

Figure S1: The group-velocity spectrogram for the SPB station and Offshore event. **Left:** Rayleigh wave. **Right:** Love wave. The colors reflect the normalized signal amplitude. The white points mark the selected dispersion curve. The black points denote various branches of the dispersion curve suggested by the code, but not used.

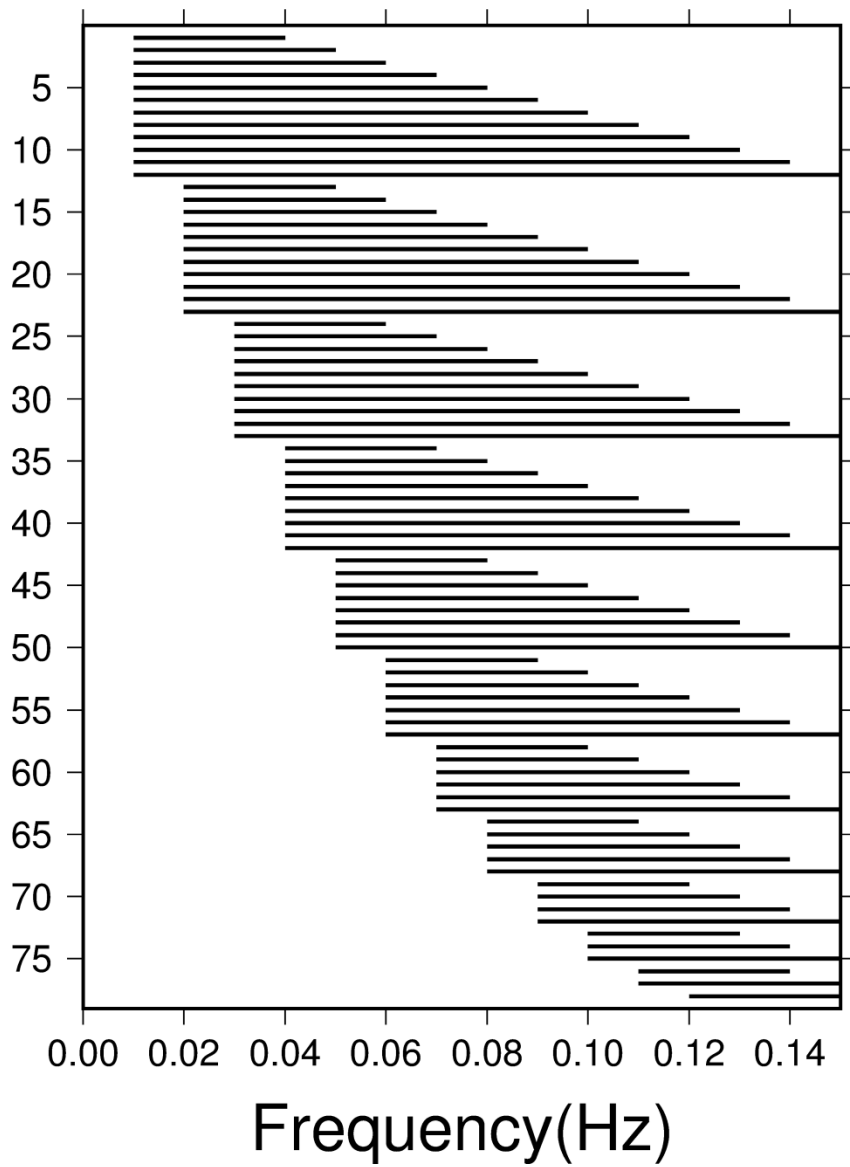


Figure S2: All 78 frequency ranges used in the waveform inversion. Each range is shown by a horizontal bar.

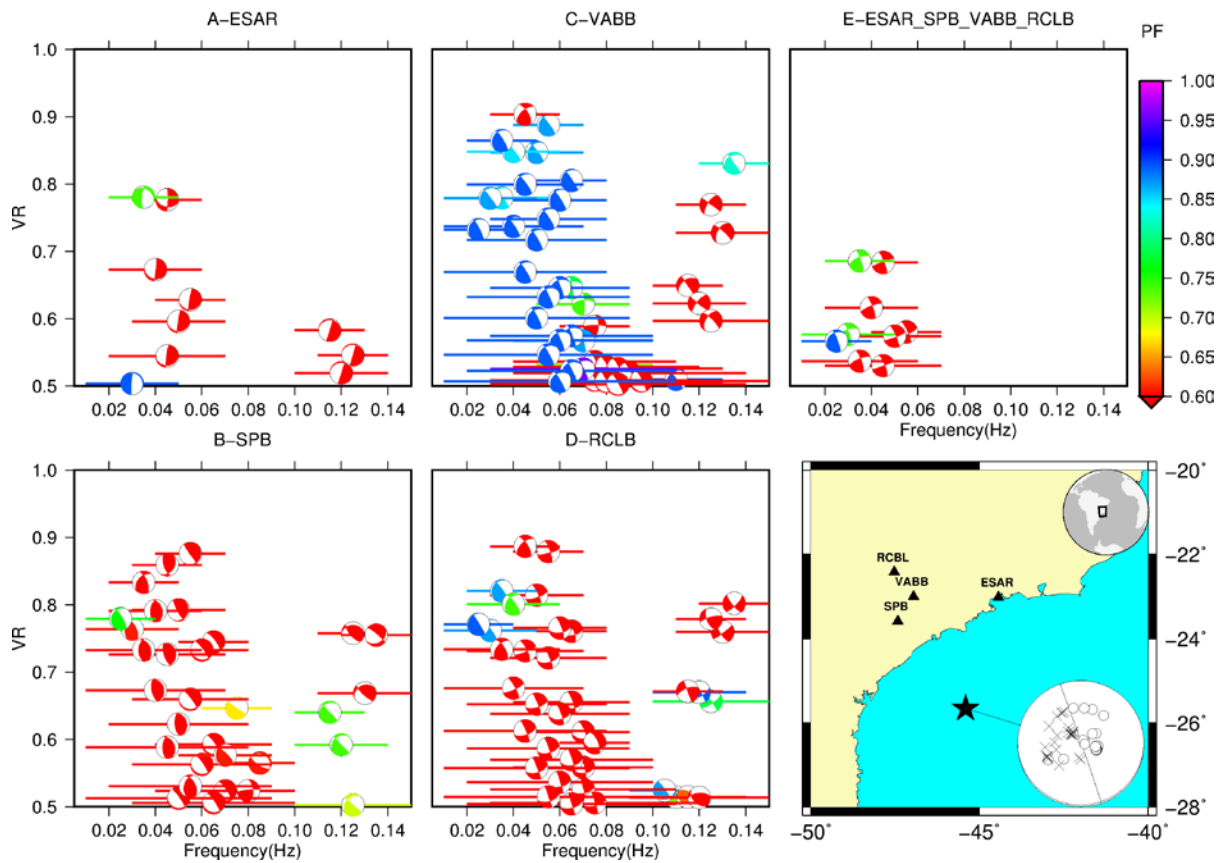


Figure S3: Frequency range test for the Offshore event using the NewBr velocity model. The horizontal bars (with the double-couple beachballs in the middle) denote the used frequency ranges. The variance reduction (VR) of the seismograms is indicated in the vertical axis. **Panels A, B, C and D** show the frequency range test for each single station used in the waveform inversion. **Panel E** shows the four-station inversion. The beachballs are color-coded according to the fitted first motion polarities (see the colorbar denoted PF). The bottom-right panel shows the map with the epicenter location (star), the broad band stations (triangles) and the P-wave polarities (crosses - compression, circles - dilatation). The focal mechanism from Assumpção et al. (2011) is plotted with the polarities.

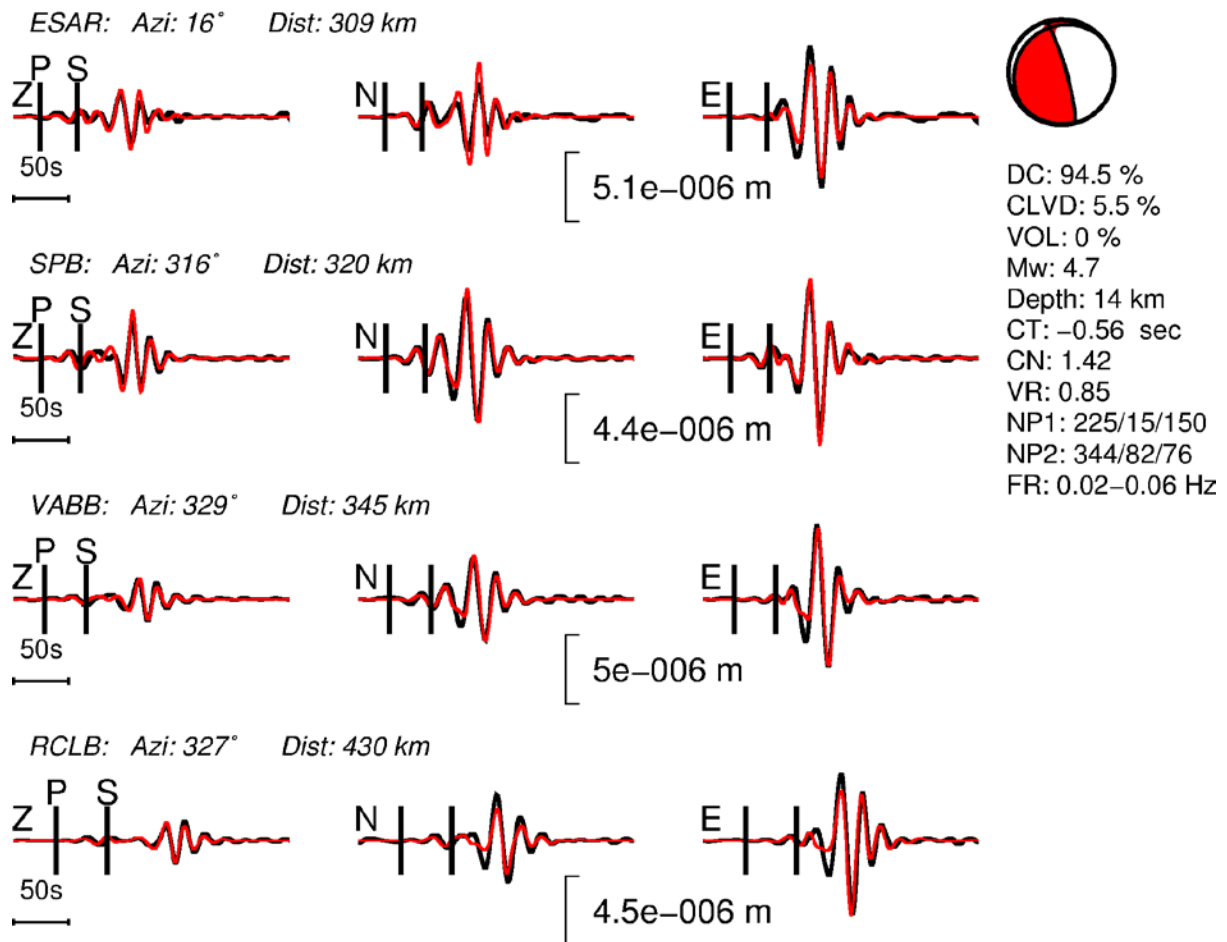


Figure S4: Waveform fit example for the Offshore event using the velocity models derived from the dispersion analysis for four stations (ESAR, SPB, VABB, RCLB). The black traces are the observed displacement waveforms (Z-vertical, N-North, E-East), and the red traces are the synthetics. The P- and S-wave arrival times, station azimuth and distance, as well as the amplitude scale are indicated. Legend gives the information about focal mechanism: Decomposition into the DC, CLVD and VOL components, moment magnitude Mw, centroid depth, centroid time shift with respect to origin time (CT), nodal planes (NP1 and NP2), condition number (CN), variance reduction (VR), frequency range of the inversion (FR).

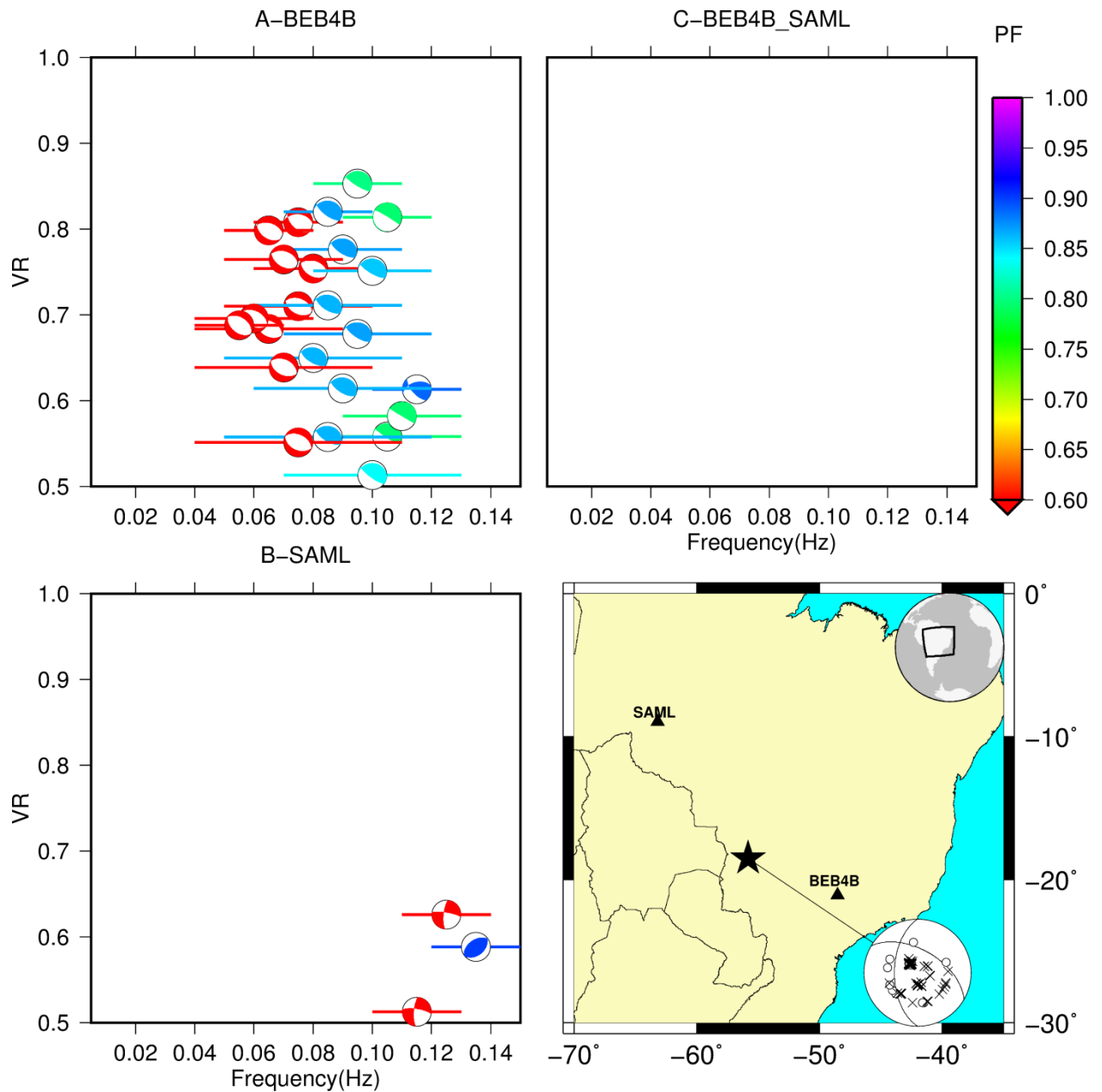


Figure S5: Waveform inversion of focal-mechanism for the Pantanal Basin event, using the NewBr velocity model. **Panel C** is empty because there are no solutions within the considered range of frequencies and VR values. The rest of the caption is the same as in Figure S3. The focal mechanism from Dias et al. (2015) is plotted with the polarities.

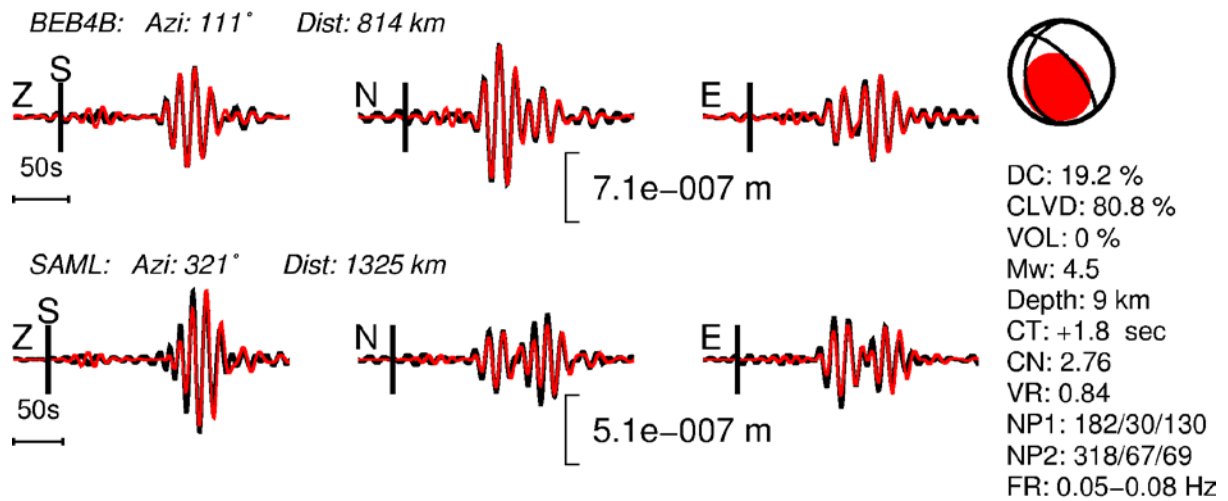


Figure S6: Waveform fit example for the Pantanal Basin event using the velocity models derived from the dispersion analysis (stations BEB4B and SAML). The rest of caption is the same as in Figure S4.

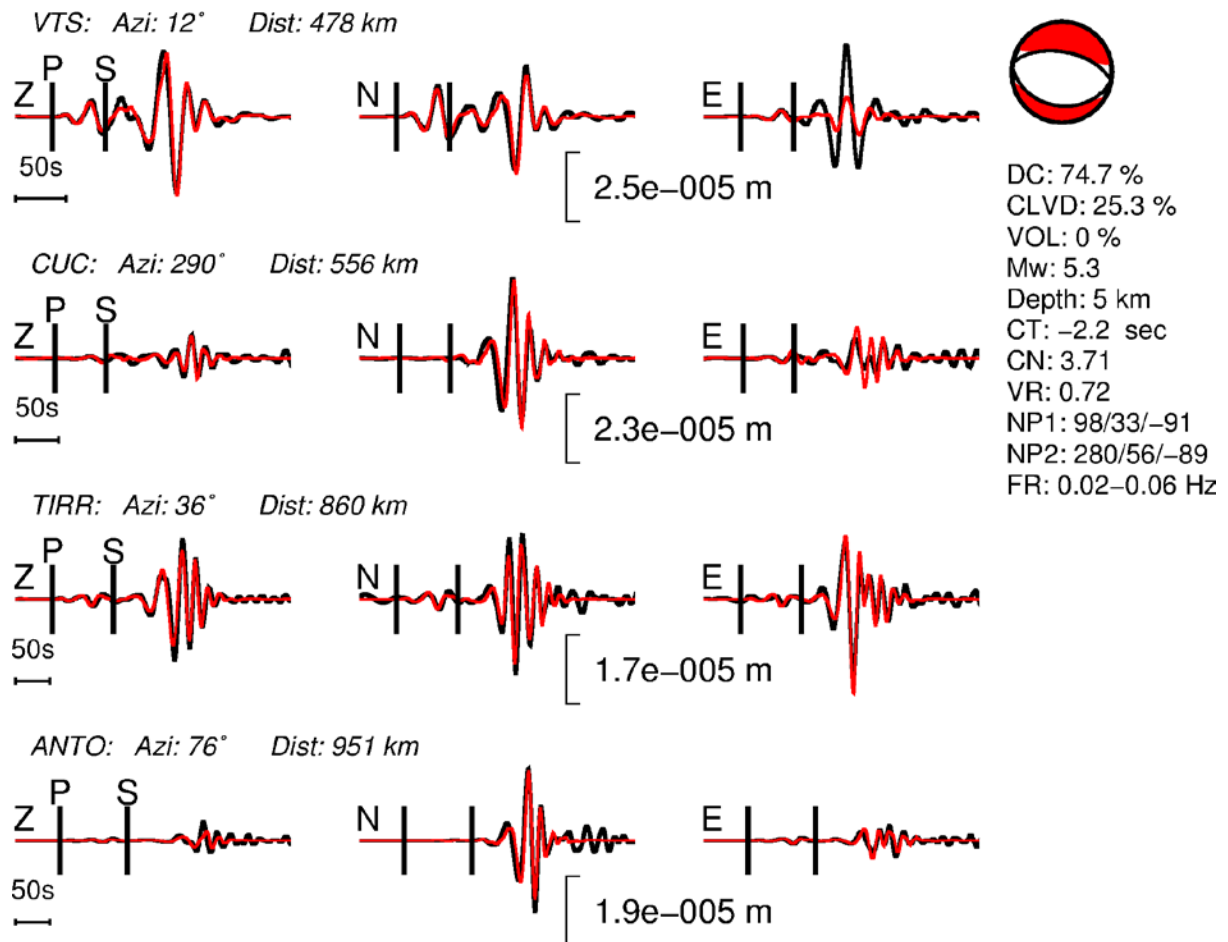


Figure S7: Waveform fit example for the Greek event using the velocity models derived from the dispersion analysis (stations VTS, CUC, TIRR and ANTO). The rest of caption is the same as in Figure S4.