ANALOGUE EXPERIMENTS USING CREAM CAKE: THE CASE FOR PLASTICITY

STÜWE, K. and TENCZER, V. Department of Geology, University of Graz, Heinrichstr. 26, Graz, Austria

Analogue experiments modelling the mechanics of rock deformation use highly-sophisticated foods to approximate the flow laws of rocks. Examples include the use of Bulgarian honey (Ratschbacher et al., 1989) and other non-linear viscous, calorie-rich edibles (Grujic & Wosnitza,1999).In contrast, numerical models of microstructures around porphyroblasts have shown that the constitutive relationship has a relative small influence on the strain geometry - in comparison with the influence of the boundary conditions (Bons & Barr, 1998).In order to investigate if plastic materials can also reproduce the strain geometry, we have performed analogue experiments of deformation in pure and simple shear using cream cake with Kiwi-fruit inclusions. Cream cakes are assumed to behave plastically and were deformed by hand to high strains. Results were compared with numerical experiments using a finite element program and a non-linear viscous rheology. Our smashing results were very fruitful. In particular, we could illustrate the fact that strain (but not stress) is comparably insensitive to the flow law. We believe that our results pertain directly to the question whether rocks suffer or enjoy deformation (Bons et al., 1999; Knipe, 1982).