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# Higher Order Elasticity and the Dynamics of Earthquake Sources

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The earthquake source dynamics has been described by the linear elasticity theory. However, various enigmatic phenomena represented as the weak faults hypothesis remains unexplained. Particularly, the heat flow paradox and principal stress patterns almost perpendicular to faults seem to be essentially important in understanding the earthquake source process. We introduce higher order elasticity theory to address these situations. Infinitesimal linear theory has some limitation to describe detailed process in the vicinity of earthquake faults. In the context of higher order theory, rotational motion and torque gradients play an essential role in the source process of large earthquakes. The higher order elasticity also gives a possible explanation for unusual behavior of strong motions. Indeed, generation of strong energy pulses that are commonly observed during large earthquakes can not be understood without taking account of the effect of the higher order elasticity.