

## Lithospheric thinning in the Cathaysia block (South China) from joint inversion of receiver function, surface wave dispersion, and P-wave velocity

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Cratons are stable geological blocks, whose thickness is typically more than 200 km. However, the lithosphere in the North China Craton is believed to have been modified since Mesozoic. More recent geochemical studies show that the lithosphere in eastern China has been destructed. Nevertheless, the study of the lithospheric structure in the Cathaysia block (South China) is rare. In this study, we use a new joint inversion method to focus on the lithospheric structure below a dense seismic array in the Cathaysia block, where the P-wave receiver functions, surface wave dispersions, and P-wave velocity are available. The layered S velocity and Vp/Vs ratio are obtained simultaneously. The thin lithospheric thickness (60-70 km) is comparable with the thickness in eastern North China Craton, which provides clear evidence of lithospheric thinning in the Cathaysia block. The low S velocity and high Vp/Vs in the middle crust indicate possible partial crustal melting. The lithospheric thinning and the consequent crustal melting could be possible reason for the widely distributed granitoids in South China.

Keywords: Lithospheric thinning, Joint inversion, South China, Partial melt