Preliminary structural results on the Makran accretionary wedge, Iran

Jean-Pierre Burg[1)], Abbas Bahroudi[2)], Guy Simpson[1)], Stefan M. Schmalholz[1)], Asghar Dollati[2)] and Marcel Frehner[1)]

[1)] Geological Institute, ETH Zurich, Sonneggstrasse 5, 8092 Zurich, Switzerland
phone: + 41 1 632 60 27, fax: + 41 1 632 10 30, jean-pierre.burg@erdw.ethz.ch
[2)] Geological Survey of Iran, Tehran, Iran

We report the first results from sections in the eastern Makran accretionary wedge in Iran. We briefly describe the main lithologies and put more emphasis on the structural development of the area.

There is no evidence of refolding, despite the succession of events that folded Eocene-Oligocene rocks and later formed the broad folds that affect the Miocene sequences. The lack of superposed folds suggests homoaxial folding through time before Late Pliocene fanglomerates. The most intense folding event is considered to be late Miocene to early Pliocene in age.

North-dipping and south-dipping thrusts (thrusts and backthrusts, respectively) are regionally pervasive. Thrusts constitute the dominant family, in particular in the mélange with exotic blocks. A general SSW-NNE compression seems obvious. Stress calculation helps recognising tilted thrusts A difficulty is to identify thrusts that have a regional significance, and distinguish them from subordinate reverse faults and thrusts that developed during folding to accommodate disharmonies inherent to tight folding.

Normal faults are relatively frequent in the south, in particular near the coast. They are associated with sediment filled, open fractures. Late stage normal faulting in an accretionary wedge is generally attributed to the response to overthickening caused by underthrusting. Another interpretation that would fit the general seaward dip of coastal Pleistocene layers and open fractures invokes outer-arc, near-surface extension owing to seaward tilting of the frontal accretionary prism subsequent to a diminishing dip of the slab.

The study of fission track ages and heavy minerals in turbiditic layers help to specify the source areas and the low-temperature evolution of the various tectonic units. Comparisons with the Pakistani Makran are straight-forward, denoting the strong cylindricity recognizable on satellite images, which implies long-distance coherence of lithological and structural units involved in accretionary systems.