

## **Recycling of mantle lithosphere under continents: the role of subduction**

MIAN LIU

University of Missouri

Presenting Author: [lium@missouri.edu](mailto:lium@missouri.edu)

Recycling of the mantle lithosphere under continents occurs mainly through delamination and convective downwelling. It occurs often under orogenic belts, but also under some cratons. Previous studies have attributed removal of mantle lithosphere under orogens to plate convergence, which is thought to shorten not only the crust but also the mantle lithosphere of the overriding plate. Gravitational instability starts when the mantle lithosphere is overthickened, leading to delamination or convective downwelling. This process has been used to explain significant removal of the mantle lithosphere under central Andes. However, in some similar plate boundary zones, no significant mantle lithosphere removal has been observed. Overthickening of mantle lithosphere is also inadequate to explain recycling of mantle lithosphere under some cratons. We have investigated the initiation and development of delamination and convective downwelling of mantle lithosphere in numerical models. Our studies suggest that a key precondition for effective delamination or convective downwelling is a relatively weak mantle lithosphere, which may be caused by subduction-related magmatism and metasomatism. Our results show that the subduction-weakening processes may have played a key role in the delamination and convective thinning of mantle lithosphere under the central Andes and the North China craton.