

Abstract Submitted
for the PSF13 Meeting of
The American Physical Society

Crustal Structure Beneath the Ozark Plateau and Illinois Basin using the OIINK Flexible Array JOSHUA RUSSELL, Univ of Missouri - Columbia, HERSH GILBERT, Purdue University, GARY PAVLIS, Indiana University — The Ozarks Illinois INdiana Kentucky (OIINK) FlexArray seismic deployment provides an opportunity to learn more about the assembly and evolution of North America by comparing tectonic boundaries to variations in crustal thickness. We analyze P-to-S receiver functions to measure crustal thickness across eastern Missouri and southern Illinois. These observations indicate that crustal thickness across the region ranges from 55km at its thickest along the eastern part of the Ozark Plateau, to 43km beneath the southern portion of the Illinois Basin. The crust thins from the Ozark Plateau southeastward into Illinois where the thinnest crust in the Illinois Basin is found beneath the region where the basin reaches its greatest depth. By examining how the arrival times of converted phases of receiver functions vary as a function of incidence angle, we identify that complications resulting from the reverberation of converted waves within the low velocity sediments of the Illinois Basin influence our crustal thickness measurements. Incorporating the low velocity, shallow sedimentary layers into the velocity model used to migrate receiver function arrival times to depth reduces the crustal thickness by 3-4 km compared to depths calculated without considering basin effects. By understanding how the basin geometry effects crustal arrivals, we can more accurately estimate crustal thickness and determine how it relates to the evolution of structures in the mid-continent.

Joshua Russell
University of Missouri - Columbia

Date submitted: 03 Oct 2013

Electronic form version 1.4