Response to Comments by Reviewer #1

The author has performed numerical experiments on the basis of two-body spring slider model. The paper studies the influence of a large number of parameters on the dynamics of system of 2 blocks and the peculiarities of their slips. The author shows that under certain conditions there is a sequence of slow movement of one block at the beginning, followed by a rapid slip of the second block. The assumption is put forward in the work that this effect can account for the generation of nucleation phase on a sub-fault. General issues: I think that using such simple models has to be accurately grounded, and even more arguments are needed to apply the obtained results to real processes taking place in natural fault zones. In a system consisting of two blocks, almost always the slippage of one block will trigger a fast (or slow) slip of the other. Currently, there is a large number of works on the dynamics of multi-block slider-model, including a large number of works in NPG, for example: https://doi.org/10.5194/npg-24-215-2017, and presented in the introduction. They tend to present a very complex system dynamics. The article of J.-H. Wang does not have any benefits and has a number of serious simplifications.

[Answer] Since 1967 when Burridge and Knopoff proposed their multi-block spring slider model, there have been a large number of works on the dynamics of the model. I myself have also studied numerous seismological problems based on the model. The studies about generation of nucleation phase and initiation of dynamic slip (or an earthquake) on a single fault can be seen in Wang (J. Seismol. 2017). Since the present study concentrates on the dynamics of generation of nucleation phase on a sub-fault and initiation of dynamic slip (or an earthquake) on a main fault, a two-body spring-slider model is taken into account. Of course, a multi-block spring slider model can provide more information. Nevertheless, it is easier clearer to explore the interaction between nucleation phase on a sub-fault and main dynamic slip on the main fault by using a two-block spring-slider model.

There are many "descriptions" in this article. Almost all come down to a description of how the block moves, it does not give any time variations of velocity and another relationship. Moreover, the pictures are made in very poor quality, which makes it difficult to understand the features of the process. It worth mentioning, that the main assumption is presented in Figure 1, where first is a phase of linear growth followed by a dynamic slip. In any cases presented in this article this characteristic behavior is not observed.

[Answer] The “descriptions” given in the text are just written to explain

simulation results, with a focus on the interaction between the nucleation phase on the sub-fault and dynamic slip (or an earthquake) on the main fault. Hence, the description about the time variations in velocities and displacements is not the major one of the study. Of course, I can add some statements to describe the time variations in velocities and displacements and their relationships in the revised manuscript after the Editor allow me to submit the revised version. In Figures 4 and 5, there are not clear nucleation phases on the sub-fault. In Figures 6−10, we can see the nucleation phase which grows linearly with time on the sub-fault and is followed by dynamic slip on the main fault. This is essentially consistent with Figure 1.

One gets the impression that due to very serious simplifications of the numerical model, the discussion is reduced to a detailed description of all possible realization and occasionally a comparison with other works is given. But, presented results coinciding only partially with field observations and the numerical experiments. In addition, it was worth adding a discussion on the influence of slow slip events on the generation of large earthquakes, which in my opinion is more applicable to this work.
[Answer] I think simulation results of this study can help us to understand two things: (1) the nucleation phase being able to be generated on a sub-fault linked to the main fault of an earthquake; and (2) the major physical factors in controlling the processes. Of course, it is OK for me to add more statements to describe the influence of slow slip on the initiation of large earthquake in the revised manuscript after the Editor allow me to submit the revised version.