

# International Explorationists Dinner Meeting

Monday, January 21, 2002

Westhase Hilton • 9999 Westheimer  
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: \$25 Preregistered members; \$30 Nonmembers & Walk-ups

Make your reservations now by calling 713-463-8920 (5-0-3) or by e-mail to [Joan@hgs.org](mailto:Joan@hgs.org) (include your name, meeting you are attending, phone number, and membership ID#).

by **Walter H. Pierce**

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## Chronostratigraphic Isopach Mapping of Sequences of the Arabian Plate

### Abstract

Having as a product objective, regional maps which enable: 1) construction of cross-sections, 2) understanding sequence distribution, and 3) modeling of maturation; we describe the construction process of plate-wide chronostratigraphic isopach maps from a large multi-country area. The Arabian plate database is comprised of over 46,000 top records for 1,400 aged stratigraphic units and 2,640 mappable wells with tops. Four tables are used: well header, tops, stratigraphic age, and surface ages. The most important contribution of this mapping system is that it handles multiple stratigraphic nomenclatures, maps unconformity-bounded sequences, and takes full advantage of multiple constraints to enhance mapping and zero-edges. Once set up, the system also adapts to other kinds of mapping. Figure 1 represents a mapped example of the Lower Cretaceous of the Arabian Plate.

Absolute ages for lithostratigraphic units are inferred from the literature and superposition. For age quality-control I have devised a spreadsheet-database cycle system that focuses on superposition/age problems. I re-run the cycle until superposition is obeyed and ages are constrained to literature. A dual query-system is used to obtain thickness values. The first part of the dual query-pair delimits upper and lower ages of the unit in question and searches downward in the database for each side of the age bracket. A second part of the query uses the same age delimited interval and then searches upward from the base and downward from the top for minimum and maximum depths. Querying out the largest thickness value from the dual query maximizes data control.

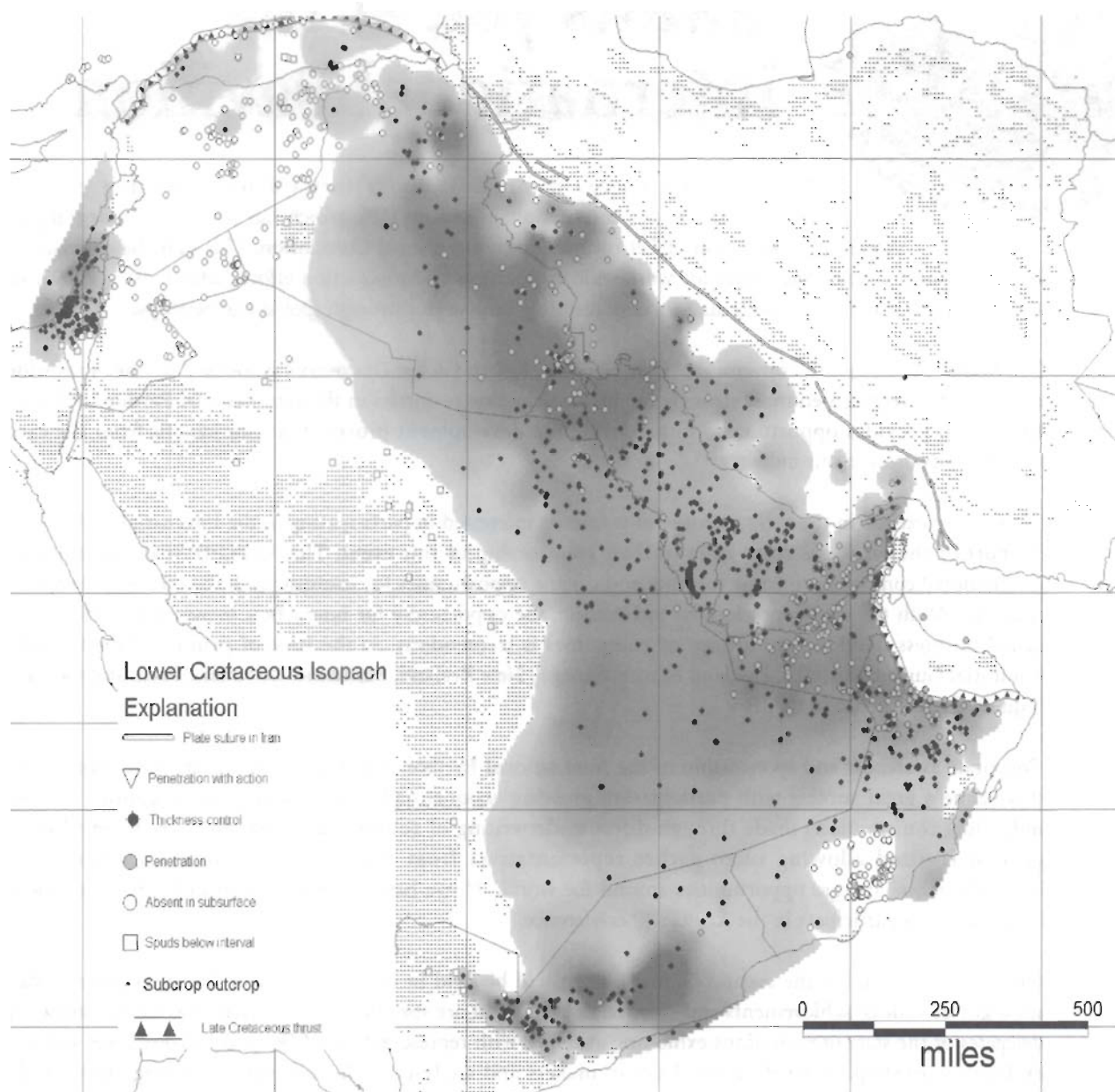
Series of linked queries enable constraint of mapping by using a) wells with queried thickness, b) subsurface pinch-out wells, c) wells that spud below interval in question, d) penetration wells, and e) older surface outcrop. After querying or assigning these individual elements they are aggregated into a combined table, a) through e), to constrain contouring. Then a) through e) are independently mapped superimposing them on the contour result with distinct identifiers, to enhance appearance for quality control. In addition to visual study of individual maps, stratigraphic thickness elevation plots are used to find and check data outliers.

Fifteen unique interval maps have been constructed in GIS. These are: 1) Neogene, 2) Oligocene, 3) Eocene and Paleocene, 4) Upper Cretaceous, 5) Middle Cretaceous, 6) Lower Cretaceous, 7) Upper and Middle Jurassic, 8) Lias and Triassic, and each (9-15) Paleozoic System. This method adapts to making lithostratigraphic, structural, subcrop, worm's eye, and time-hiatus maps.



### Biographical Sketch

WALTER H. PIERCE is the director of WHPierce Exploration located in Cypress, Texas, USA. His company Web site is at [whpierceexploration.com](http://whpierceexploration.com). His background includes consulting after early retirement subsequent to 17 years of experience with international groups within Amoco. He has 17 years of experience working the Middle East. He has PhD and MSc. degrees in



**Figure 1.** Lower Cretaceous isopach of the Arabian Plate constrained by wells that spud below interval, wells that penetrate, wells with interval absent in subsurface, outcrop of subcrop, and wells that have thickness of Lower Cretaceous present. See the map legend for symbols of each of these elements.

geology from the Colorado School of Mines and an AB from DePauw University. Previously he taught geology for eight years at Ball State University, University of Georgia, and the Colorado School of Mines. He also worked for the USGS in the Petroleum Group and in the Heavy Metals group. His recent work has

focused on a review of Middle East source rock for exploration, hydrocarbon system analysis of the Arabian plate, undiscovered reserve assessment, multibasin assessment of Central Asia and the Middle East, and new ventures. □