Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SSS29-05 会場:105 時間:5 月 21 日 14:45-15:00

透過波振幅を通して見たすべり弱化過程
Monitoring of slip weakening process using transmitted acoustic waves

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To investigate the physical process of slip weakening at subseismic slip rate, Fukuyama et al. (2011, JpGU; 2011, AGU) measured the transmitted acoustic waves during high slip velocity experiments. They concluded that at steady state after the slip exceeds the slip weakening distance, fluctuation of friction, which is typical for the gabbro rock sample at room humidity and room temperature, is controlled by the characteristic size of voids inside the gouge layer. In the experiment, two different proportional coefficients can be found between the friction and transmission coefficient. At beginning before the slip reached the slip weakening distance, the slope was steep, while at the steady state stage, slope became gentle. This difference might be caused by the different process between the weakening and steady state stages. Here, we theoretically investigate this difference. In the scattering theory, Q^{-1} value increases as a function of void size as well as a function of thickness of the gouge layer. In the steady state stage, we assumed that the thickness of the layer does not change. Here, we examine if the steep slope at slip weakening stage can be attributed to the growth of layer thickness or not. We conclude that the steep slope can be explained by the layer growth process. This technique enables us to investigate the generation process of the gouge layer, which might be an origin of the slip weakening process of slip at subseismic slip rate.

キーワード: すべり弱化, 透過波, 高速すべり摩擦, ガウジ層
Keywords: slip weakening, transmitted waves, high slip rate friction, gouge layer