A simple view to the lithosphere rheology
(Case study, NW-SE Iran)

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Abstract

The rheology of the lithosphere determines its deformation under given initial and boundary conditions. The rheology of the lithosphere is a function of its composition and structure, pressure, temperature, and state of stress. The concept of *strength envelope (rheological profile)*, firstly developed by Goetze and Evans (1979), is well known (cf. Ranalli, 1995). On the basis of a generalization of experimental results, it is assumed that the deformation regime for any given rock can be subdivided into two domains: *brit-tel* or *frictional*, governed by the Coulomb-Navier shear failure criterion, and *ductile*, governed by the power-law creep equation. The brittle/ductile transition is defined by the equality of frictional strength and ductile strength (for a given strain rate). In this article we review the lithosphere and its behavior by various rheological law based on rock composition, temperature(cold), pressure, with simple numerical model (block in NW-SE Iran) .

Key words : lithosphere, temperature, strain, rheology

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Introduction

In geology and geophysics the term rheology refers to the study of mechanical properties and their role in the deformation and the flow of the materials that form the Earth. We can describe the Earth's rheology mathematically in many ways, but it is always function of intrinsic,(material parameters), and extrinsic,(environmental) parameters. Basic rheological equations describing deformation are called constitutive equations, which relate stress and strain. The stress is a result of the force acting on a surface surrounding or within a body, and comprises both the force and the reaction of the material on the other side of the surface (Park 1989). The state of the stress at a point can be expressed by the stress tensor, which has nine components. Stresses cause solids to deform, i.e., stresses produce changes in the distances separating neighbouring small elements of solids. The amount of deformation of a body is