Atypical "Noise" for an Atypical Badger Football Saturday

by John Naranjo — President Wisconsin-Madison Student Geophysical Society

This is not your typical Badger football tailgate party. On the morning of Nov. 18, 2006 the Wisconsin-Madison Student Geophysical Society, member of the Society of Exploration Geophysicists (SEG) under the direction and supervision of Dr. Dante Fratta and Dr. Kurt Feigl, set out to make the most of a "noisy" time-honored student tradition on Badger game day.

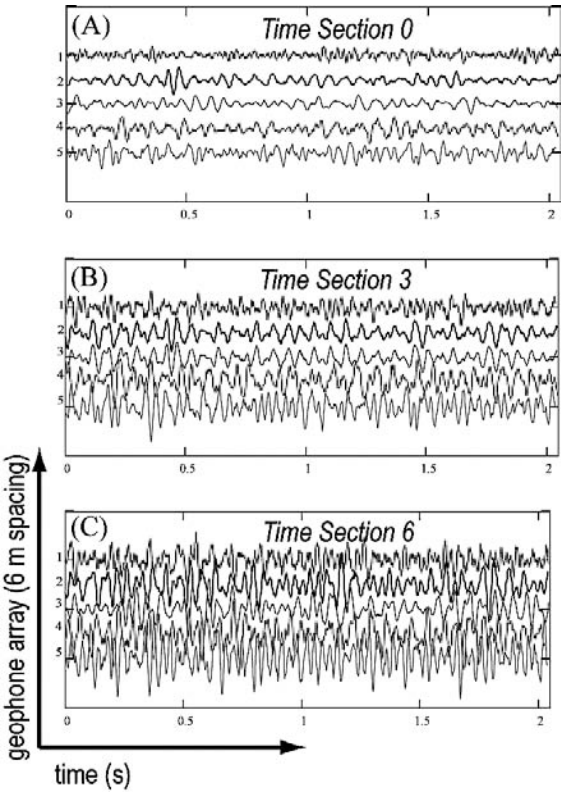

Figure 1.

At the end of the 3rd quarter during every Badger football home game, the entire student section (seated Sec. J-P) turns its attention to the northern end of the stadium. Following a brief race between student section mascots on the Jumbotron, a familiar song, once popular in the early 1990s begins blaring at an overwhelming volume and the entire mass of students begins randomly jumping around. This lasts for approximately 30-40 seconds. Having personally contributed to this organized madness to witness its impressive intensity and having previously received training in the processes behind exploration geophysical methods, it was as if a light came on in the attic. And thus, the "Jump Around" experiment began!

At its inception, the idea was solely to use this source for 2D reflection seismic sounding. However, with increased interest came increased instrumentation. Nine students (John Naranjo, Francisco Correa-Mora, Manuel Rodriguez, Matthew Knuth, Jessica Lopez, Ryan Sharma, Craig Schuettpelz, Preeya Jirutthitijaroen, and Eric Grunwald) and two faculty (Fratta and Feigl) deployed and monitored the following forms of instrumentation: 3 Guralp CMG3-ESPD broadband seismometers, 1 Geometric Strataview seismograph geophone array (5 receivers, 6 m spacing), and 1 shear wave accelerometer array (5 receivers, 1 m spacing).

Some of the crew: John Naranjo, Francisco Correa-Mora, Ryan Sharma, Manuel Rodriguez, and Matthew Knuth. *(Kurt Feigl)*

A few of the results are shown in figures 1 and 2. The overall interpretation of observed measurements concludes that the "Jump Around" source has a characteristic frequency slightly greater than 2 Hz, consistent with previous studies involving crowd excitation in European soccer stadiums (Reynolds et al., 2002). Furthermore, Figure 2 shows that some indications of harmonic overtones are observed which is typical for tremor-like sources.

With lessons learned and seismic sources characterized, all was well when ended as the Badgers closed out a record-setting regular season with a 35-3 routing over the Buffalo Bulls.

References

Reynolds, P., A. Pavic and Z. Ibrahim, "Changes of modal properties of a stadium structure occupied by a crowd." *in* <http://vibration.shef.ac.uk/pdfs/IMAC_XXII.pdf> ●

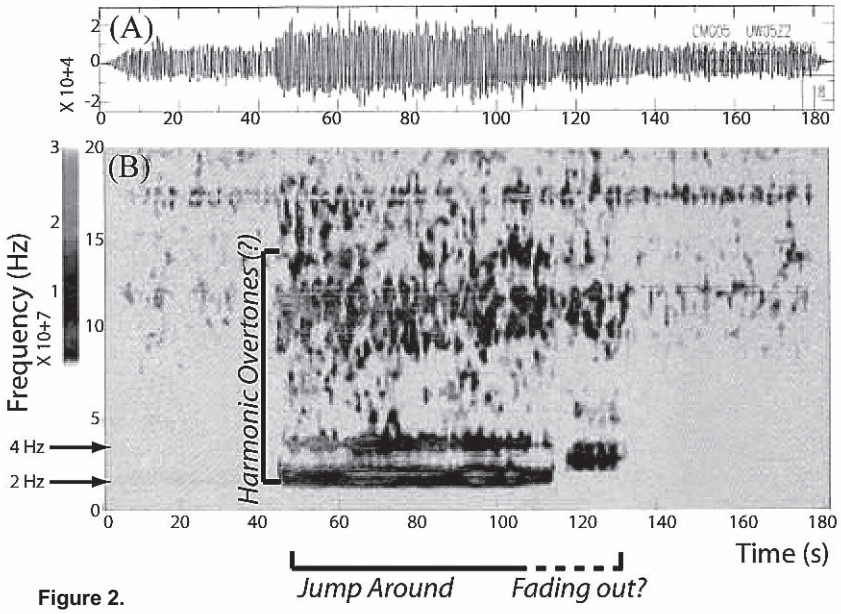

Figure 2.