Supplement of

Marine forearc structure of eastern Java and its role in the 1994 Java tsunami earthquake

Yueyang Xia et al.

Correspondence to: Yueyang Xia (yxia@geomar.de)

Table S 1. Seismic processing sequences.

Sequence Step Names
Normal and Nominal Geometry Establishment with Common Midpoint (CMP) spacing of 6.25 m
Anomalous and Random Noise Attenuation
Offset regularization and Interpolation to Zero Offset
Interactive Velocity Analysis in Time Domain
Initial Time-domain Velocity building
Shot Interpolation for Aliasing Elimination (from 50 m to 12.5 m shot distance)
Free Surface-Related Multiple Prediction
Multiple Attenuation 1: Frequency-Split 2D Cascaded Adaptive Filter
2: Radon Dip Filter
3: Inside Mute and Amplitude Clipping
Kirchhoff Pre-stack Time Migration
Initial Depth Domain Velocity Building (Merge with Wide-angle model)
Kirchhoff Pre-stack Depth Migration with Common Image Point (CIP) gather output (Initial)
Iteration Loop:
CIP Gather Pre-filtering for Non-Rigid-Matching (NRM) Calculation
NRM Displacement Field Calculation
CIP Gather Residual Move-Out (RMO) Calculation from NRM Field
Dip and Coherency Field Estimation from Depth Migrated Stack
Ray-based RMO Depth-Tomography with preconditioning of Dip and Coherency Field
Update the Tomography Model Properties to Reduce the CIP-gather RMO
Kirchhoff Pre-stack Depth Migration with CIP-gather Output
Iteration Stopped if RMO is Minimized
Stacking of the Pre-stack Depth Migrated Gathers

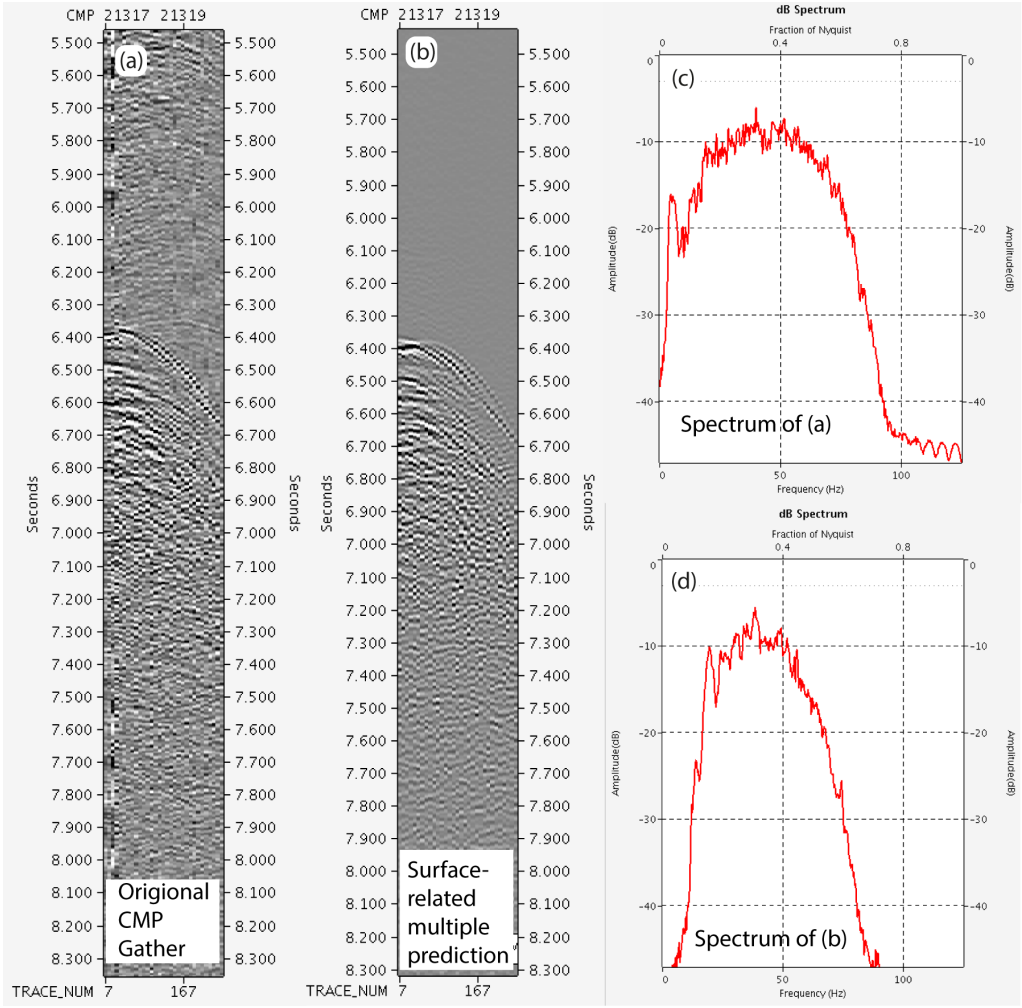

Figure S1. (a) Original CMP gather with multiple contamination. (b) Free Surface-related predicted multiple model. (c) The frequency spectrum of the original data. (d) The frequency spectrum of the modelled multiple.

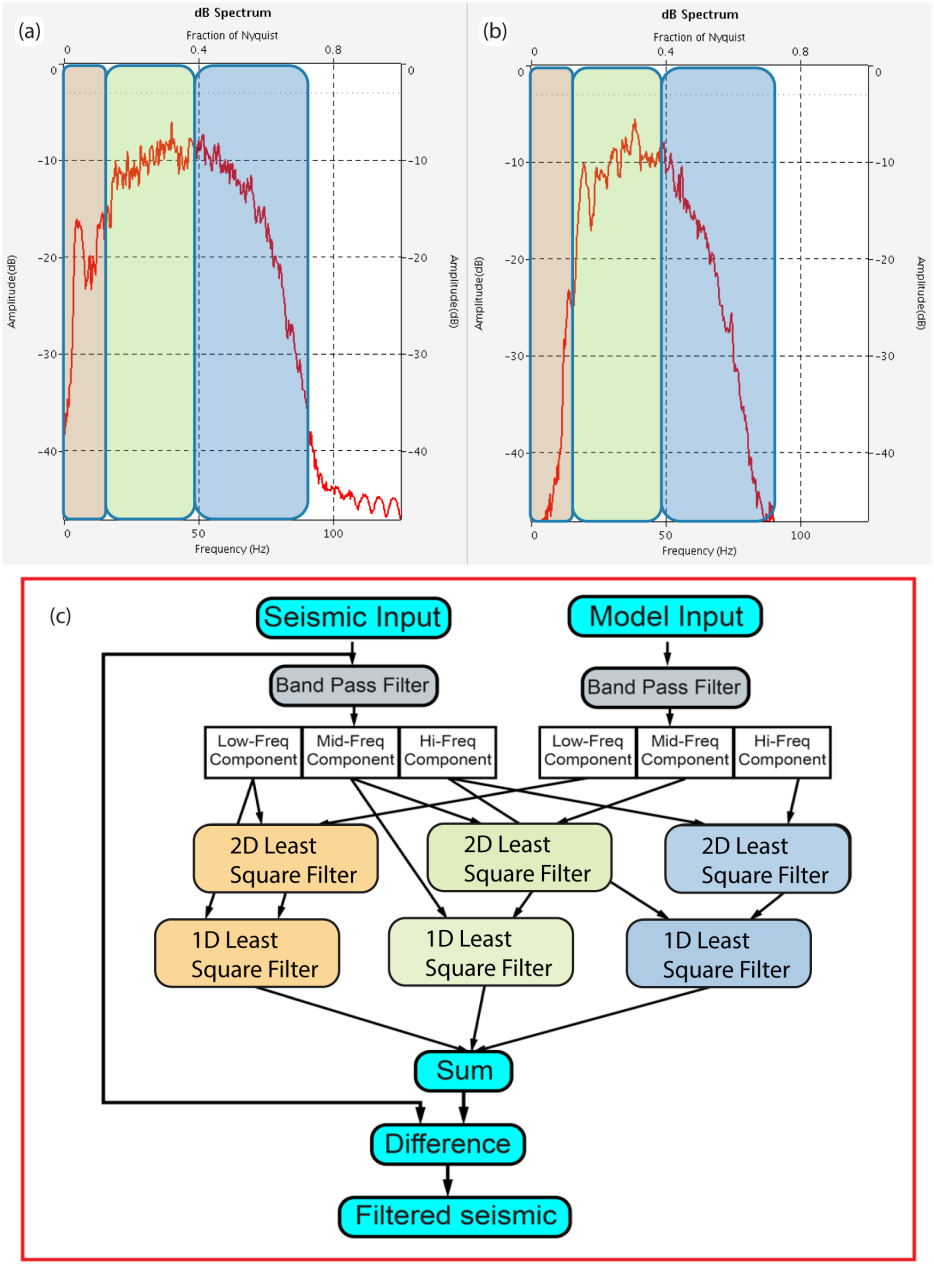

Figure S2. (a) Frequency bands segmentation of the original data used in the adaptive subtraction. (b) Frequency bands segmentation of the modelled multiple used in the adaptive subtraction. (c) Adaptive subtraction strategy.

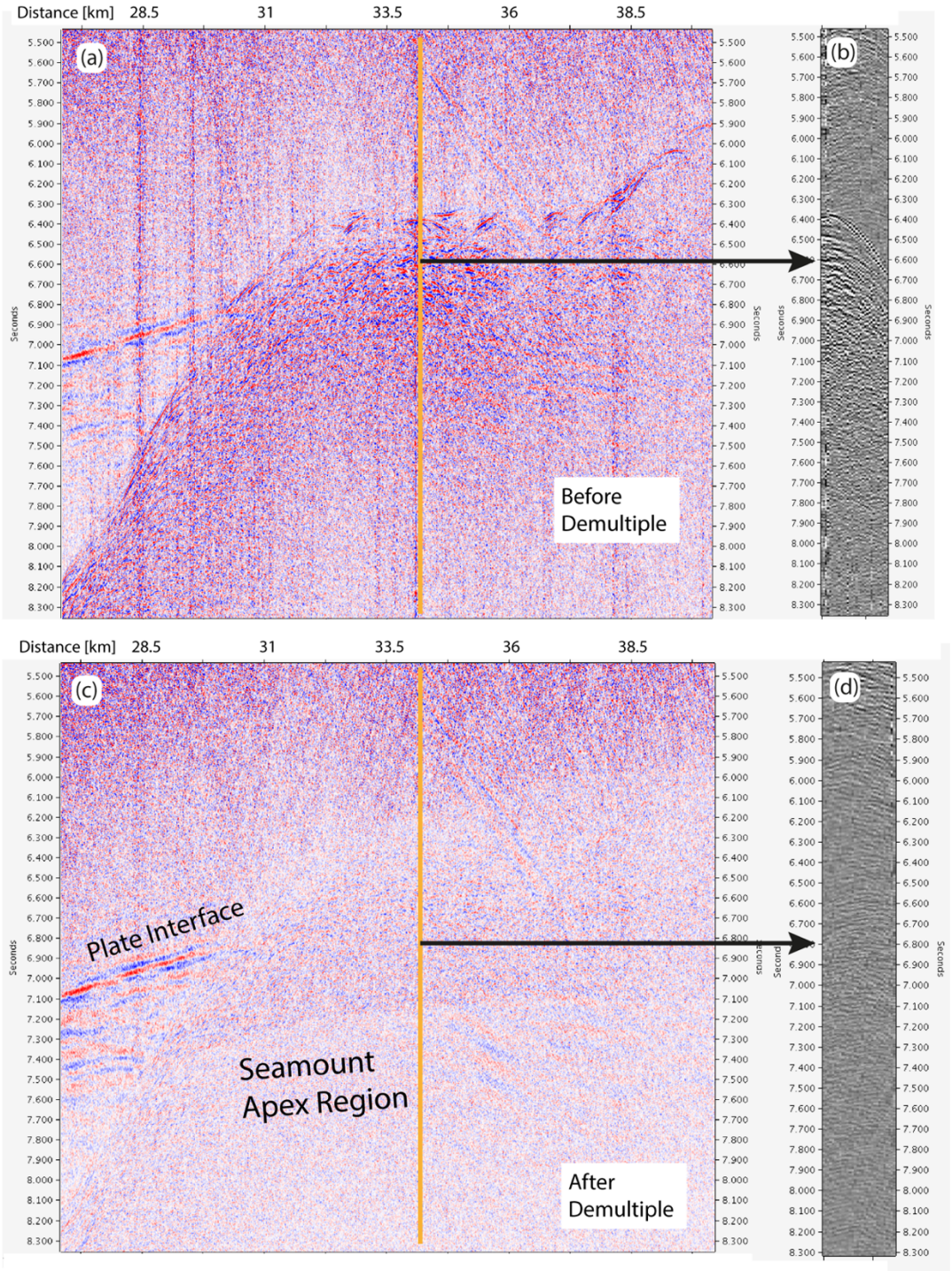

Figure S3. (a) Original MCS stacked image with multiple contamination. (b) Original CMP gather. (c) MCS stacked section after multiple attenuation. (d) CMP gather after multiple attenuation.

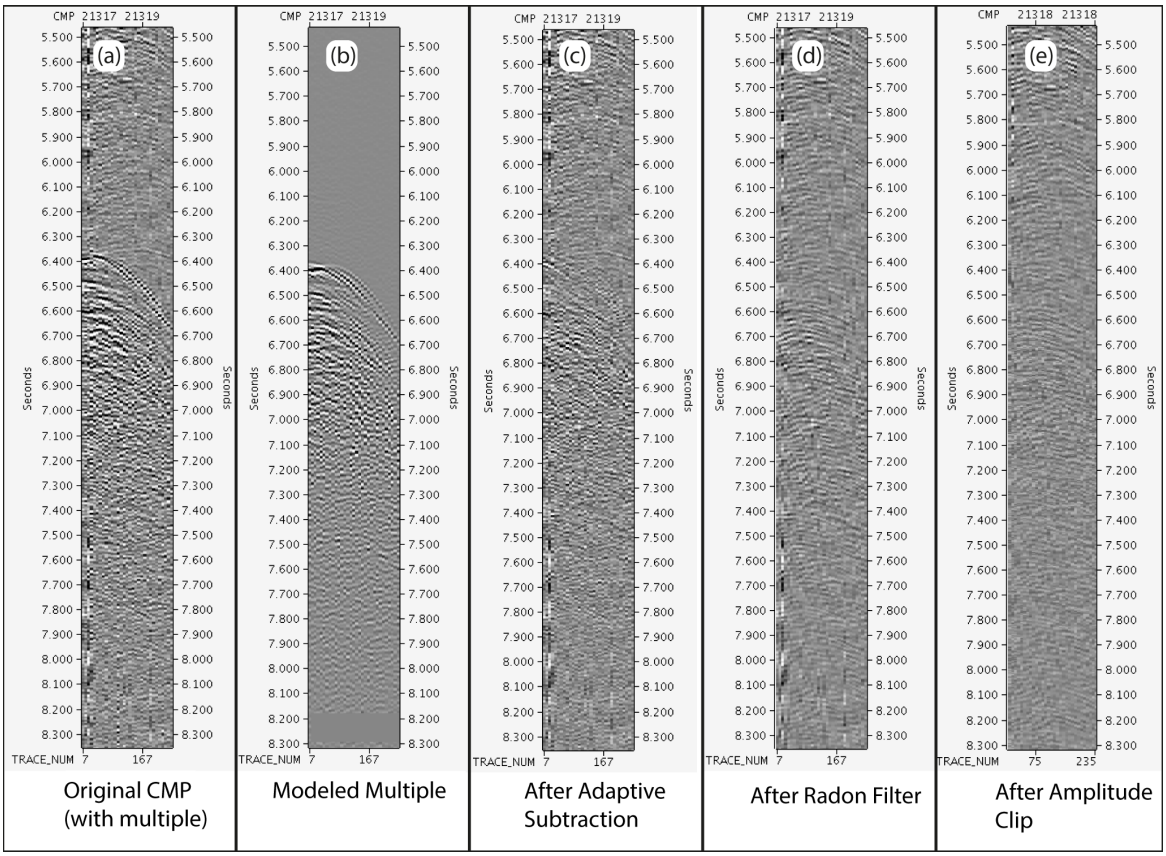

Figure S4. Multiple attenuation working flow in CMP domain (panels a to e). (a) Original CMP gather with multiple contamination. (b) Surface related modelled multiple. (c) CMP gather after frequency split adaptive subtraction. (d) CMP gather after additional Radon filter. (e) CMP gather after additional amplitude clip.

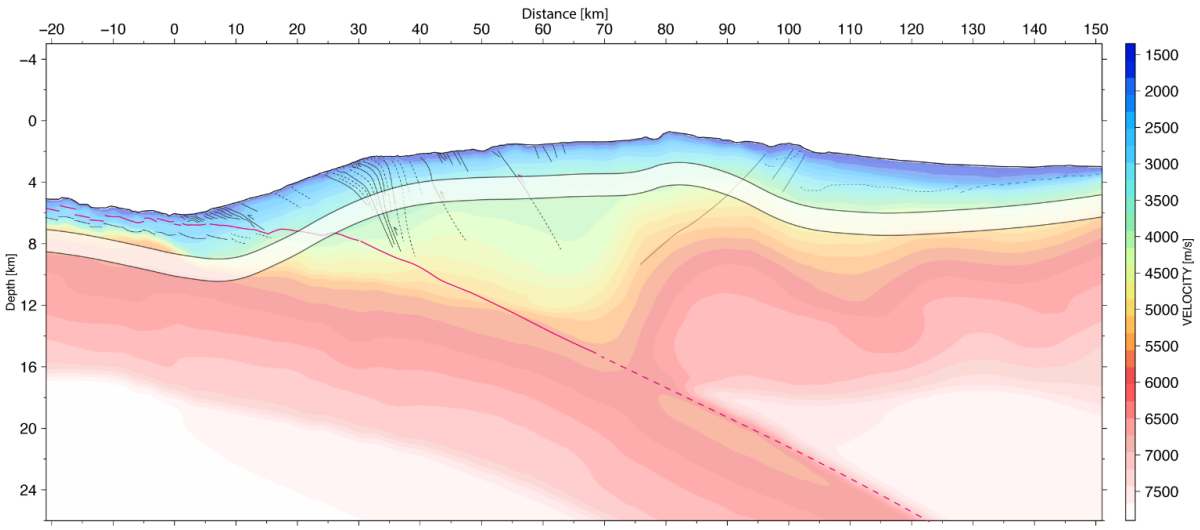

Figure S5. The final velocity model merged from the multi-channel seismic velocity analysis (above the white transparent band) and the wide-angle velocity model (Shulgin et al., 2011) (below the white transparent band). The line drawing is based on the final pre-stack depth migrated image.