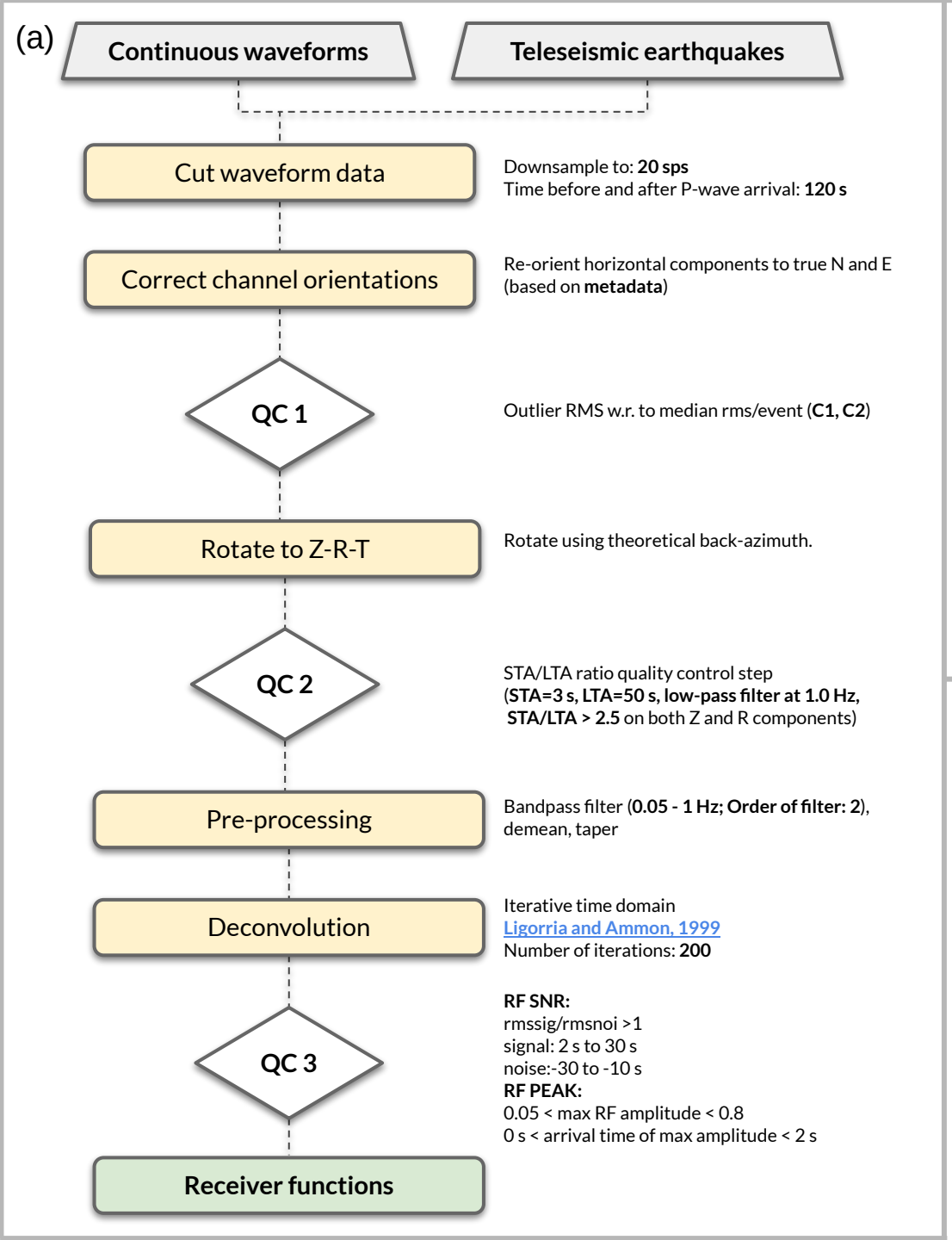
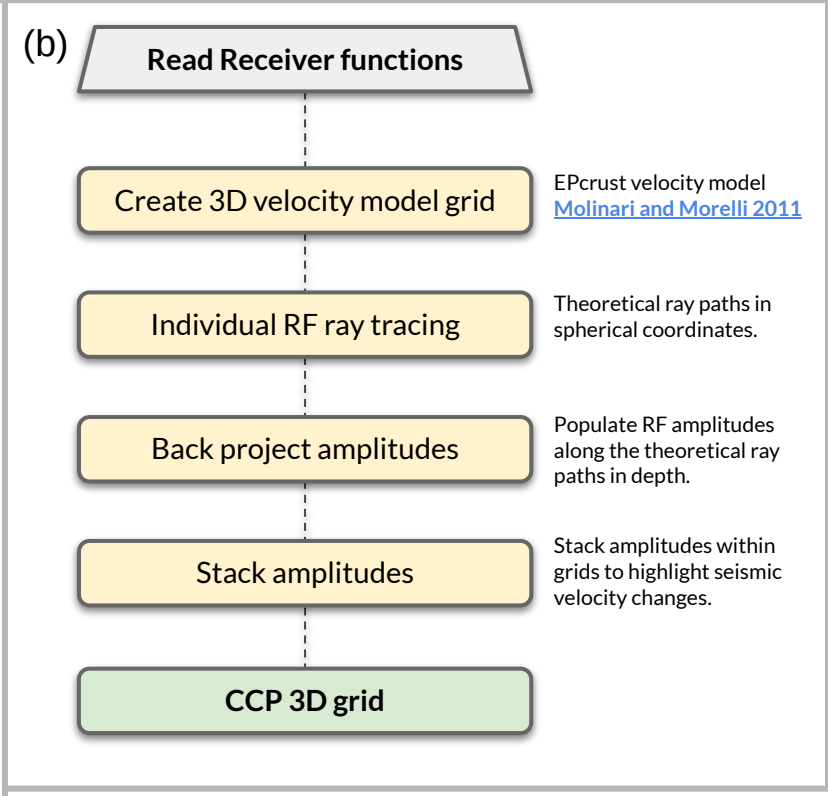

(a)
Continuous waveforms
Teleseismic earthquakes
Cut waveform data
Downsample to: 20 sps
Time before and after P-wave arrival: 120 s
Correct channel orientations
Re-orient horizontal components to true N and E (based on metadata)
QC 1
Outlier RMS w.r. to median rms/event (C1, C2)
Rotate to Z-R-T
Rotate using theoretical back-azimuth.
QC 2
STA/LTA ratio quality control step
(STA=3 s, LTA=50 s, low-pass filter at 1.0 Hz,
STA/LTA > 2.5 on both Z and R components)
Pre-processing
Bandpass filter (0.05 - 1 Hz; Order of filter: 2), demean, taper
Deconvolution
Iterative time domain
Ligorria and Ammon, 1999
Number of iterations: 200
QC 3
RF SNR:
rmssig/rmsnoi >1
signal: 2 s to 30 s
noise:-30 to -10 s
RF PEAK:
0.05 < max RF amplitude < 0.8
0 s < arrival time of max amplitude < 2 s
Receiver functions


(b)
Read Receiver functions
Create 3D velocity model grid
EPcrust velocity model
Molinari and Morelli 2011
Individual RF ray tracing
Theoretical ray paths in spherical coordinates.
Back project amplitudes
Populate RF amplitudes along the theoretical ray paths in depth.
Stack amplitudes
Stack amplitudes within grids to highlight seismic velocity changes.
CCP 3D grid