# SHALLOW CRUSTAL STRUCTURE
# AS INFERRED FROM
# SHORT PERIOD RAYLEIGH WAVE DISPERSION

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I have constructed regional and local shear wave velocity profiles at four sites in the Illinois Basin and Ozark Uplift. These profiles extend down to 2 km, thus effectively representing the sedimentary sequences that overlie the crystalline basement. The data studied consisted of strip-mine generated, fundamental mode Rayleigh waves recorded by Sprengnether MEQ-800 instruments deployed in small, five- element arrays at each study site. These arrays, with average station spacing of 1.5 km, were designed to record short period ($0.6 \leq \tau \leq 1.5$ sec) waves for time domain least-squares phase velocity analysis. In general, the Ozark observations were very scattered, due to poor time resolution of the pen and ink recording, and could not discriminate between models of local structure. In contrast, the Illinois values formed more coherent trends due to larger station separations, and were consistent with theoretical dispersion curves generated with forward modeling techniques. These were based on models in which the layer shear velocities varied as $2.32 \leq \beta \leq 2.41$ km/sec at one site, and as $1.79 \leq \beta \leq 2.26$ km/sec at another. In both cases the basement $\beta$ was 3.5 km/sec, and Poisson's ratio was assumed to be 0.25. I also estimated group velocities for the source-station paths by dividing the path lengths by the appropriate travel times. The resulting dispersion curves lacked significant scatter, and were inverted to obtain regional, one and two-layer velocity models for the Basin and Uplift. For the Ozark model, I can tentatively correlate layer interfaces with known stratigraphic units. For the Illinois model, the top of the St. Genevieve limestone is clearly identified at a depth of 0.9 km, which agrees with sonic well log data from Hamilton Co., IL.