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# REGIONAL WAVEFORM MODELING IN SOUTHWESTERN ASIA: TECTONIC RELEASE FROM THE MAY 11, 1998 INDIAN NUCLEAR TESTS

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The seismic signal from the May 11, 1998 underground nuclear explosions in western India provide new data to test regional event analysis techniques that provide valuable insight into both tectonic processes and for monitoring the Comprehensive Nuclear-Test-Ban Treaty (CTBT). One such technique is regional waveform modeling which can provide information about both the source of seismic waves and the structure they pass through. The technique matches reflectivity generated synthetic seismograms to data, and is most effective if either the source or structure is known independently so the other can be determined by goodness of waveform fit. Starting with a large May 21, 1997 event in central India with a teleseismically well-constrained depth and focal mechanism, we have used regional waveform modeling in the 10-100 s period range to determine the average velocity structure to stations NIL, LSA and HYB. In a bootstrap process of fitting earthquakes progressively farther away and at smaller magnitudes and shorter periods we refined both the models and the regions over which the models are valid.

Using our best models for western India and a pure explosion source we find the Rayleigh waves from the May 11, 1998 tests have the opposite polarity over the 10-50 s period band than expected at NIL. Such reversed Rayleigh waves indicates significant tectonic release with a stress release moment greater than the explosion "moment". Reversed Rayleigh waves have been observed previously in other nuclear tests, notably in Kazakhstan in the mid 1980's by Rygg and others. Fixing the size of the explosion from the mb we use the waveform fit to find the size and mechanism of the tectonic release, which appears consistent with the tectonics. We are currently investigating what effects, if any, this tectonic release has on discriminants used to identify explosions.

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