



Distinguishing an earthquake from a nuclear event requires a close examination of the seismic waves. Typically, explosions show strong P-waves and weak S-waves, with earthquakes showing the opposite. At frequencies of 6 to 8 hertz, this pattern is clear for past nuclear explosions (red waves) compared with nearby earthquakes (blue waves). Shown are (a) 1988 Pakistan test, (b) 1998 India test, (c) 1985 former Soviet Union test, and (d) 2006 North Korea test. Circles are event epicenters and triangles are recording stations. Sometimes complicated geological structures can mask these differences, so LLNL scientists perform calibration studies to correct for Earth complexities.