Spectral Balancing Example

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This report presents some preliminary results obtained by applying
Claerbout's spectral balancing routines (ref. Jon Claerbout-Spectral
Balancing, SEP 7, page 172) to raw data obtained from one of the
sponsors. Two parts (each about one second long) of the gathers were
treated separately: the first corresponding to the direct arrival and
the second to the first reflection. These are illustrated in Figures 1
and 2.

Both these were computed using floating point arithmetic since
our first attempts to use integer arithmetic with a view towards
reducing the computational effort by a factor of 10 on a minicomputer
were not successful. We would like to use integer arithmetic wherever
we deal with long sections of the data, viz subroutines AUTO (to compute
the autocorrelation), PMULT (polynomial multiplication) and PDIV
(polynomial division)because here we operate upon traces each containing
> 2000 data points. Because of our "short" filter model the others
operate upon only a few terms. These features are being currently
investigated along with the effects of truncation of the various series
and filter lengths. There also seems to be an apparent bias in the
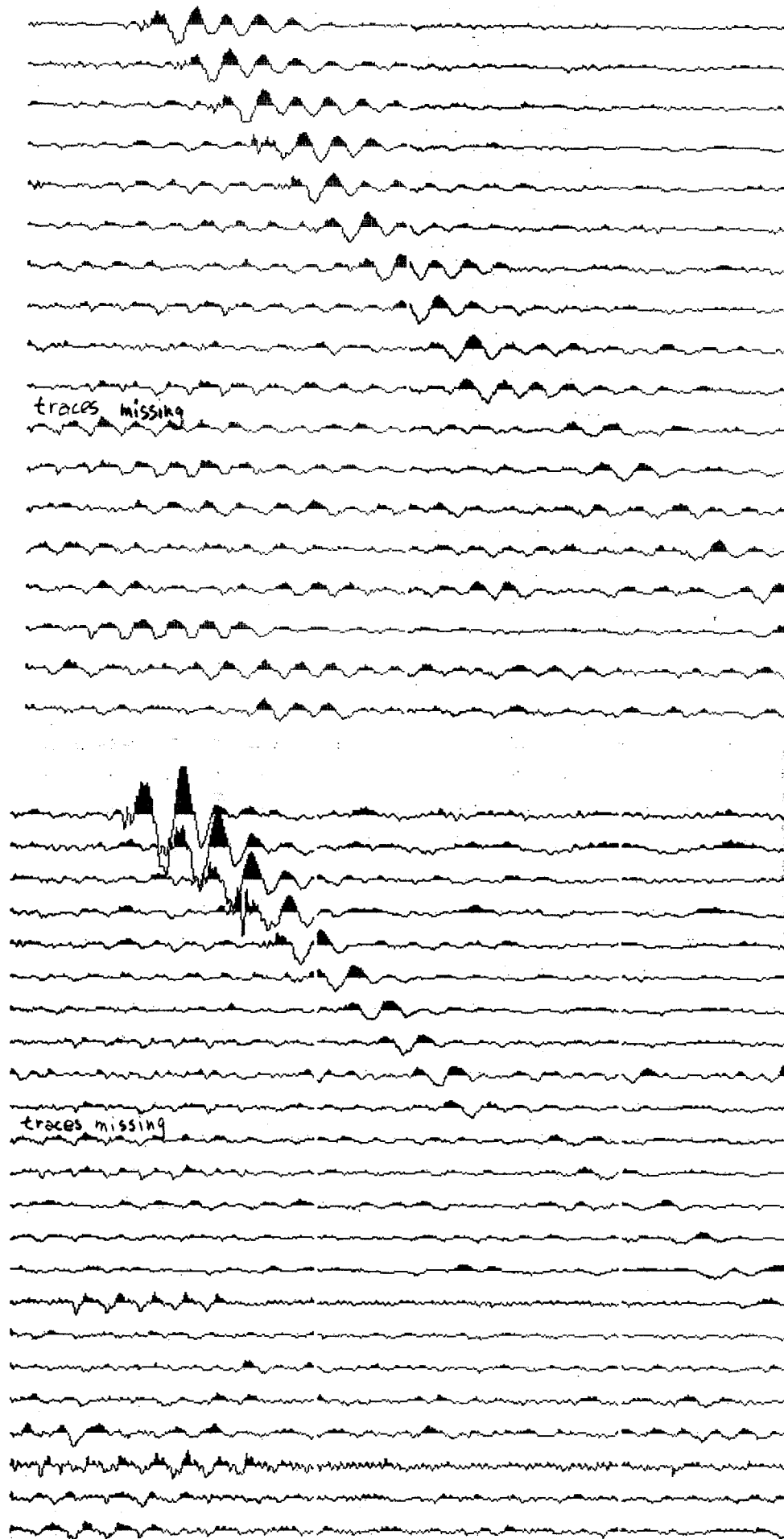balanced traces.

traces missing

Fig. 1b. Gather of Figure 1a after the traces have been spectrally balanced using a 9-term filter.

traces missing

Fig. 1a. Gather plotted from raw data corresponding to the first second. The waveform received is due to the direct arrival.

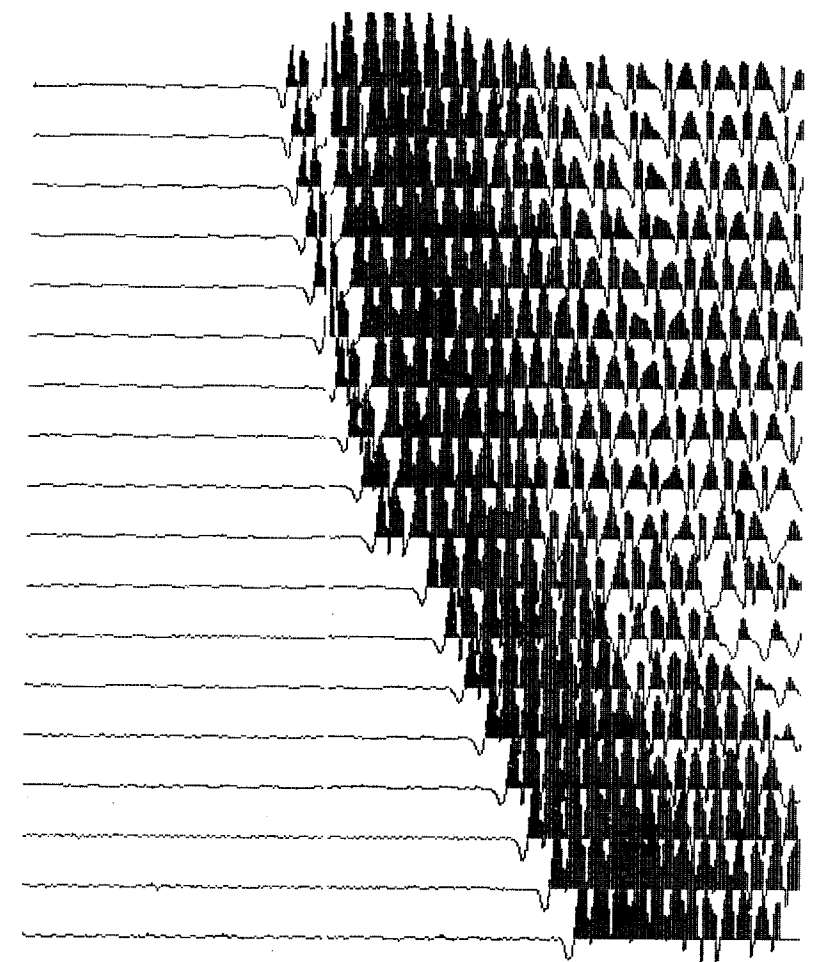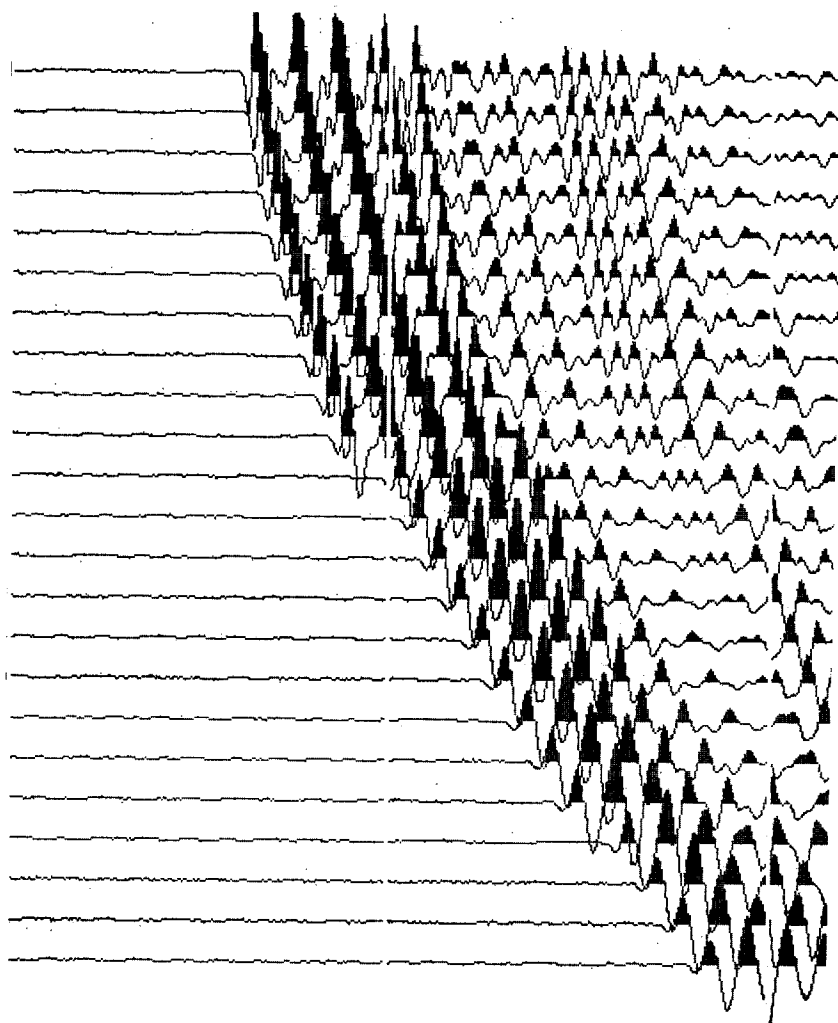Fig. 2b. Gather of Fig. 2a after the traces have been spectrally balanced using a 9-term filter.

Fig. 2a. Gather plotted from raw data corresponding to the first reflector. Duration approximately one second.