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Listening to the Earth with Gravity Meters

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Gravity meters have long been used to gain static information about the earth. For example, gravity provides information about the shape of the earth for geodetic purposes as well as subsurface density anomalies that can be used to locate oil, gas, and other minerals. Gravity is also very sensitive to vibrations in the earth induced in the earth by earthquakes. Gravity meters can potentially detect seismic energy at lower frequencies than is possible with traditional seismometers. This talk will introduce and explain the differences between different types of gravity meters; from spring-based systems to absolute free-fall ballistic techniques. It will also describe how gravity can be used to monitor gas and water injections into reservoirs. Finally, we will show some new results of measurements with a new gravity meter, called the gPhone. The gPhone provides a complementary methodology for listening to the subtle bass tones excited by earthquakes at frequencies outside the bandwidth of traditional seismometers.