\procssng\working\acausal_filter_forward_reverse.tex

Investigating whether the acausal filter in `locut.for` really cares what direction is used for the filter.

I wanted to check whether the order of filtering makes any difference. Rather than look at the details for the Fortran code in `/forprogs/locut.for` and switching the filter loops, I decided that the easiest check was to make an smc file with the time series in reverse order. I did this using this series of steps:

1. Baseline-corrected the file `0530c_a.smc`, with a baseline correction given by a constrained quadratic fit to the whole velocity (but no filtering). The corrected file, before adding pads, is `53qxf_a.smc`.

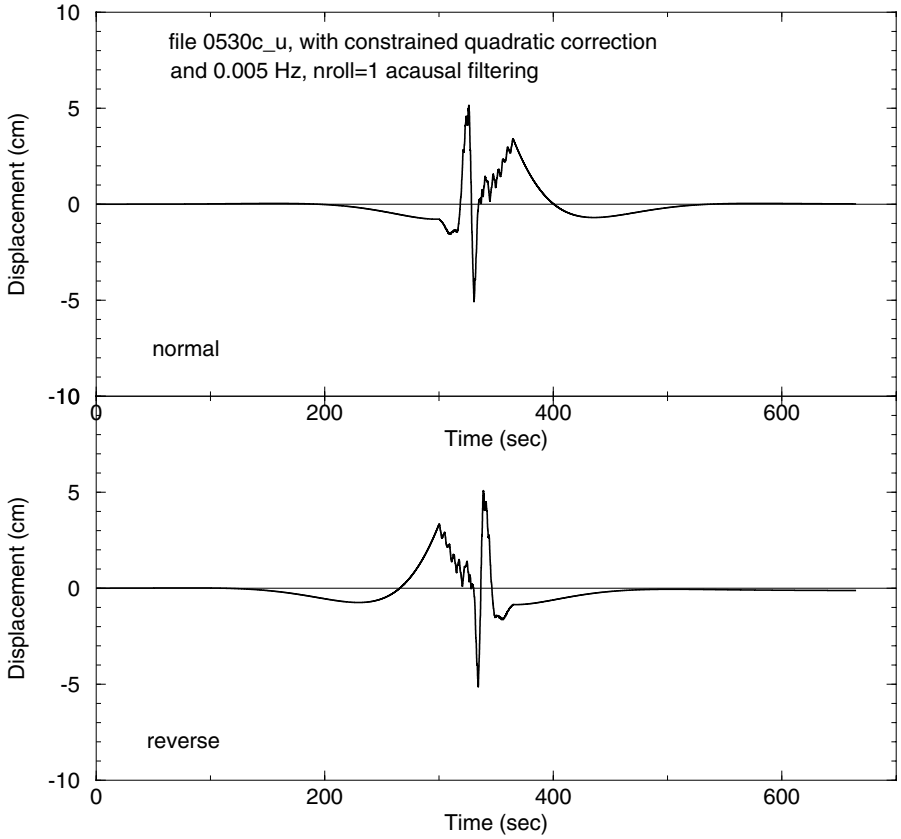
2. Used `smc_pad.for` to add zero pads to the file above; the file after adding pads is `53qxf_a.pad`.

3. Used a special-purpose Fortran program (`/forprogs/smcrvrse.for`) to make a reversed version of the padded file; the new file is `53rvra.pad`.

4. Used `/forprogs/bl_fltr.for` to do 0.005 Hz, nroll = 1 acausal filtering and integration of the normal- and time-reversed padded files. The resulting displacements are `pad005d.smc` and `rvr005d.smc`.

5. Made a comparison plot, using program `/forprogs/smctsplt.for`.

The result is shown in the accompanying figure, and shows that the filtered waveforms are reversed, as expected if the filter program is working correctly.



File: C:\procssng\working\Reverse.draw; Date: 2002-04-19

Figure. Displacements using acausal filter on normal and time-reversed acceleration time series, before integrating to displacement.