Architecture of the Luoyang basin from a short-period dense array

Yunhao Wei\textsuperscript{1,2}, Xiaobo Tian\textsuperscript{2}, Yonghong Duan\textsuperscript{1}

\textsuperscript{1}Geophysical Exploration Center, China Earthquake Administration, Zhengzhou, 450002, China, wweiyunhao@163.com
\textsuperscript{2}Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, 100049, China

Dense arrays have facilitated much interest in seismological research. Here, we offer a new application example in which a dense array was used to image the details of a basin architecture. A structural model including basement and Moho topography was derived for the Luoyang basin, central China, based on receiver-function (RF) analysis, using data from a dense array including 110 short-period three-component seismometers deployed over the basin. The RF technique is an effective method that utilizes seismic P to S conversion waves to map out subsurface interfaces beneath a seismic receiver. There is an obvious delayed converted phase around 1 s from the basin basement as the waves pass through seismically slow sediment, which were used to estimate the sediment depth distribution. There is a solid and continuous Ps-converted phase appearing around the 6 s time from the Moho, as a first-order discontinuity, is characterized by the maximum amplitude of the conversion phase. The structure of the model shows that the basin has a maximum depth of 6 km and that the Moho declines to a depth of 38 km below the central basin. The short-period geophone array opens up new applications and advantages in passive seismological research. It has superior performance for imaging the high-resolution basin architecture to other seismic methods.

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References
