

# Processing of the multi-channel seismic reflection data for profiles ILAB-SP05 and ILAB-SP08 to image the triplication event

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This document describes the processing steps applied to the multi-channel seismic data collected during the ILAB-SPARC experiment in 2018 aboard R/V Pourquoi Pas? to image the subsurface triplication events at the eastern Chain median ridge in the equatorial Atlantic Ocean. The processed post stack time migration composite sections are published in Rohilla et al. (2025). The processing steps are as follows:

1. Importing raw .segd files and application of a bandpass filter with a frequency range of 3-80 Hz to remove low frequency noise and extract the signal of interest.
2. Suppression of frequencies less than 8Hz to remove the ocean swell noise.
3. Predictive deconvolution to remove the bubble pulse.
4. Application of a mute until 0.1 s above the seabed reflection to remove the direct wave.
5. Reducing the total record length to 11 s and resampling the data with a 4 ms interval.
6. Sorting the data into CDP-offset domain and forming super CDP gathers by combining two adjacent CDPs to get a final CDP spacing of 6.25 m.
7. To stack the seafloor event, the super-CDP gathers were then stacked with an offset range of 0.147 – 1 km, using the 2D tomographic velocities derived from the first arrival tomography of the downward continued seismic profiles. This was followed by a Post stack time migration using a velocity of 1500 m/s.
8. To stack the triplication event, the shot gathers were first interpolated in the common receiver domain to a shot spacing of 12.5 m and then corrected for NMO using a constant velocity of 1750 m/s. This was followed by stacking within an offset range of between 3 to 6 km. and Post stack time migration using a velocity of 1550 m/s.

9. To create a composite image of both the triplication event and the seafloor event, the triplication event was carefully cut from the its respective migrated section followed by application of a 3-fold gain and was finally pasted onto the migrated seafloor stacked section.

10. These composite sections were then exported as separate .segy files for each profile.