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NORSAR

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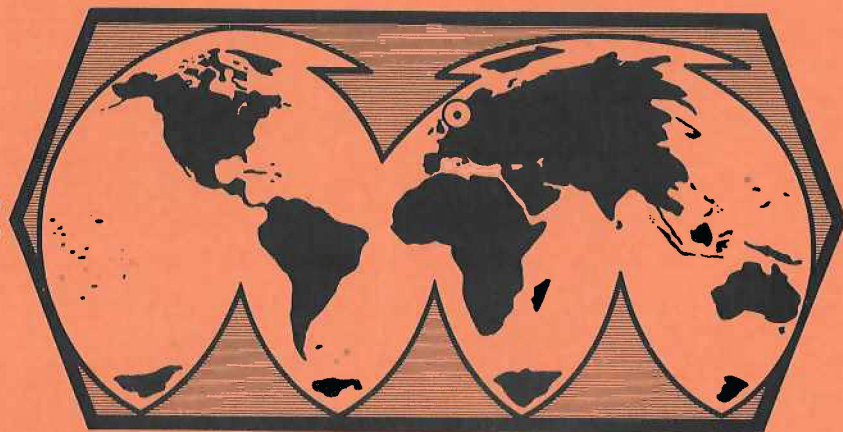
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I. LONG PERIOD P FROM NOVAYA ZEMLYA EXPLOSIONS

Routine analysis of long period P waves recorded at NORSAR after two large Novaya Zemlya explosions in 1973 revealed that the signal pulses exhibited unsystematic variations in size and shape both between events and within the array aperture for single events. This is in marked contrast with long period P phases from earthquakes (of much lower m_b) at similar distances. Records of selected vertical channels recorded after the explosion of 27 October and an earthquake at a similar distance are plotted in Figure I.1 for comparison purposes. All short period channels recorded after the explosions (12 September and 27 October) are severely clipped, since ground motions of up to approximately $10 \mu\text{m}$ at 1 second period are involved. The variability of the long period P wave signals suggests that an instrumental instability is involved, and consultation with colleagues at Seismic Data Analysis Center (SDAC) and Lincoln Laboratory revealed that equivalent anomalous behavior has been observed in LASA recordings of large NTS explosions. The problematic 'signals' are a manifestation of a non-linearity in the response of the LP amplification system to the very large SP ground motions. The size of the ground motions involved precludes the possibility of testing for the non-linearity experimentally, but the manufacturers have provided confirmation of the anomalous behavior. Consequently, LP signals recorded when the corresponding SP signals are severely clipped should be treated with extreme caution.

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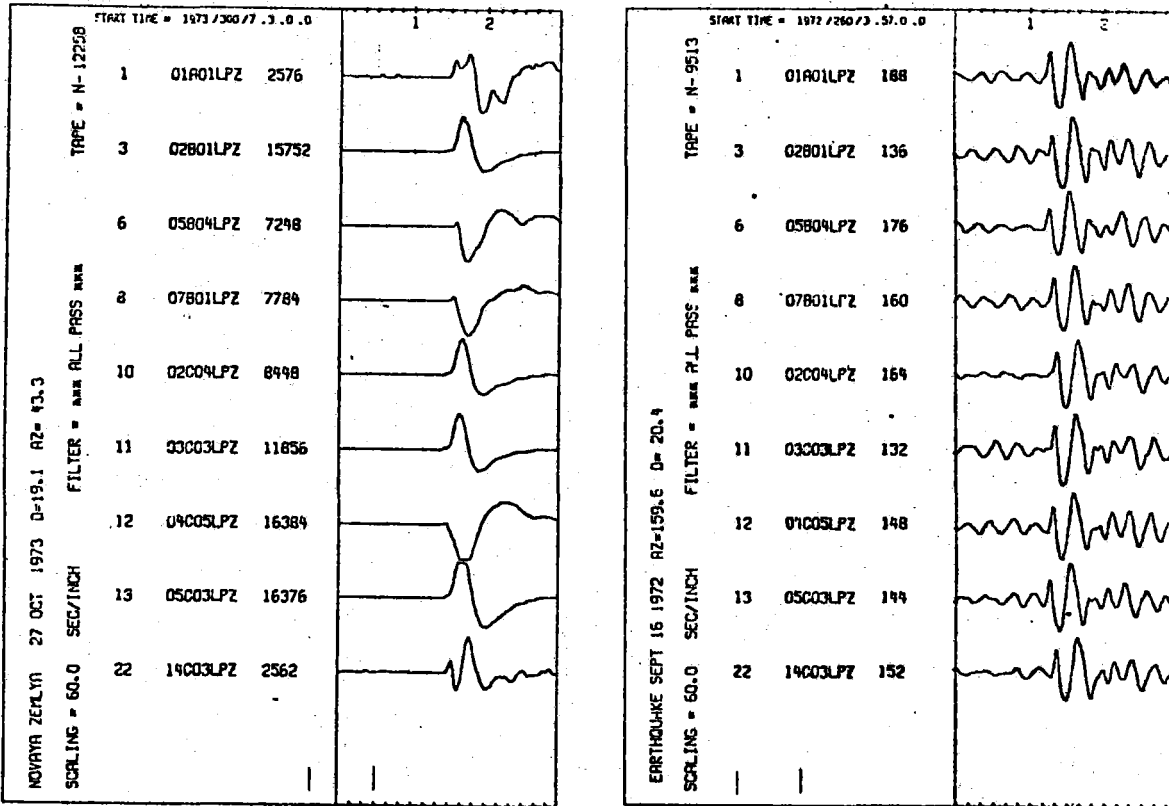


Figure I.1 Selected LP vertical channels after Novaya Zemlya explosion of 27 October 1973 (left) and earthquake of 16 September 1972 (right).