research Laboratory in the 1990s did not find easily correlatable magnetic anomalies in the Canada Basin as hoped. A simple rotational opening of the Amerasian Basin is hampered by the large Chukchi Borderland including the Northwind Ridge northwest of Alaska and the Mendeleev and Alpha ridges to the west of the Chukchi Cap. The two ridges are thought by many to be manifestations of a hot spot that formed either before, during or after the Amerasian Basin opened. If the ridges formed after the basin opened they are not a problem to a rotational opening.

All these features have recently become important not only as tectonic problems but also in a legal framework. The United Nations Convention on Law of the Sea (UNCLOS) Article 76 allowed exceptions to the standard 200 nautical mile exclusive

economic zone (EEZ). The Russians filed the first claims to an extended EEZ in the Arctic under the idea that the Lomonosov, Alpha and Mendeleev ridges are all continental and that much of the remainder of the Amerasian and the Eurasian basins is continental. They have even asserted that the Amerasian Basin formed by “oceanization of continental crust” and therefore virtually all of the Arctic Ocean belongs to one of the five bordering, claimant nations.

The tectonic history of the Amerasian Basin is not just an important tectonic problem; it is also a legal problem since Russia has filed the first claims to an extended economic zone based on arguments that the basin is largely continental.

In summer 2006, scientists at the Institute for Geophysics undertook a seismic refraction experiment to study the crustal structure of the Northwind Ridge, Chukchi Cap and Mendeleev Ridge. Previous cores taken along the Northwind Ridge recovered sediments as old as Cambrian, so at least parts of the Chukchi Borderland are believed to be continental. Aerogravity data indicate that while much of the Chukchi Cap may be continental, substantial parts may be extended continental crust; the 2700 m deep, 15 km wide Chukchi Trough that separates the Chukchi Cap from the Northwind Ridge appears to be some form of rift.

The 2006 season for seismic work along the Alaskan margin turned out to be a difficult one for acquiring the necessary permits. In the recent past very little seismic work has been done but upcoming lease sales have prompted a number of companies to undertake substantial

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Thanks Joan!

Joan Henshaw is retiring this month after 10 years of service to the HGS. Joan was born Joan Allen on October 1st, 1936 in Georgetown, a little north of Austin, Texas. She was an only child, but was raised by a father who tried his best not to spoil her. She grew up in Houston and Austin. Joan married in 1956 and had three girls, Debra who is one of the top sales people at Channel 11; Brenda, a marketing representative for Diamond Offshore Drilling, and Vicki, a home care specialist in Orlando, Florida. Joan has seven grandchildren.

She continually worked while raising her children, first as a group secretary and then as a private secretary to one of the life insurance agents at Connecticut General Life Insurance Company. She then worked for Randalls in the Group Insurance Department. She left there to work at Southern States Log Library for eight years. When Southern States and Gulf Coast log libraries merged in 1996, she applied for the position of HGS/GSH Office Manager, which had just become available. The team responsible

for hiring Joan was Jeff Lund, Jim Ragsdale and Deborah Sacrey, then the Office Management Committee chair.

You might call Joan a real “survivor” because in less than a year after coming to work for the HGS, her apartment building burned to the ground and she lost virtually everything she owned. The HGS helped raise money and goods to try to make her world whole again. A year later she was diagnosed with Hodgkins Lymphoma. She managed to get through the Chemo and radiation therapies and still do her job for the HGS/GSH.

Her biggest challenge now is to sell her condo and move to Lake Jackson to be with her long time friend, Jack, whom she has known for 45 years. Retirement is going to be difficult for Joan, a very active person who has loved working with many of the HGS members in various capacities during her 10 years at the office helm. We will all miss her. ■

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seismic reflection surveys in both the Beaufort and Chukchi seas. The Alaska Eskimo Whaling Commission (AEWC) has established itself as the arbitrator for seismic permitting. There is even talk of a seismic noise budget that will set seasonal limits to the total amount of seismic noise allowed in a given area. This presentation will cover these issues as well as the primary focus of the tectonic history of the Arctic Ocean. ■

Biographical Sketches

LAWRENCE LAWVER is a senior research scientist with the Institute for Geophysics, an organized research unit within the Jackson School of Geosciences at the University of Texas at Austin. He returned to Texas in 1983 after receiving his BS in Geophysics at Stanford, a PhD from Scripps Institution of Oceanography and stints at the USGS in Menlo Park and MIT. His work at the USGS involved



geothermal studies in Alaska with Art Lachenbruch and John Sass. He felt that in order to decipher the thermal history of Alaska, he first had to understand its tectonic history. His research at the University of Texas at Austin covers a wide range of plate tectonic problems with interests in the Southern Oceans, Southeast Asia and the Arctic. Lawver was the chief scientist on *USCGC Healy* this past summer where he and others from UTIG placed sea ice seismometers on the ice and then used a ship-based seismic source to determine the crustal structure of the Chukchi Borderland and Mendeleev Ridge.

LISA GAHAGAN is the project manager of the Plates Project, an industry funded consortium to develop plate tectonic databases and use plate tectonics to support research at the Jackson School of Geosciences. Lisa received her BS in geology from Tulane and her MS from UT Austin.

