INTERNATIONAL EXPLORATIONISTS

HGS INTERNATIONAL GROUP
DINNER MEETING—APRIL 20, 1992
Post Oak Doubletree Inn
Social hour, 5:30 p.m., Dinner, 6:30 p.m.
Technical Presentation, 7:30 p.m.

ISABELLE MORETTI—Biographical Sketch

Isabelle Moretti studied at Orsay University in Paris receiving her M.S. in 1980, and Ph.D. in 1983. Her dissertation was on aseismic ridge subduction and vertical motion of overriding plates with applications in the Pacific. She completed her These d'etat at Orsay University and French Institute of Petroleum (IFP) in March 1987. Dr. Moretti is currently working on thermicity-maturation-migration modeling in the strategic geochemistry division of TOTAL in Paris, France.

Her work experience includes a visiting scientist position at Cornell University in spring of 1983 on modeling erosion and vertical movements with Prof. D. Turcotte. In June 1983 Dr. Moretti joined IFP working on thermomechanical modeling of rifting. She participated in geological field studies and offshore seismic acquisition surveys. From November 1986 to February 1987 she joined Massachusetts Institute of Technology as a visiting scientist, working with Dr. Leigh Royden on numerical study of subsidence in foreland basins. After her return to IFP, she worked on regional studies on the Southern Apennines and Sicily and thematic studies on the mode of geological deformation. She was also involved in training. In March 1986, Dr. Moretti became the head of the LOCACE project (a computer-aided construction software for balanced geological cross sections). This program is a joint research between AGIP, IFP, SNEA(P), TOTAL, and is now a commercial project in these companies. She joined the TOTAL staff in June 1991. Dr. Moretti has published numerous papers and reports.

THE SUEZ RIFT: STRUCTURAL PATTERN AND EVOLUTION

After a regional presentation of the Gulf of Suez, a thermomechanical model of the rift evolution will be presented.

Then we will examine some structural problems related to extensional tectonics as the internal deformation of tilted blocks.

Two main types of deformation are generally considered in extensional terranes: (1) faulted blocks are rigid and deformation consists of translations and rotations; (2) blocks are pervasively deformed, by simple shear along closely spaced minor faults or by "flexural slip" parallel to bedding planes. To evaluate the amount of such pervasive deformation field measurements were performed across three major tilted blocks of the Suez rift (Abu Durba and Araba-Qabeliat blocks) and Red Sea (Duwi block). They consist of narrow (15 to 20 km wide) elongated (30 to 60 km long) monoclines dipping to the northeast and bounded by major southwest dipping faults which have vertical displacement of about 2 km. Tilt angles vary from 15 to 20°. Secondary normal faults are scarce, widely spaced and their throw comprises between 10 cm. to 150 m. No pervasive and closely-spaced faults with centimetric or metric throws have been observed.

In the Abu Durba and Duwi blocks the amount of extension due to secondary faults is less than 7% while it is almost null across the Araba-Qabeliat block. Extensional models inducing pervasive deformation of blocks by vertical or oblique simple shear are irrelevant when tilt angles do not exceed 20° and rigid rotation can be applied to restore the cross-section. Moreover, most of the observed secondary normal faults have the same dip direction as major bounding faults. This arrangement suggests that tilting occurs over a ductile crustal layer which accomodates at depth the volume problems caused by rigid block rotation.