

## **Lithospheric architecture of NE China from joint Inversions of receiver functions and surface wave dispersion through Bayesian optimisation**

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The purpose of this study is to develop an integrated inference on the lithospheric structure of NE China using three passive seismic networks comprised of 92 stations.

The NE China plain consists of complex lithospheric domains characterised by the co-existence of complex geodynamic processes such as crustal thinning, active intraplate cenozoic volcanism and low velocity anomalies.

To estimate lithospheric structures with greater detail, we chose to perform the joint inversion of independent data sets such as receiver functions and surface wave dispersion curves (group and phase velocity). We perform a joint inversion based on principles of Bayesian transdimensional optimisation techniques (Kim et al., 2016). Unlike in the previous studies of NE China, the complexity of the model is determined from the data in the first stage of the inversion, and the data uncertainty is computed based on Bayesian statistics in the second stage of the inversion. The computed crustal properties are retrieved from an ensemble of probable models.

We obtain major structural inferences with well constrained absolute velocity estimates, which are vital for inferring properties of the lithosphere and bulk crustal  $V_p/V_s$  ratio. The  $V_p/V_s$  estimate obtained from joint inversions confirms the high  $V_p/V_s$  ratio ( $\sim 1.98$ ) obtained using the H-Kappa method beneath some stations. Moreover, we could confirm the existence of a lower crustal velocity beneath several stations (eg: station SHS) within the NE China plain. Based on these findings we attempt to identify a plausible origin for structural complexity. We compile a high-resolution 3D image of the lithospheric architecture of the NE China plain.