

## ***Interactive comment on “Simulation of seismic waves at the Earth crust (brittle-ductile transition) based on the Burgers model” by J. M. Carcione et al.***

### **Anonymous Referee #2**

Received and published: 8 August 2014

General Comments: The paper entitled Simulation of seismic waves at the Earth crust based on the Burgers model is concerned with wave propagation in the crust transition based on a Burger model. The paper argues this Burger model is appropriate (physically and geologically) for such a brittle-ductile transition. The paper also gives the formulation of numerical simulation for 2D P-SV and SH and then verifies the accuracy against the known analytical solutions. The papers have theoretical and numerical examples to demonstrate wave propagation in such a Burger models. Overall, the paper is easy to follow and well written. There is however a number of points which need clarification before publish.

Specific Comments: 1. That the second paragraph describes fundamentals of the  
C754

viscosity in the crust could be concise. The first part of this paragraph is not easy to follow for me. 2. In the third paragraph P1373, authors mentioned that linear visco-elastic-plastic law is a tool to model the behavior of ductile media. Is it also appropriate for brittle crust? Could authors make comments on this and also point out the media type in the numerical examples? 3. Is it possible to explain section 2 along with section 3? For me I can follow section 2 but it seems to be disconnected. Or could you connect octahedral stress with Figure 1 Burger mechanical model? 4. P1381 Line 18, 'a analytical' → 'an analytical. ..' 5. What's the density profile with depth in the second example? Could author specify this in the text? Also, I am confusing why P and S velocities are constant in the above of the transition zone and below. I expect that they are generally increasing with depth or proportional to the temperature profile. 6. I suggest authors may want to rotate Figure 6, 7, 8, & 9 in 90 degree so that readers can build the relation between depth & temperature quickly in mind. But I am OK with the current Figures. 7. f-k plot show the dispersion effect. I suggest authors point out this dispersion effects with circles in Figure 12. So readers can see it clearly.

---

Interactive comment on Solid Earth Discuss., 6, 1371, 2014.