Microstructural and strain analysis of quartz grains on estimation of deformation conditions and origin of thrust sheets in the eastern Alborz

E. Mofidi¹, A. Yassaghi¹, B. Rahimi²

¹-Department of Geology, Tarbiat Modares University
²-Department of Geology, Damghan University
E-Mail: yassaghi@modares.ac.ir

(Received: 9/4/2006, received in revised form: 17/10/2006)

Abstract: In this study, strain and microstructures of quartz grains have been used for deformational analysis of thrust sheets in the eastern Alborz. Structural studies resulted in recognition of eight thrust sheets (Gorgan, Siahkhani, Tazereh, Shahdar, Anbankuh, Shirband, Anjirlu and Sefidkuh) in ascending order from north to south. Microstructural studies and strain analyses on samples across the sheets were carried out for interpretation of deformation conditions. Detail microstructural analysis of quartz grains indicated that the grains are deformed by intracrystalline deformation. Accordingly, it is proposed that the thrust sheets in the southern portion of Tazereh (i.e. Shahdar, Anban-kuh, etc) and the Siahkhani to be generated in shallow depth. However, Tazereh and Gorgan sheets postulated to have deeper origin, presumably from a depth in which the transition from brittle to ductile deformation occurs. The low values of finite strain indicate that emplacement mechanism of the sheets was assumed to be compatible with the model proposed for foreland sheets. That is, the sheets were emplaced on their basal thrust as rigid blocks. Consequently, the area of study is governed by thin skinned tectonics.

Keywords: Eastern Alborz, North Damghan, microstructural analysis, strain analysis, quartz grains.