Appendix B

Definition of the misfit function

In order to quantify in a rigorous way the differences existing between the solutions obtained by using the boundary integral method (BIE) and the finite difference (FD) approach, we have introduced in the x_1–t plane the misfit function $m(x_i , t_n)$, defined as

$$m(x_i, t_n) = \frac{\left| u^{(\mathrm{BIE})}(x_i, t_n) - \tilde{u}^{(\mathrm{FD})}(x_i, t_n) \right|}{\left| u^{(\mathrm{BIE})}(x_i, t_n) + \tilde{u}^{(\mathrm{FD})}(x_i, t_n) \right|} \tag{B.1}$$

In (B.1) $u^{(\mathrm{BIE})}$ denotes the slip obtained with the BIE method, while $\tilde{u}^{(\mathrm{FD})}$ is the value of the slip arising from the FD approach. While the solutions of the dynamic problem are defined in the same position along the x_1 coordinate, along the t coordinate they are defined in different points, because $t_n = (n - 1)$

Dt and $Dt^{(BIE)} \neq Dt^{(FD)}$. We have therefore resampled the values of the array $u^{(FD)}(x_i\ ,\ t_n^{(FD)})$ into the array $\tilde{u}^{(FD)}(x_i\ ,\ t_n^{(BIE)})$, by means of a linear interpolation in time. In the (B.1), used also by Nostro et al. (1999), the misfit m is in the range [0,1]: in this way we magnify the numerical difference between the two solutions.