

Predictive deconvolution for multiple and ghost removal within Reflexw

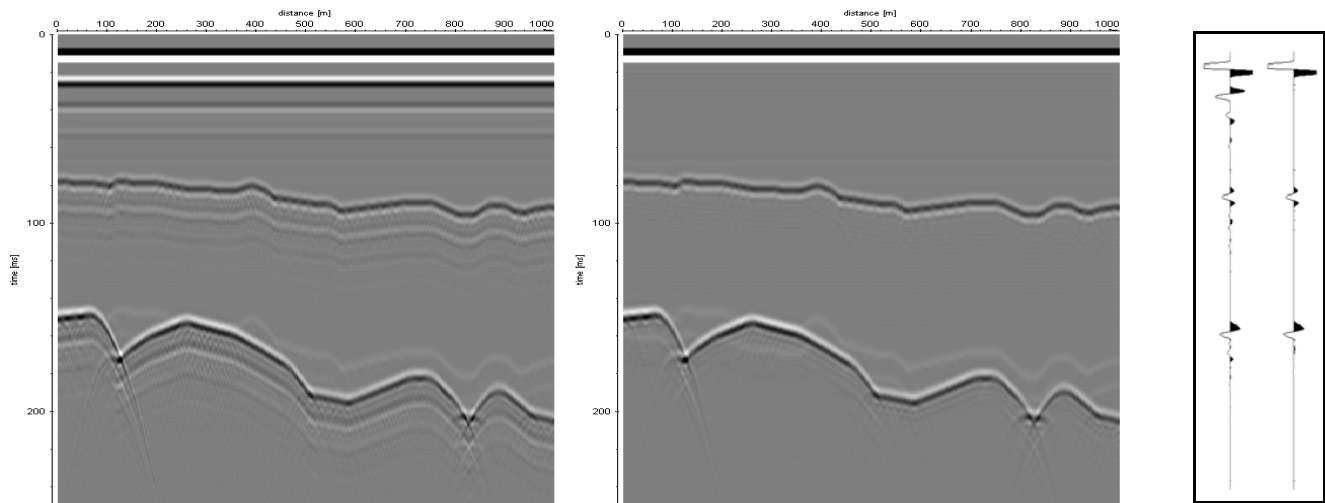
The main goal of the predictive deconvolution is the suppression of multiples. The desired output is a time advanced (parameter lag) version of the input signal. To suppress multiples choose a lag corresponding to the two-way-traveltime of the multiple. If the input signal is mixed-phase a spiking deconvolution or wavelet shaping may improve the result of the following predictive deconvolution. In the following synthetic seismograms have been created in order to examine the effectiveness of the implemented deconvolution method for multiple and ghost removal.

1. multiple removal

Example with **weak multiples** coming from a very near surface interface with quite high velocity contrast. The predictive deconvolution yields good results with the following parameters:

autocorr.start: 0 ms, autocorr.end: 60 ms

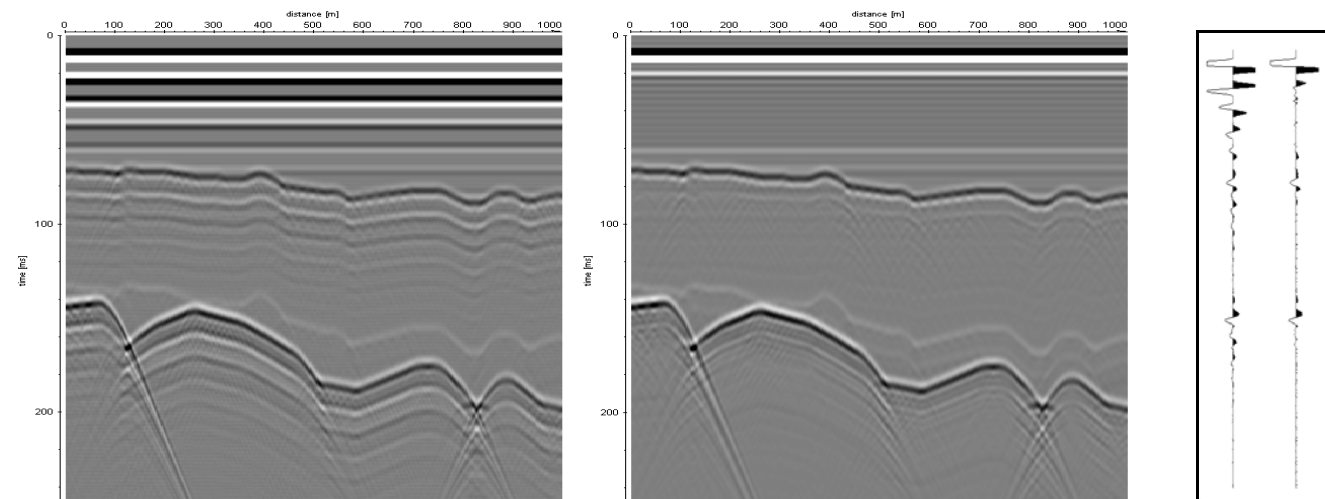
filterlength: 60 ms, lag: 12 ms



Example with **strong multiples** coming from a very near surface interface with very high velocity contrast. Again the predictive deconvolution yields quite good results with the following parameters:

autocorr.start: 0 m, autocorr.end: 60 ms

filterlength: 60 m, lag: 12 ms



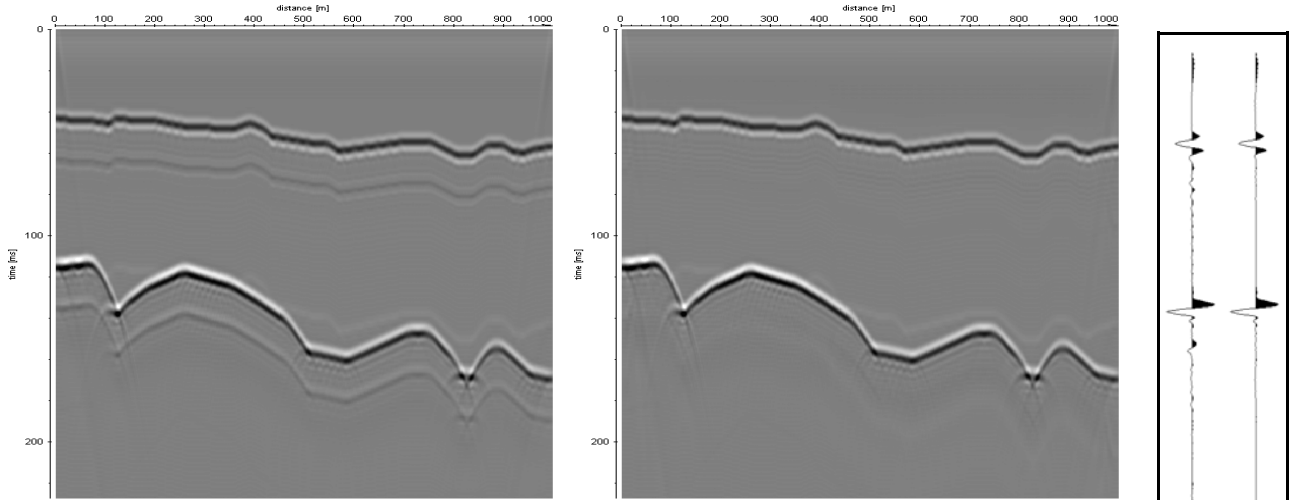
2. ghost removal

A single ghost has been created by setting the receivers below the free surface (e.g. streamer line below the water surface).

Example with a **weak ghost** (small contrast of the interface/surface). The predictive deconvolution yields good results with the following parameters:

autocorr.start: 20 m, autocorr.end: 100 ms

filterlength: 60 ms, lag: 20 ms

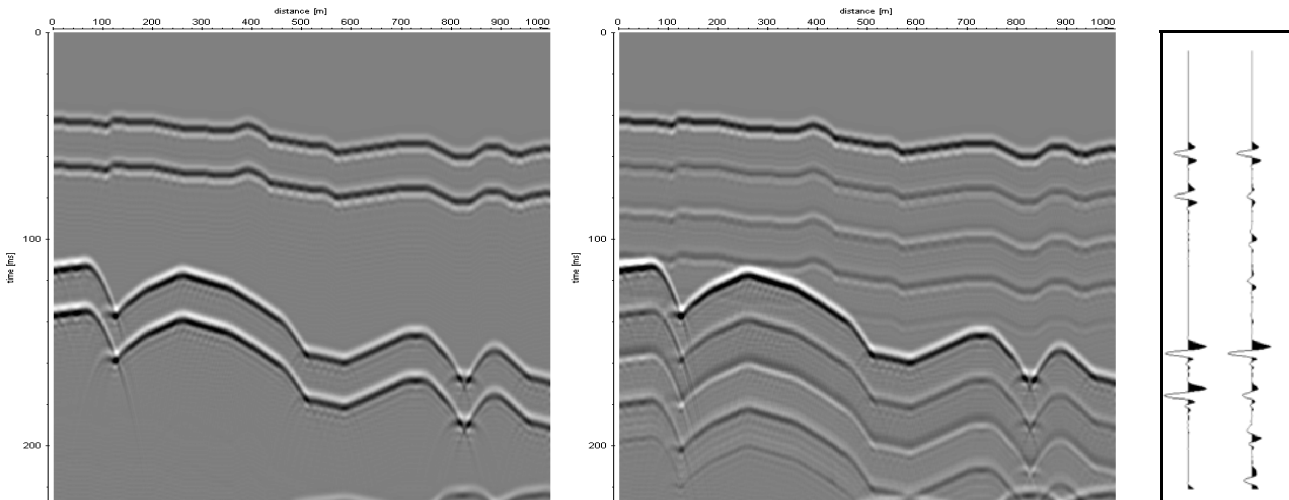


Example with a **strong ghost** (strong contrast of the interface/surface). The predictive deconvolution yields no good results with the following parameters:

autocorr.start: 20 ms, autocorr.end: 100 ms

filterlength: 60 m, lag: 20 ms

It is not possible to eliminate the ghost which has similar amplitudes like the primary onset. The ghost is still visible although with smaller amplitudes and the deconvolution process produces multiples.



3. conclusions

The predictive deconvolution method implemented within Reflexw is able to reduce or even eliminate multiples and ghosts. The signals presented within the synthetic seismograms are minimal phase. The effectiveness of the deconvolution will be lower if this does not hold true or if reverberations are present in addition. Ghosts can only be eliminated if the amplitude of the ghost is significantly lower than of the primary onset.