

Monday, March 22, 2010

Westchase Hilton • 9999 Westheimer  
Social Hour 5:30–6:30 p.m.  
Dinner 6:30–7:30 p.m.

Cost: \$28 Preregistered members; \$35 non-members & walk-ups

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.

Pre-registration without payment will not be accepted.

You may still walk up and pay at the door, if extra seats are available.

## HGS International Dinner Meeting

Walter D. Mooney

HGS International Dinner Meeting

# Understanding the Crust Beneath Sedimentary Basins

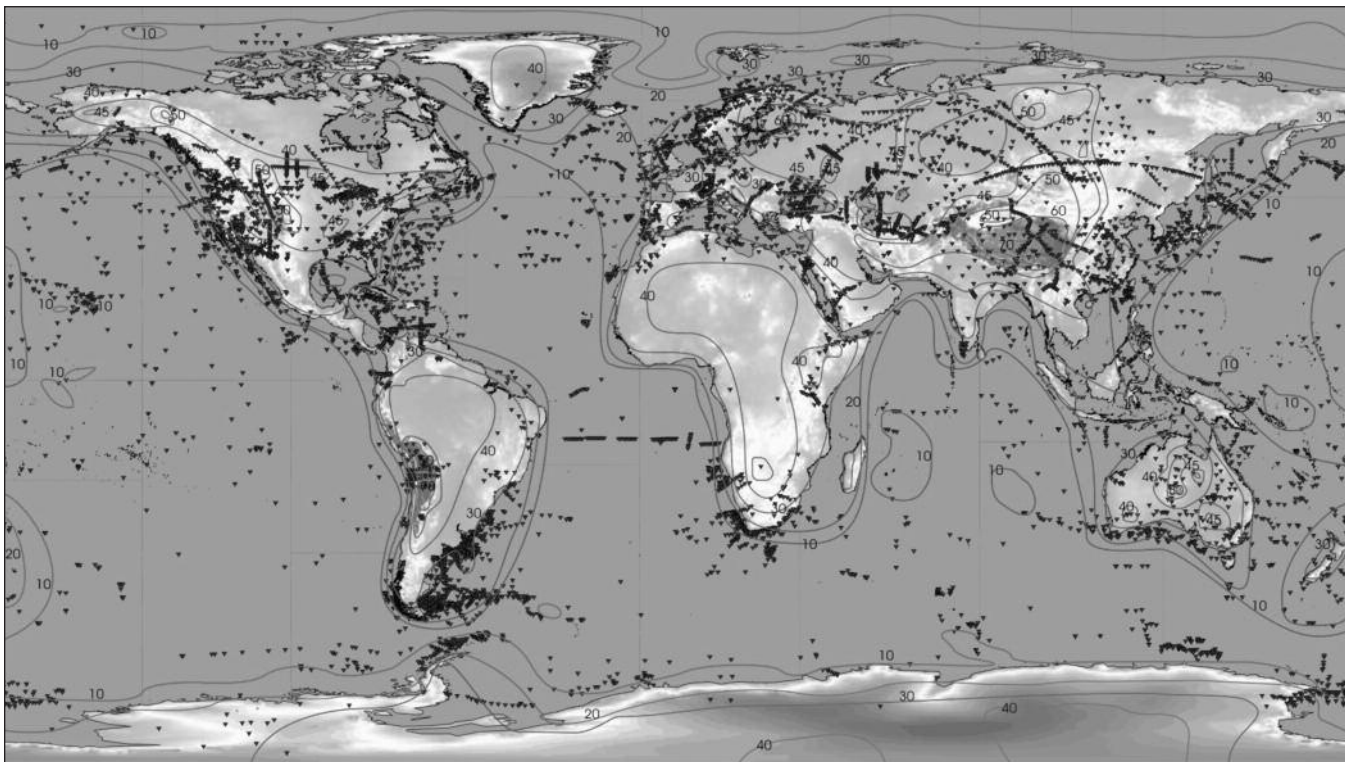
Understanding how sedimentary basins evolve is an exciting, but difficult task. Seismic reflection data do a marvelous job of imaging the internal structure of sedimentary basins. There is no better technique. However, we often want more than just a detailed image of the basin. Of particular interest are the physical properties within the basin and below it, within the crystalline crust. For example, seismic P- and S-wave velocities are closely tied to lithology, and hence crustal type (oceanic versus continental). Consequently, seismic reflection studies are complemented by seismic velocity studies. Such velocity information is very effective in determining basin geometry, and can be used to determine Poisson's ratio, an important parameter for determining the kind of source rocks, crustal type, as well as issues related to the Law of the Seas convention.

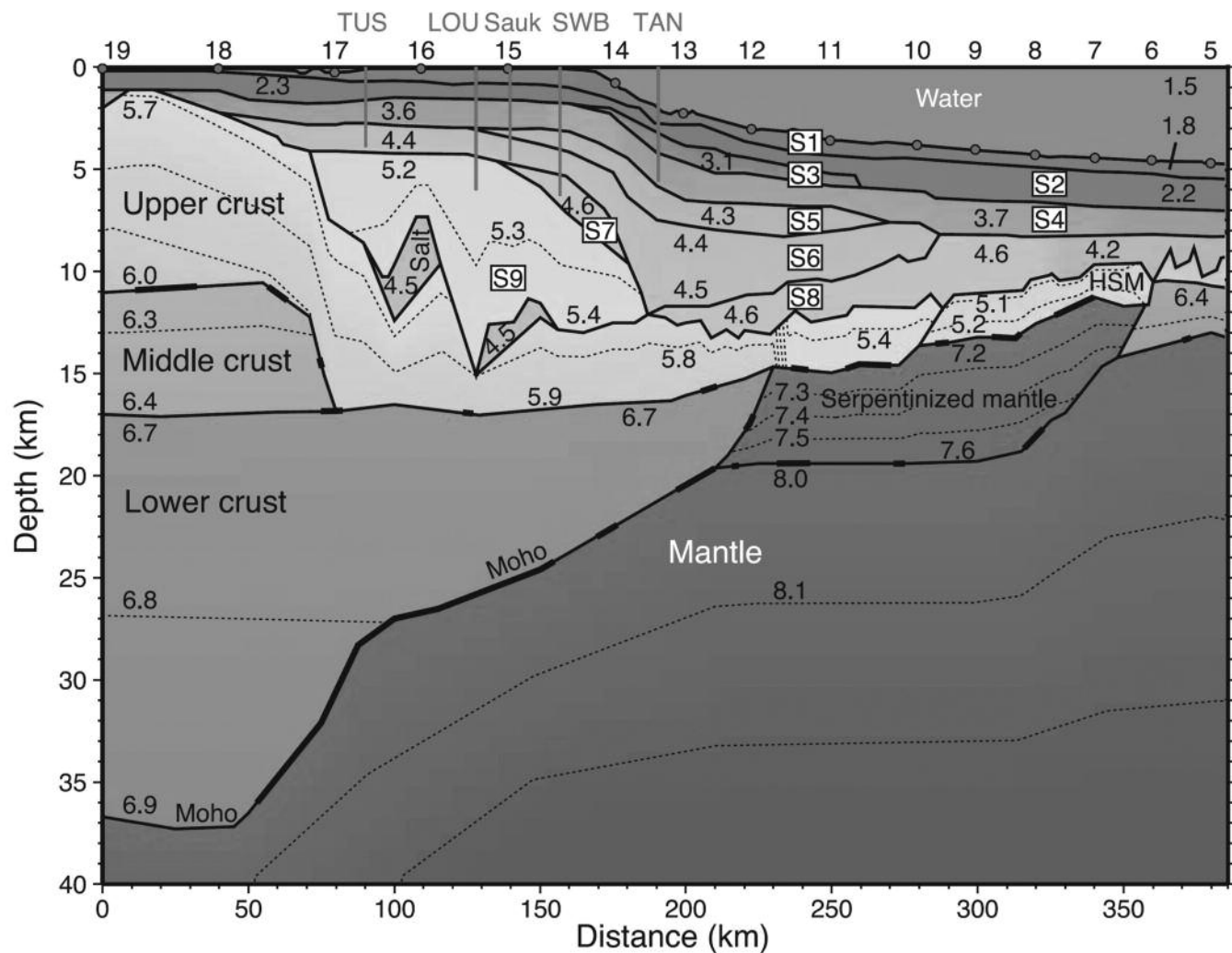
*...many of these results challenge conventional views of "how the Earth works".*

One good way to obtain reliable deep seismic velocities is to shoot wide-offset seismic refraction profiles. Actually, this technique is a classical one that all students encounter in their first course about the Earth's crust. Indeed, seismic refraction profiles formed the basis for the early exploration for hydrocarbon resources. Today, high-resolution seismic refraction profiles are recorded on land and at sea using a wide variety of techniques.

In this talk I will present a global synthesis of what we have learned from deep crustal seismic velocity profiles, from the Gulf Coast to the Bay of Bengal and beyond. A very extensive literature search has been undertaken to track down as many of the seismic refraction publications as possible. The resulting database

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contains over 10,000 one-dimensional P-wave and S-wave profiles, making it the largest such catalog in existence. These data, especially when examined as complete crustal cross sections, reveal a number of surprising results, such as the discovery of highly thinned continental crust extending 100s of km offshore, serpentinized peridotite (rather than basalt) right at the sea floor, and evidence for deep, highly metamorphosed sediments that mimic crystalline basement rocks, thus confounding traditional basin interpretations. Indeed, many of these results challenge conventional views of “how the Earth works”. That’s just what makes this investigation so exciting! ■

**Biographical Sketch**

**WALTER D. MOONEY, PH.D.**, is a senior research geophysicist with the US Geological Survey in Menlo Park, California, where he has worked since 1978. He has studied the structure, composition,

and evolution of the Earth’s crust for more than thirty years. His work has taken him to locations throughout the world, with much of his recent work in China, Indonesia, and Africa. His undergraduate degree was from Cornell University (physics) and his Ph.D. (geophysics) from the University of Wisconsin-Madison. He is the recipient of the George P. Woollard Award from the Geological Society of America (GSA), and is a Fellow of the GSA, American Geophysical Union (AGU), and Geological Society of London. He was a visiting professor in the Department of Earth Sciences at Rice University in 2003, and has authored or co-authored over 150 publications. He collects British sports cars, some of which are actually running.

