P Wave Attenuation Structure in Southern Mexico : Studies from VEOX Line

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Introduction

The Veracruz-Oaxaca Seismic Line (VEOX), as a follow of the Meso American Subduction Experiment (MASE), provides us a good opportunity to study the attenuation of southern Mexico carefully.

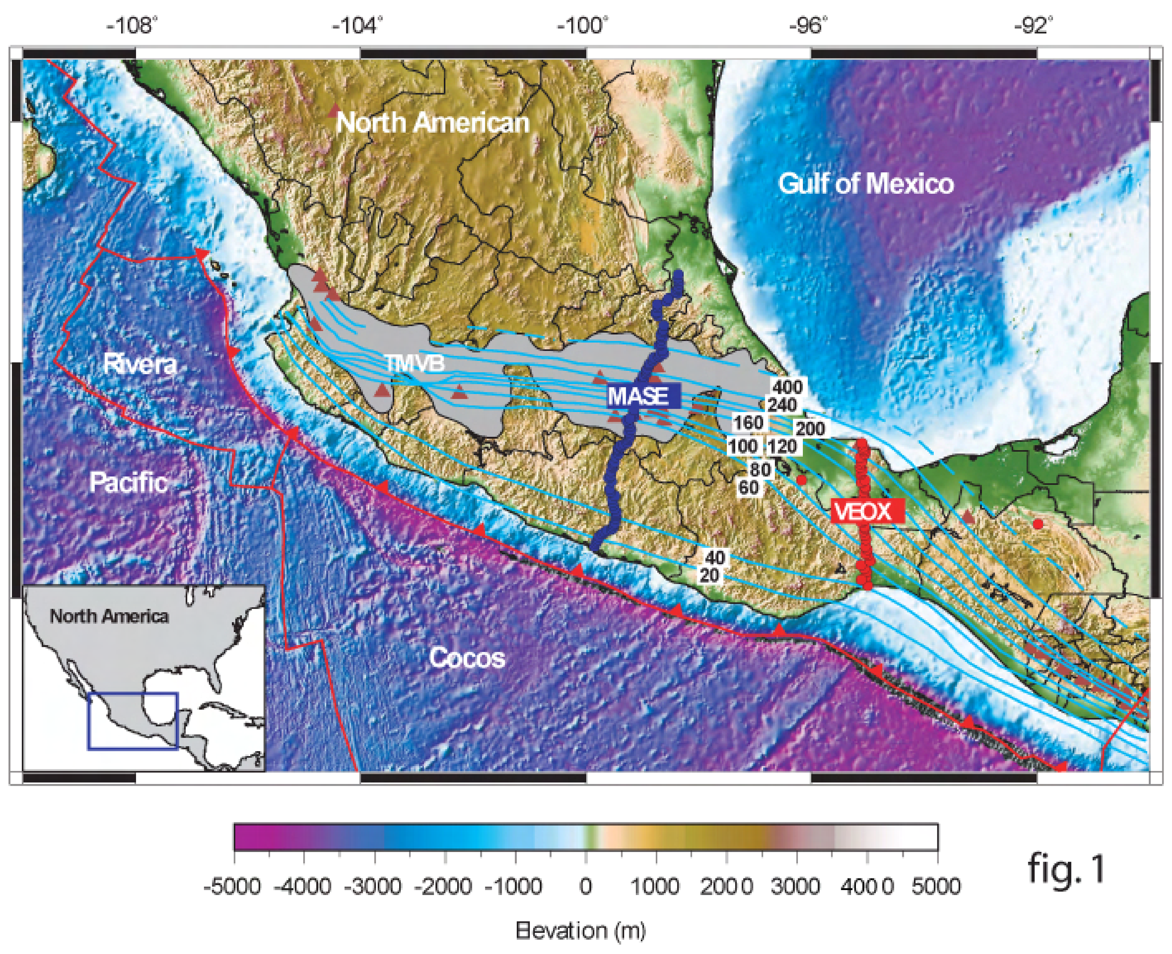


fig. 1

VEOX line consists of 47 broadband sensors.

The slab contours are determined based on the combination of seismicity, velocity tomography and receiver functions.

Volcanos are shown as brown triangles. TMVB stands for Trans-Mexican Volcanic Belt.

Data and Analysis

246 locall events, 3.4 < M < 6.6

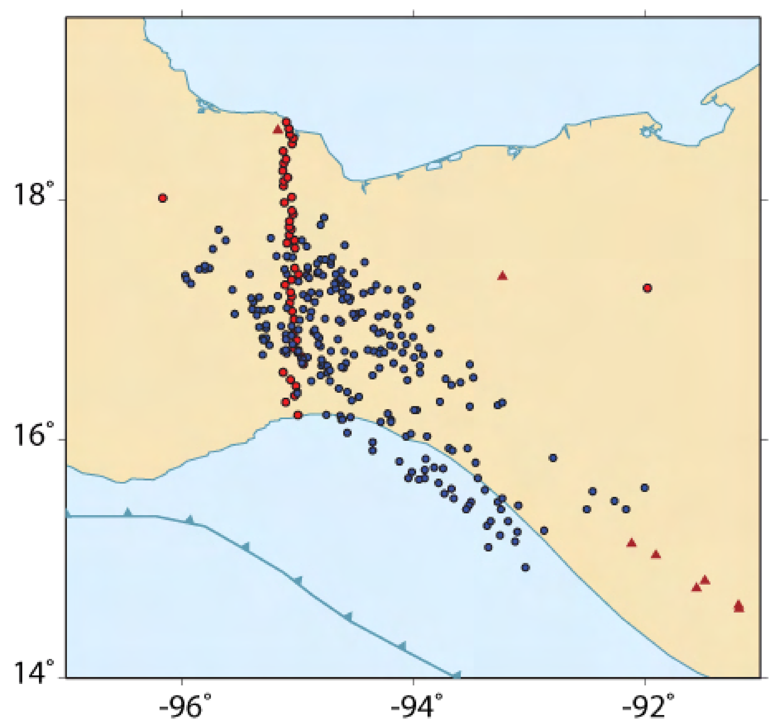


fig. 2

We use spectral decay method to determine the attenuation parameter $t^* = t/Q$, assuming a Brune-type source [Brune, 1970].

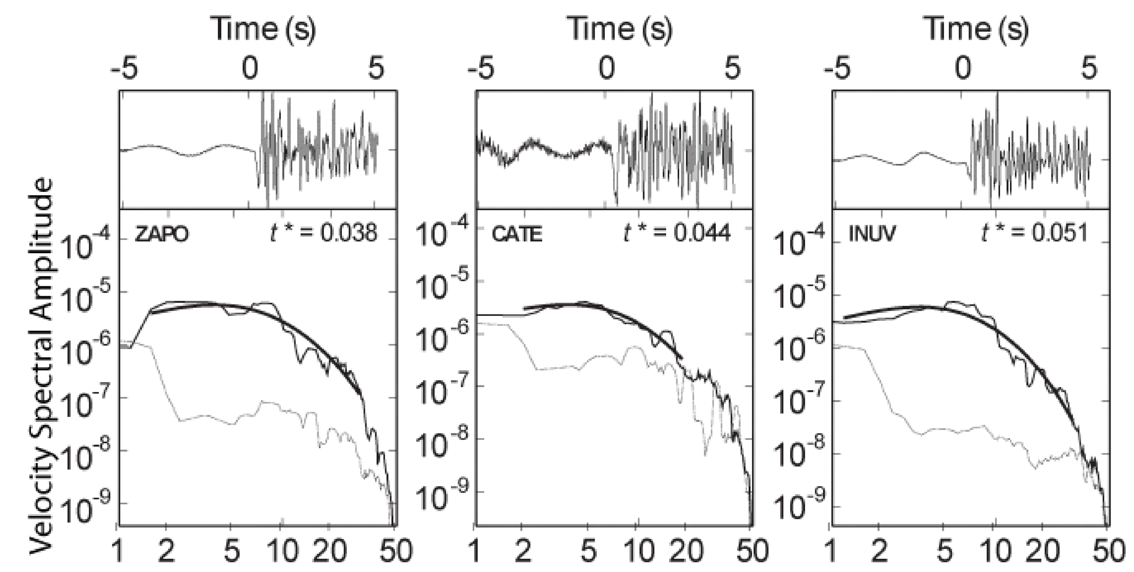
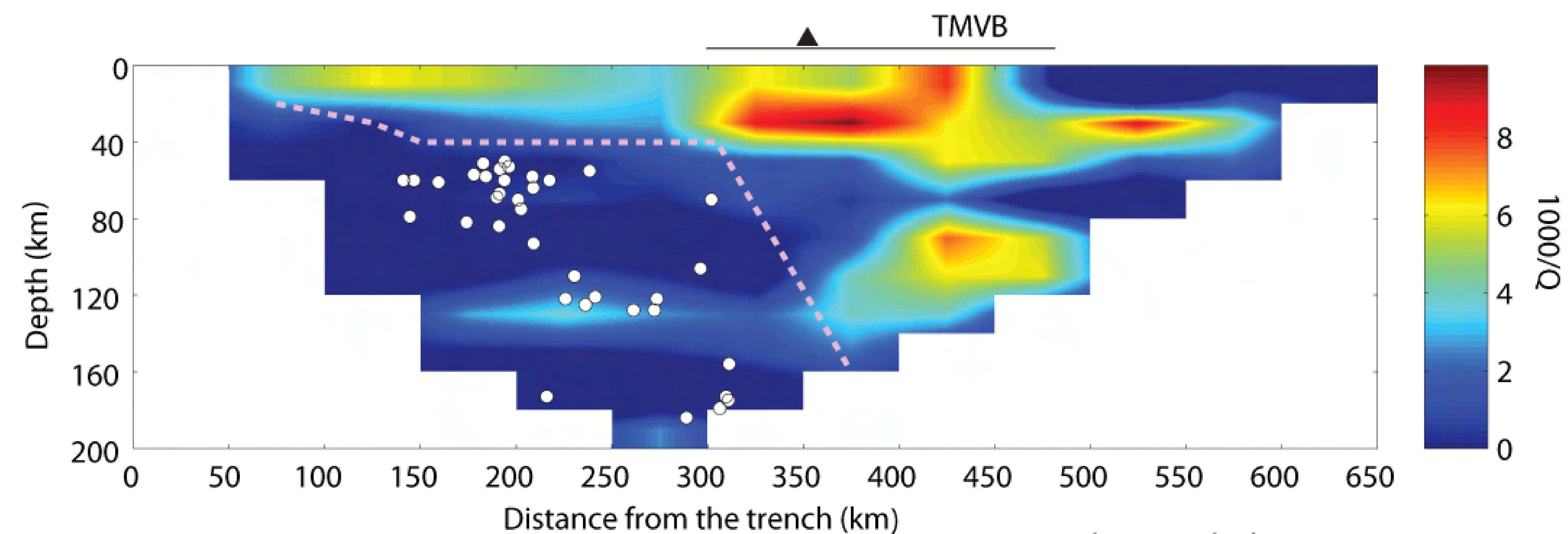


fig. 3 Examples of signals, noises, and fittings for some seismograms.

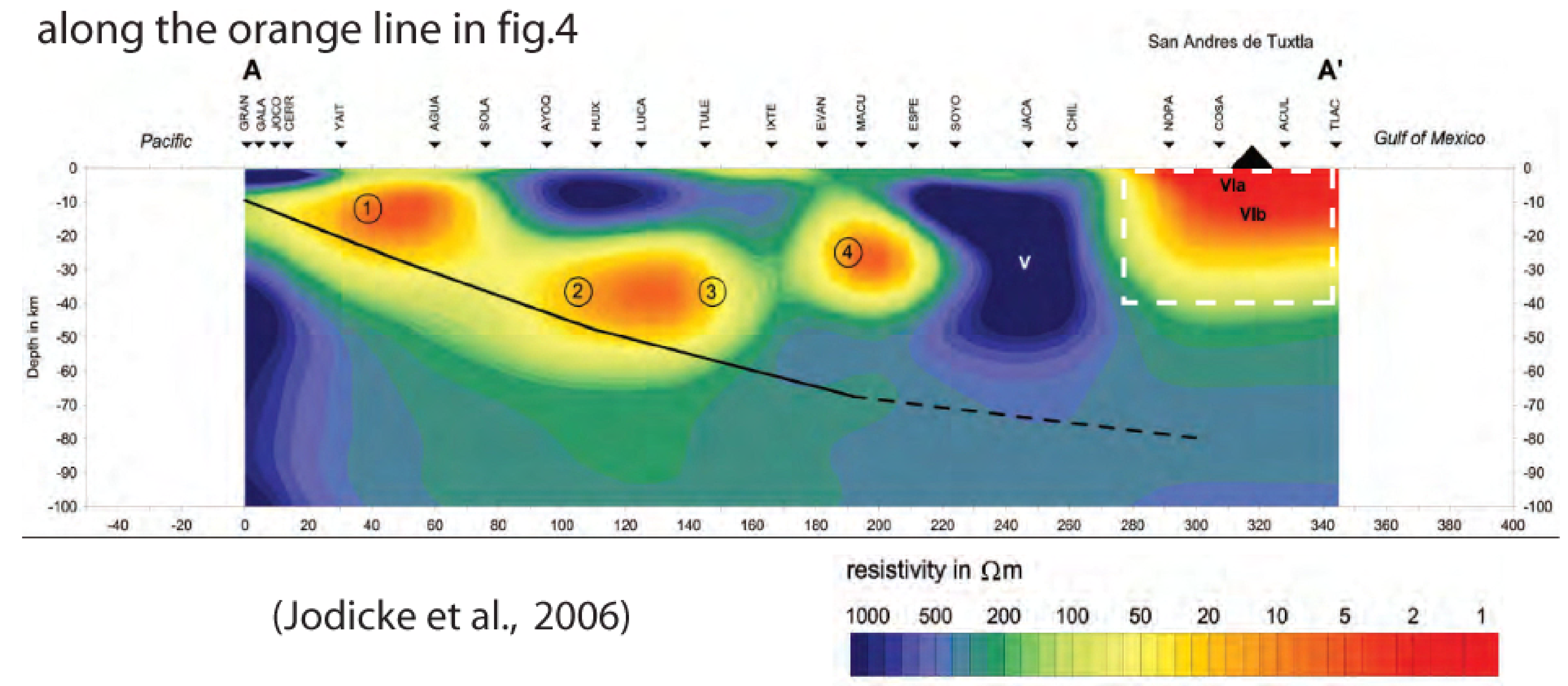
Comparison with Attenuation Structure in Central Mexico (along MASE line)



(Chen and Clayton, 2009) fig.6

Comparison with Resistivity Results in Southern Mexico

along the orange line in fig.4



(Jodicke et al., 2006) fig.7

2D Tomography

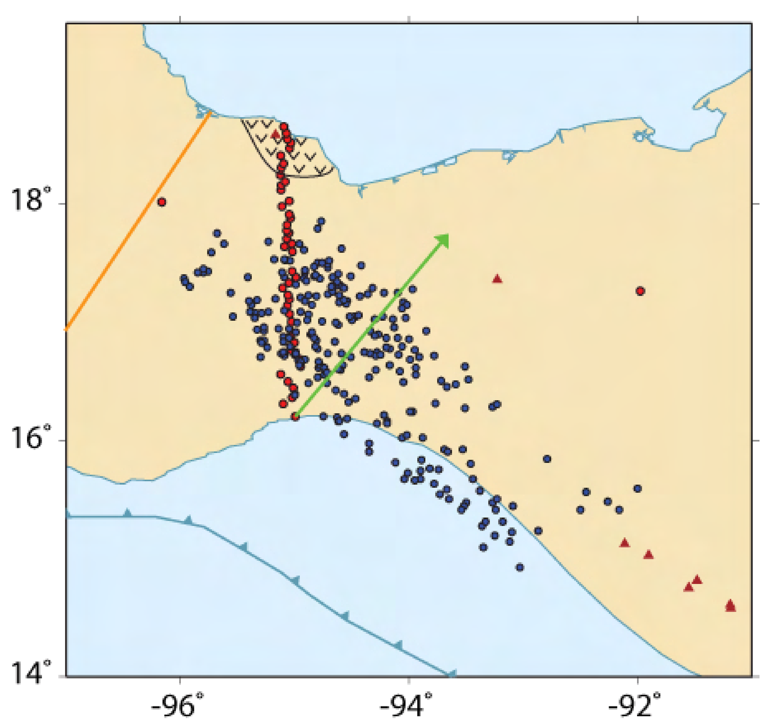


fig. 4

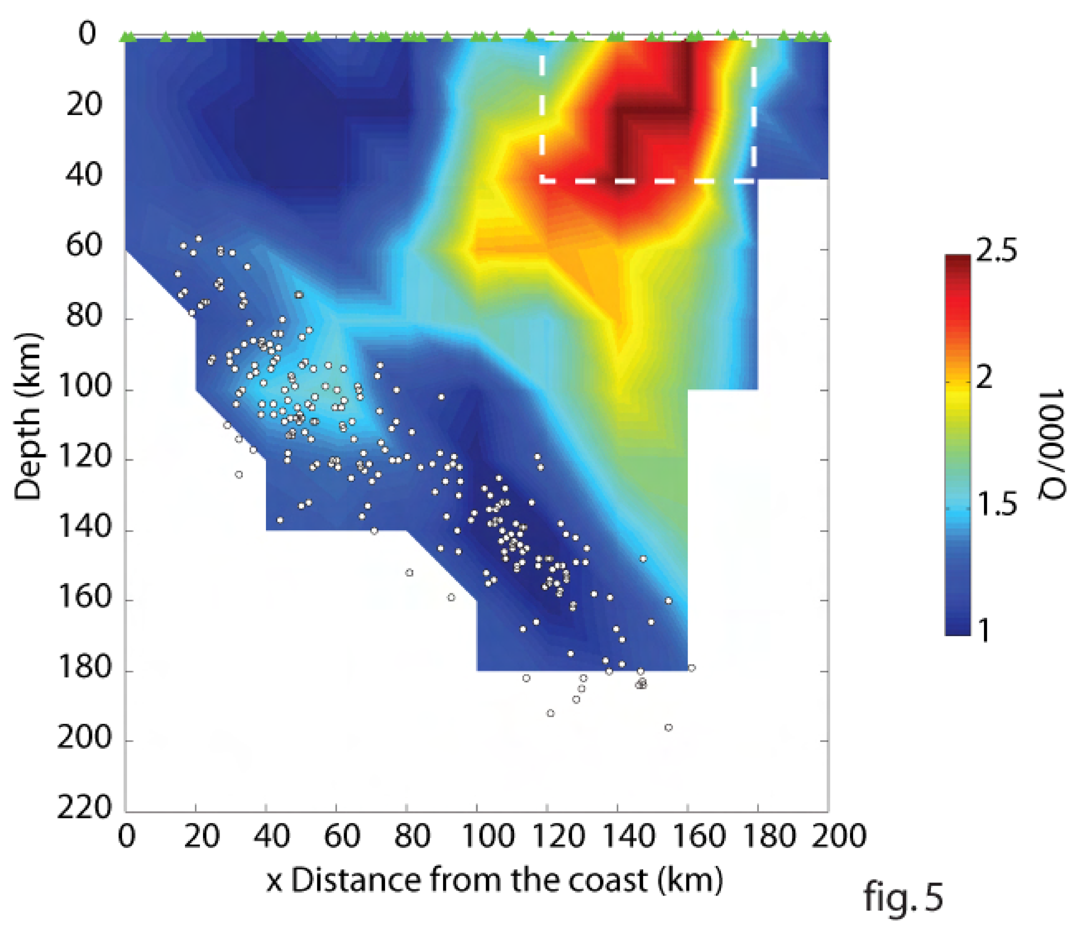


fig. 5

2D tomographic inversion is done on a cross section perpendicular to the trench (green line in fig. 4).

The highest attenuation lies in the crust, similar to the attenuation model in central Mexico along MASE line (fig. 6). The high attenuation in the crust correlates with low resistivity (white dashed box, fig.7) , and is probably related to the active Los Tuxtlas volcanic field (the shaded area in fig. 4).

3D Tomography

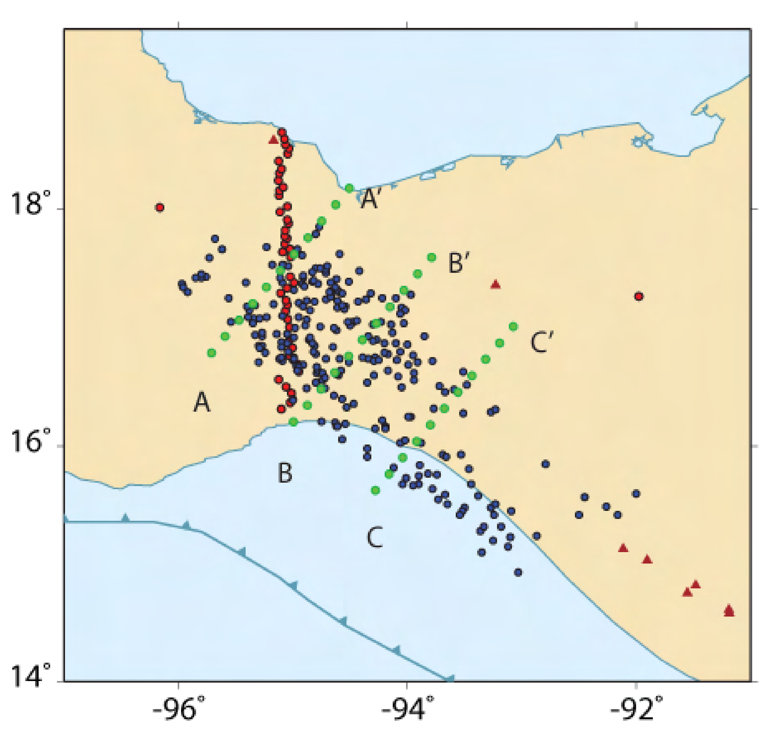
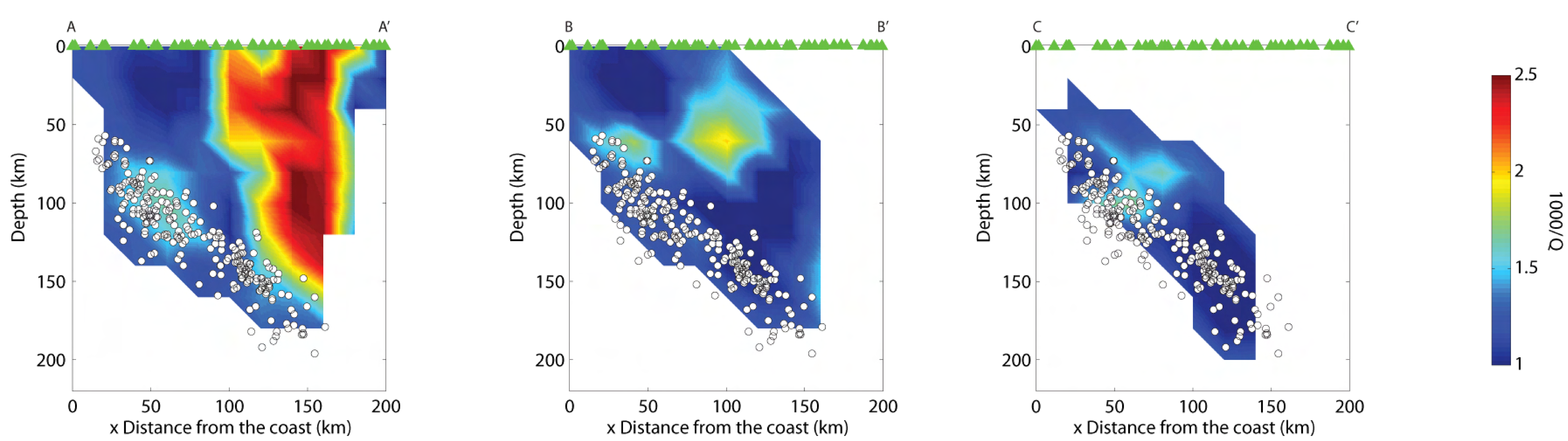


fig. 8



3D inversion grids are shown as green dots in fig. 8.
High-attenuation regions are found in the crust and the mantle wedge. The relatively high attenuation at the shallow slab (50 - 120 km) is probably related to the dehydration process.