



A preliminary seismic velocity model of Ireland's crust from controlled source body wave tomography

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Due to Ireland's low seismicity rate, standard local earthquake tomography is virtually impossible. However, there is a significant number (~600 per year) of quarry and mining blasts, homogeneously distributed over the island. We can use the information contained in the seismic waves produced by these man-made sources to reconstruct an all-Ireland seismic velocity model. We used 1100 detected events recorded at permanent seismic stations (Irish National Seismic Network), and temporary deployments for the time period from 2013 and 2014. Each event has been attributed to a known quarry, so the source location uncertainty is minimal. Since both source and receiver locations are fixed, we have repeating events and we can do basic statistical analysis to assess the quality of the picks. We calculate a 1D velocity model, and use it to remove outliers from the dataset, and as a starting model in the tomographic inversion. We present preliminary tomographic results based on the inversion of a selected subset of our dataset using routine tomographic codes. The resulting 3D model will improve our knowledge about the crustal structure of Ireland, and the 1D model could be used to improve earthquake location accuracy in the region.