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# Fault dynamics caused by asymmetric friction

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In this study a geological fault involving anisotropic rocks that create a section with asymmetric friction (markedly different friction encountered by the movement in opposite directions) connected to a section with conventional symmetric friction is considered. We consider the simplest model: sliding of two blocks – one block with asymmetric friction property and the other block with symmetric friction property – connected by a spring. These blocks are set in a constrained environment to which vibrations are applied. Results show that the presence of asymmetric friction leads to fault instability at lower magnitudes of vibrations than it would require with the conventional symmetric friction. At low magnitudes of vibrations, the fault held only by symmetric friction will not slide. However fault with sections of asymmetric friction may move if the frequency of vibration of the environment lies within a certain frequency band that depends on the magnitude of vibration. At higher magnitudes of vibrations, the frequency band at which motion occurs in faults with sections of symmetric and asymmetric friction conditions will expand. Within this frequency band, the faults with sections in symmetric and asymmetric friction conditions will have both transient (finite) and steady cyclic movement in the easy direction.