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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "The analysis of H/V curve from different ellipticity retrieval technique for a single 3c-station recording" *by* Irfan Ullah and Renato Luiz Prado

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Thank you very much Sir for your time and for highlighting my mistakes.I have corrected all the error/mistake as suggested in text and missing reference. The Idea regarding, to show some result about the TFA and RayDec curve joint inversion with the borehole model dispersion curve is excellent and I have jointly inverted the TFA and RayDec curve with the borehole dispersion curve. A paragraph is added to the article before discussion and conclusion. Here i am giving the new text and the figure which is added to the article.I am adding the corrected article into the supplement as well. 7.Joint inversion of the ellipticity and dispersion curve. The ellipticity curve retrieved from both the time-frequency analysis and RayDec technique are jointly inverted along with

theoretical dispersion curve of the borehole obtained by forward modeling (using code gpdc, http://www.geopsy.org last accessed 1-29-2017). The frequency range of the dispersion curve is considered above the fundamental frequency of the site 2Hz (in our case) till 45 Hz, below the fundamental frequency of the site dispersion curve is difficult to retrieved for Rayleigh waves ,as the medium filter out all the lower frequencies (Scherbaum et al, 2003). To get the 1D shear wave velocity from dispersion and these H/V curve, the modified neighborhood algorithm (NA) proposed by Wathelet (2008) are used. In comparison to linearized inversion procedure, NA is a derivative-free procedure. NA is considered very good inversion strategy because it has the advantage over the other approaches as it utilizes all previous model information to sample the new model (Sambridge 1999). The parameters for inversion are considered as follow: the numbers of layers are considered to be four above the bedrock, P-wave velocity are linked with S-wave velocity, S-wave velocity are allowed to linearly increased from surface to the bedrock, density is taken constant at 2000 kg/m3, while the Poisson ratio are considered to change from 0.2 to 0.5. The inversion is made for time-frequency and RayDec based H/V curve only, as that of DFA H/V curve contains the effect of all wave-type and its inversion with Rayleigh wave dispersion curve will certainly give bias result. The misfit between all generated models and target curves (dispersion and H/V) are calculated using eq. 6. misfit=1/N $\sqrt{(\sum((x\_t(f) + x\_m(f)) 2/x\_t(f) 2))(6) where x\_t(f) is the target curve (either experimental H/V or borehole dis_j$

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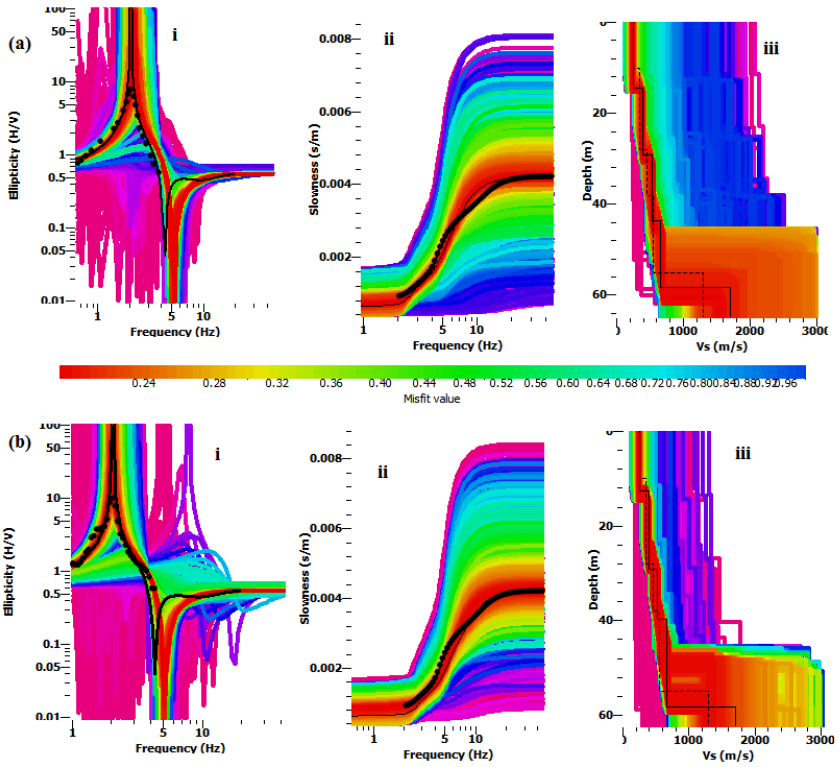
(a)
i
ii
iii
Ellipticity (H/V)
Frequency (Hz)
Slowness (s/m)
Depth (m)
Vs (m/s)
Misfit value
(b)

Fig. 1.