Nonlinear Processes
in Geophysics

Discussions

**NPGD**

**Interactive
comment**

# *Interactive comment on* "Extracting real-crack properties from nonlinear elastic behavior of rocks: abundance of cracks with dominating normal compliance and rocks with negative Poisson's ratio" *by* Vladimir Y. Zaitsev et al.

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This paper discusses a relevant and interesting problem concerning the effect of pressure on the elastic moduli of rocks with a high concentration of cracks. The basic analysis is based on the study of elastic wave velocities at different pressures. A large amount of experimental data has been analyzed. An approach is used in which an effective medium with pressure sensitive elastic moduli is considered without regard for the specific crack shape and crack orientation. The examples provided indicate significant changes in the elastic wave velocities and corresponding elastic moduli. An important point is that independent relations are allowed for in compression and shear models. An unexpected result is a large amount of data on the auxetic properties of

rocks for which negative Poisson's ratios have been obtained. The reported results raise some nontrivial questions concerning the Poisson's ratio determination in terms of the elastic wave velocities in fractured and heterogeneous media. Moreover, what are the characteristics of this parameter in fractured media? I would recommend to continue this research and to study the effect of pressure not only on dynamic but also on static moduli. This paper is of considerable interest and can be published as presented.

Please also note the supplement to this comment:
http://www.nonlin-processes-geophys-discuss.net/npg-2017-9/npg-2017-9-RC2-supplement.pdf

Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2017-9, 2017.