REVIEW

The presented work is devoted to the vital question of active fault dynamics. Discussed are the process of earthquake nucleation in the presence of thermal-pressurized slip-dependent friction and viscosity. The main question is pointed in introduction: Can the nucleation phase happen on a sub-fault which links to the main fault of an earthquake?

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.

2. 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.

3. 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.

In view of all the remarks above, I think that the paper doesn't contain any new and significant results and can't be published in Nonlinear Process in Geophysics.