Effects of friction forces on a subducting seamount

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We would like to consider the deformation and rupture of the subducting seamount itself using the finite element method, applying dynamic friction forces that are in proportion to the normal stresses on the plate interface. Our results indicated that the forward flank is in extension, and the back of the seamount is compressed by the friction force. Friction on the forward flank is higher than that on the rear flank because of pushing against the overriding plate. It pulls the forward flank up in a direction tangent to its surface. This will generate normal and thrust faulting at the forward and rear flank, respectively, of the subducting seamount.

The seafloor typically contains many topographic features such as seamounts, plateaus, aseismic rides, etc. Where the seafloor subducts at a convergent margin, these topographic features will deform the overriding plate, inducing seismicity, and generating great earthquakes. We examined this phenomenon via a numerical simulation of seamount subduction using the finite element method, applying dynamic friction forces that are in proportion to the normal stresses on the plate interface. The dimensions of our model are 60km width by 10km depth, and the size of the subducting seamount is 2km tall with a 15km diameter. We would like to consider the deformation and rupture of the subducting seamount itself. Our results indicated that the forward flank is in extension, and the back of the seamount is compressed by the friction force. Friction on the forward flank is higher than that on the rear flank because of pushing against the overriding plate. It pulls the forward flank up in a direction tangent to its surface. This will generate normal and thrust faulting at the forward and rear flank, respectively, of the subducting seamount.