Geophysical Research Abstracts, Vol. 8, 02373, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02373

Asymmetry and segmentation of passive margin in Socotra, Eastern Gulf of Aden, controlled by detachment faults?

M. Fournier (1), P. Huchon (1), K. Khanbari (2)

(1) University Pierre et Marie Curie-Paris6, France, (2) Sana'a University, Yemen

(marc.fournier@lgs.jussieu.fr)

Field observations in Socotra Island complemented with offshore seismic profiles suggest the existence of detachment faults on the southern margin of the Gulf of Aden. Socotra is divided into two structural provinces. Western Socotra is made up of a series of southward tilted fault blocks bounded by northward dipping normal faults. Eastern Socotra consists in an asymmetric anticline with a steep northern limb and a gently dipping southern limb. A zone of NE-SW trending normal and strike-slip faults separates the two areas. The overall structure is interpreted as representing two rift segments developed during the opening of the Gulf of Aden, that are separated by a transfer zone. The along-strike asymmetry of the southern margin is further enhanced by the asymmetry of the conjugate margins of the Gulf of Aden. Whereas the narrow western Socotra margin is characterized by consistently northward dipping normal faults, the opposite Oman margin is larger and dominated by horsts and grabens. Considering that asymmetric structures in the upper crust are often associated with synthetic shear zones in ductile levels, we propose that the western and eastern Socotra margin segments are controlled at depth by two detachment faults with opposite dip and sense of shear. The normal faults of western Socotra would sole out into a top-to-the-north ductile shear zone, whereas eastern Socotra would be made up of a rollover anticline that formed above a southward dipping detachment fault.