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# Ambient noise surface wave inversion using OBS data from the north Atlantic, north of the Gloria fault.

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The Gloria fault is a strike-slip oceanic plate boundary fault, which has remained poorly studied due mostly to its remote location in the north Atlantic Ocean. The fault has hosted some of the largest strike-slip earthquakes in the oceanic domain, notably the 1941 M8.3 and the 1975 M8.1 earthquakes, and generating tsunamis is the surrounding areas.

The seismic data used for this study was recorded by 12 broadband ocean bottom seismometers (OBSs) located about 100 km north of the Gloria fault during a 10-month experiment. The dataset has been used before to image crustal and mantle discontinuities using receiver function analysis and to infer the S-wave velocity structure of the oceanic lithosphere north of the Gloria fault from P-wave polarization. These studies indicate a slight crustal thickening towards the Gloria fault, as well as an increase in uppermost mantle S-wave velocities towards the fault.

In this study, we use ambient noise surface wave tomography to find the velocity structure beneath the OBS deployment. First, we present a 1D shear-velocity model obtained from inversion of the average fundamental mode Rayleigh and Love wave group and phase velocities. In addition, the hydrophone is also used to better constrain the inversion at shallow depths, because the hydrophone shows a clear fundamental mode without interference of the first higher mode. Because of the short interstation distances of the array, it is not possible to extract the dispersion curves at periods longer than ~16 s. To compute the Vs inversions, we used the code SURF96 (Herrmann and Ammon, 2004) and consider a water layer in the initial model for Rayleigh waves, because these waves are affected by the water layer. Our results show an upper mantle low-velocity zone, which may be related to serpentinization due to the proximity of the Gloria Fault. Finally, we present the lateral variations of group and phase velocities, as a function of period obtained using FMST (Rawlinson and Sambridge, 2005), which show strong contrast velocity anomalies at the center of the array at short periods (shallow depths).

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