

The overall objective of the Ozark Illinois INdiana Kentucky (OIINK) Flexible Array experiment is to improve our understanding of lithospheric scale structures of the North American stable interior. We aim to address a list of outstanding topics in North American geology related to the continental interior. The full experiment is centered on depocenter of the Illinois Basin and can be viewed as a 3-fold oversampling of the Transportable Array. The experiment has unfolded in three stages. Stage 1, which ran from July 2011 to early June 2012, was a ramp-up phase using 9 broadband instruments owned by Purdue University and 15 short-period instruments. That deployment was centered over the Mississippi River Valley region between Missouri and Illinois. We merged our data with data from the TA and data from regional network (NM) stations within this our study area. We processed these data for local earthquakes through the end of the phase 1 deployment. Our merged data lowered the detection threshold in the region by approximately 0.5 magnitude units. This translates to only 15 events within the Mississippi Valley study region but we find this is consistent with the longer-term seismicity rate determined by the NM regional network. The observed seismicity is diffuse, but concentrated along the boundary between the Illinois Basin and the Ozark dome. Estimated depths were found to be notably deeper (approximately 5 km) than the well-constrained distribution for New Madrid region. Phase 2 of the experiment began in early June 2012 and will continue into the fall of 2013. This full deployment of 70 broadband stations runs in a swath from central Missouri to southwestern Indiana. 52 of the stations use FA cell phone telemetry and have data recovery rates approaching the TA while the 18 standalone stations have data recovery rates of a typical PASSCAL deployment. This a demonstration of the value of telemetry in improving data recovery rates in passive array experiments. Analysis of the phase 2 data is underway. P wave residuals show a variation on the order of 0.5 s across the aperture of the array that correlates closely with existing models of the depth of sediments in the Illinois Basin. Receiver function stacks indicate that the crust is greater than 40 km thick in the region spanning from the Ozark Plateau into the Illinois Basin. The area of thickest crust within the OIINK study area (near 50 km) appears to be located near the Ozark-Illinois Basin boundary region. The pulse width and amplitude of the receiver function phase marking the Moho in the Illinois Basin differs from that in surrounding areas. Current efforts are directed at removing basin effects to better define true Moho geometry. Phase 3 of the experiment will be staged in summer and fall of 2013 and will entail migrating the stations eastward into southern Indiana and Kentucky over the Rough Creek Graben and across the Grenville Front.