Solid Earth Discuss., 5, C390–C394, 2013
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Interactive comment on "Fully probabilistic seismic source inversion – Part 1: Efficient parameterisation" *by* S. C. Stähler and K. Sigloch

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Martin Vallée raises an important point. The choice of the orthogonal functions is obviously biased by our database. In our database, we find almost no event with a *slow start*. This might be due to the selection process employed in Sigloch & Nolet (2006). However, I do believe that the absence of *slow start* events is real. In the P-waveforms, we often see a small first arriving peak, followed by a strong secondary arrival. However, in modeling the waveforms this can usually be explained by the radiation pattern. The small first peak is P, the stronger second one pP. So we see almost no *slow start* events in our database.

It still might be the case that we excluded them all for some reason, so it's definitely interesting to see how our orthogonal functions fare in expressing these late peaks.

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For that I constructed several test functions I considered difficult.

Fig.1 shows a 5s rise time triangular STF, happening after 10s of silence. This shape is rather poorly fit by 12 of our base functions, notice the strong ringing in the beginning of the time series. However, this solution ($s = 0$ with a late and rather benign STF) is discouraged by the algorithm, by allowing for individual time shifting of the waveforms. The shifting is necessary, since otherwise there would be a number of identical solutions with the same STF $s(t + \Delta t)$ shifted by an arbitrary time Δt.

Fig.2 shows a similar STF, but now with a slow rise to 50% amplitude before the triangle. This shape can be rather well expressed by 12 to 16 wavelets.

Fig.3 shows the same, but with a slower rise. The 12 wavelet-representation shows a bit more ringing on the slow slope in the beginning.

All in all, we think that the level of fit between the test functions and the 12 wavelet-representation is acceptable even for those difficult waveforms. However, it might be beneficial to allow for 16 or more base functions for some events, if the fit is poor with 12.

Interactive comment on Solid Earth Discuss., 5, 1125, 2013.

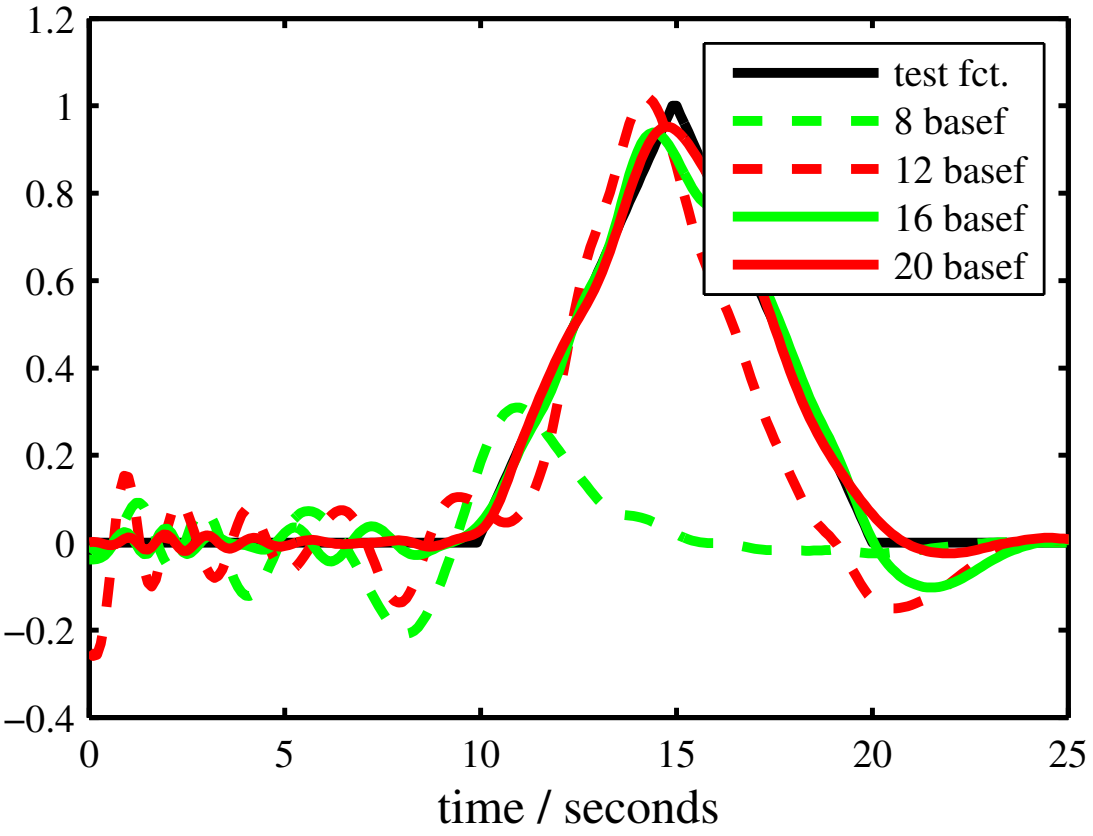

Fig. 1. triangle with 5s rise time, shifted by 10s. Poor fit by less than 16 base functions.

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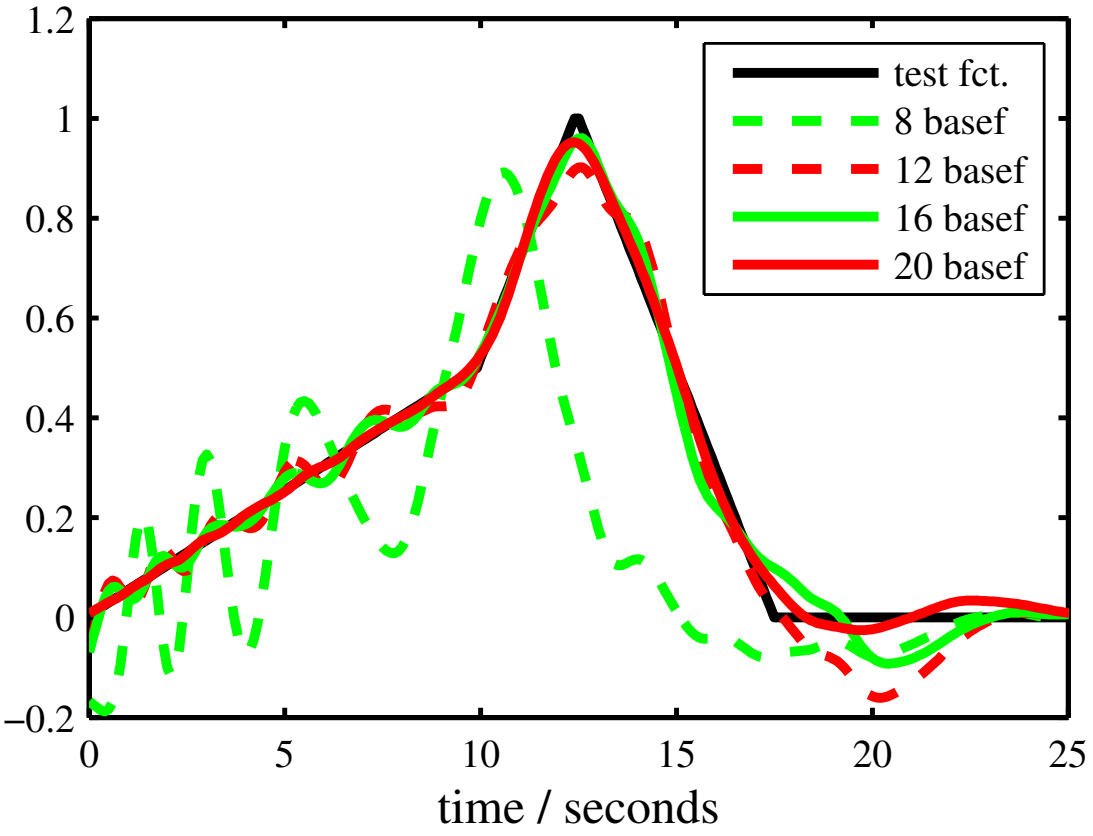

Fig. 2. Same triangle as in Fig.1, but with a rise to 50% amplitude before

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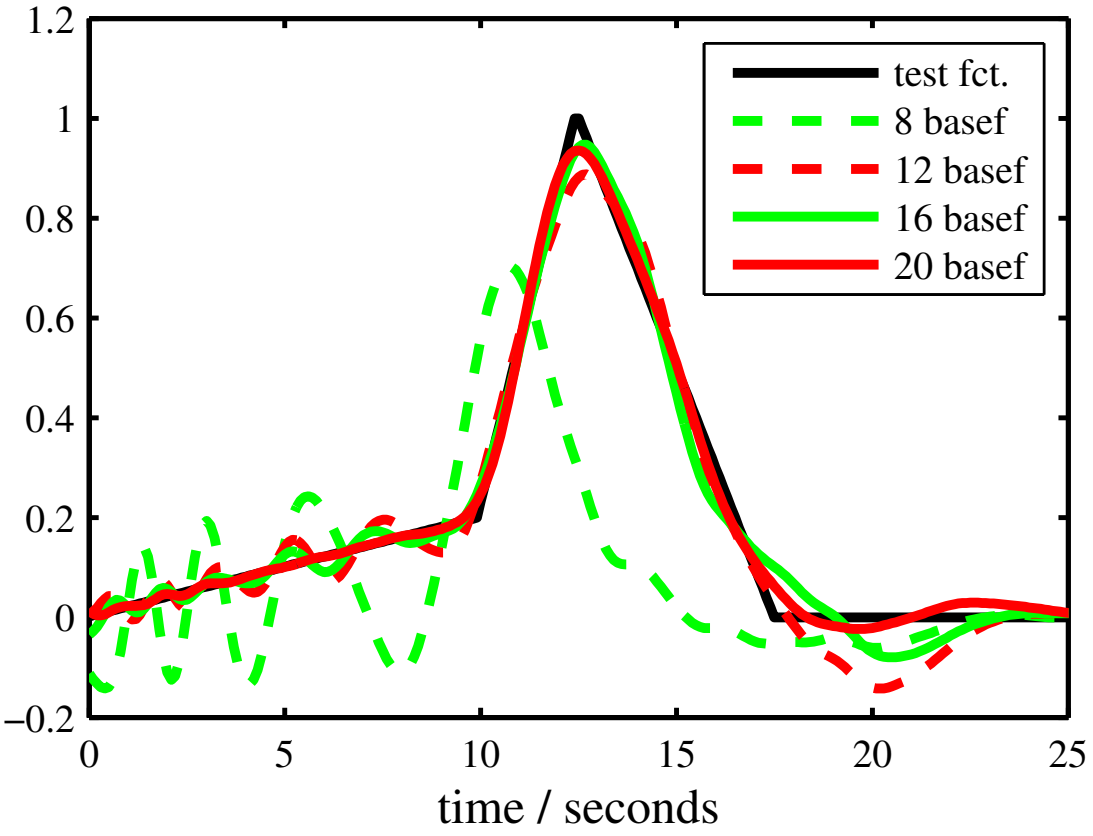

Fig. 3. Same triangle as in Fig.1, but with a rise to 20% amplitude before

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