Nonlinear Processes in Geophysics
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Discussions

Interactive comment on "Stress states and moment rates of a two-asperity fault in the presence of viscoelastic relaxation" *by* M. Dragoni and E. Lorenzano

Anonymous Referee #2

Received and published: 21 April 2015

"Stress states and moment rates of a two-asperity fault in the presence of viscoelastic relaxation" by M. Dragoni and E. Lorenzano

This article presents different aspects of a model proposed by Dragoni and Santini and whose bases can be found in previous work by the same authors. The model is very interesting, the authors mimic in a clever way the dynamics of a seismic fault with two asperities. The article is very well written and is clear in its development. There is consistency between objectives, results and conclusions. I highly recommend its publication in NPG.

I only wish to make few brief comments:

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Interactive Discussion

Discussion Paper

a) On page 300, the authors say that the two asperities in their model have equal areas; it seems to me that this hypothesis is not necessary, and I did not find where such a hypothesis is used. In fact, it would be difficult to find in nature two asperities of equal areas.

b) On page 301, line 15 they set out the limits of the parameter ε as $0 < \varepsilon < 1$. I think it has more physical sense to say that $0 < \varepsilon < \beta$.

c) In the article the authors assert that an earthquake might be produced by the failure of asperity 1, the failure of asperity 2 or the simultaneous failure of the two asperities. In reality, it is difficult to have the simultaneous failure of two asperities. I wonder if it would be necessary to add to the model the fact that the probability of the simultaneous failure is very small.

d) The application to the earthquake in Alaska in 1964 is very illustrative, but I wonder if it had not been more appropriate and interesting to apply the model to a region where recurrence times are smaller, one region more densely populated. The seismic regions in Italy may be a good example.

e) Finally, a question: Is there enough information to say that the relative plate velocity on the area of Prince William Sound asperity is equal to the relative plate velocity in the area of the Kodiak Island asperity? I know some failures where the velocity changes in different parts of the failure.

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Interactive comment on Nonlin. Processes Geophys. Discuss., 2, 297, 2015.