## Supplementary information



Figure DR1: Map showing seismicity along the coast of the South China Sea. The box indicates the study area in Figure 1B and Figure 2. Star indicates earthquakes with magnitudes over 6.0. Large circles indicate earthquakes with magnitudes between 4.0 and 6.0, whereas small circles indicates earthquakes with magnitudes smaller than 4.0. Data are obtained and available from the online database maintained by Guangdong Seismological Bureau (http://www.gsin.net).

## Moho in Velocity Model

The Moho in the velocity model is flat, and this is justified by the previous seismic results that it has been consistently imaged at ~29 km across an extensive area in the South China Sea continental margin near the study area (Zhang and Wang, 2007, and references therein; Xia et al., 2010).

## **Supplementary Reference**

Zhang, Z., and Wang, Y., 2007, Crustal structure and contact relationship revealed from deep seismic sounding data in South China: Physics of the Earth and Planetary Interiors, v. 165, p. 114-126.



Figure DR2: Original checkerboard pattern used in the model assessment. See Figure 2 C1-C3 in the main manuscript for the recovered velocity anomalies.

## **Checkerboard Test**

The result of the checkerboard test has also allowed us to assess the resolution of the velocity model such that the velocity structure of the less well constrained regions outside the target area (i.e. outside the box shown in Figure 2 but within the study area in which stations are located in Figure 1) does not affect the recovery of velocity variations in the well-resolved regions inside the target area.



Figure DR3: Photo showing fractured granite on Dangan Islands within the Dangan Island Fault Zone (DIFZ)