Supplementary Material

Upper lithospheric structure of northeastern Venezuela from joint inversion of surface wave dispersion and receiver functions

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1. Histograms for data selection

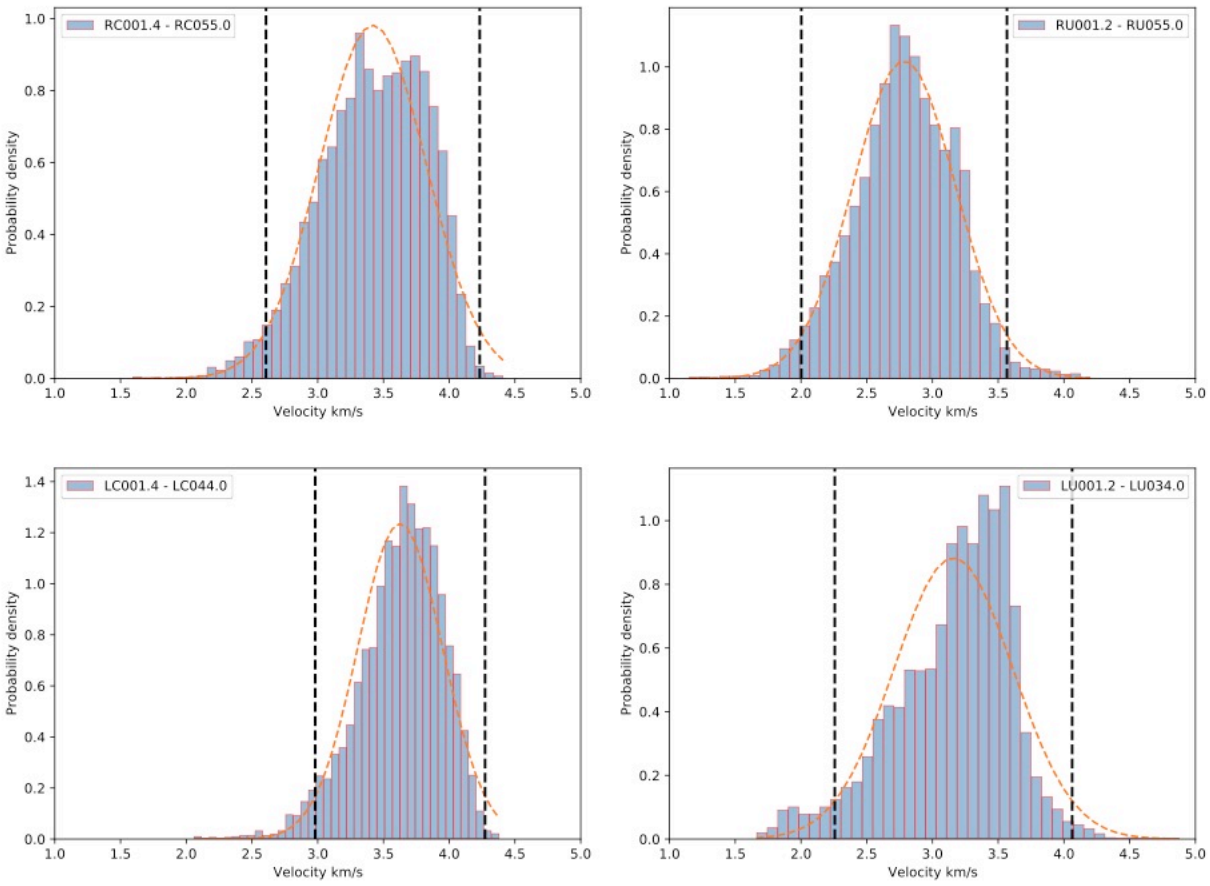

Fig S1. Histograms for data selection of Group and Phase Velocity for the fundamental mode of Rayleigh and Love waves.

2. Ray paths coverage

2.1 Group Velocity (Rayleigh wave)

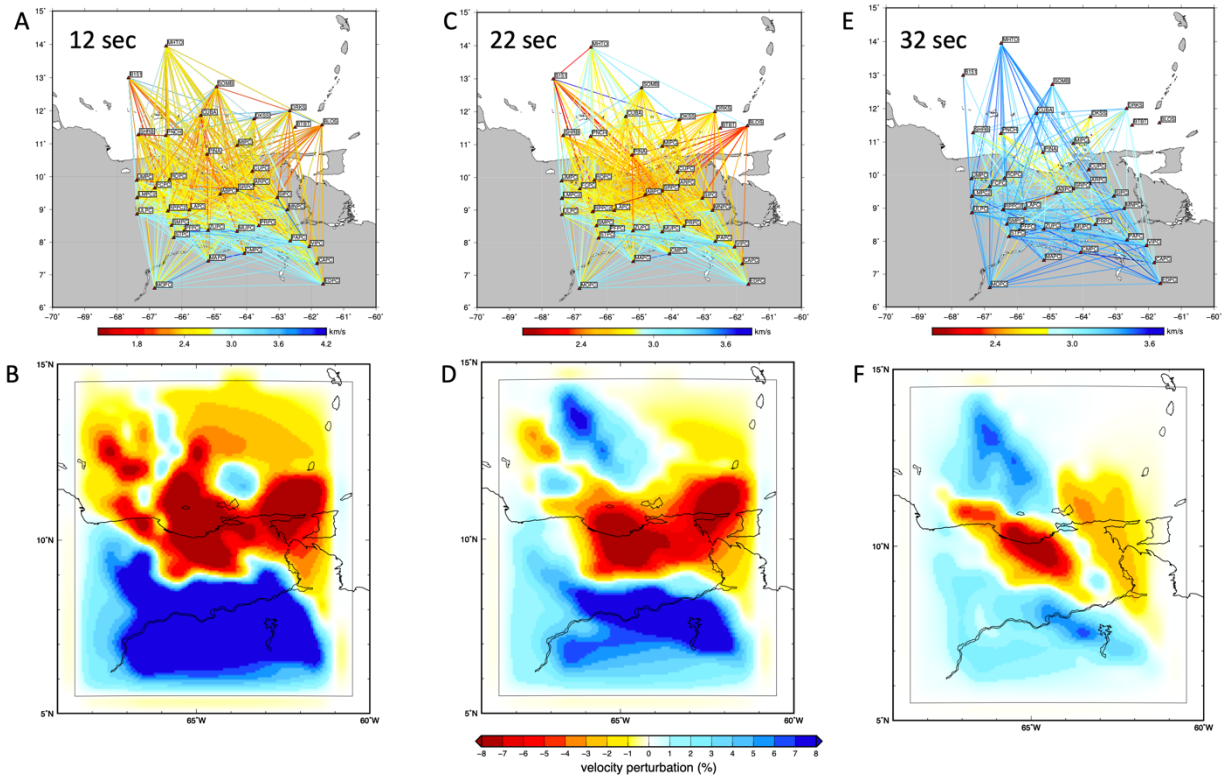

Figure S2. Rayleigh-wave ray-paths and group velocity maps 12, 22 and 32 seconds periods. Upper panels, A, C and E show ray-paths shaded according to the recorded velocities between pairs of stations. Lower panels, B, D and F corresponds to group velocity maps for the period shown in the above panel.

2.2 Phase Velocity (Rayleigh wave)

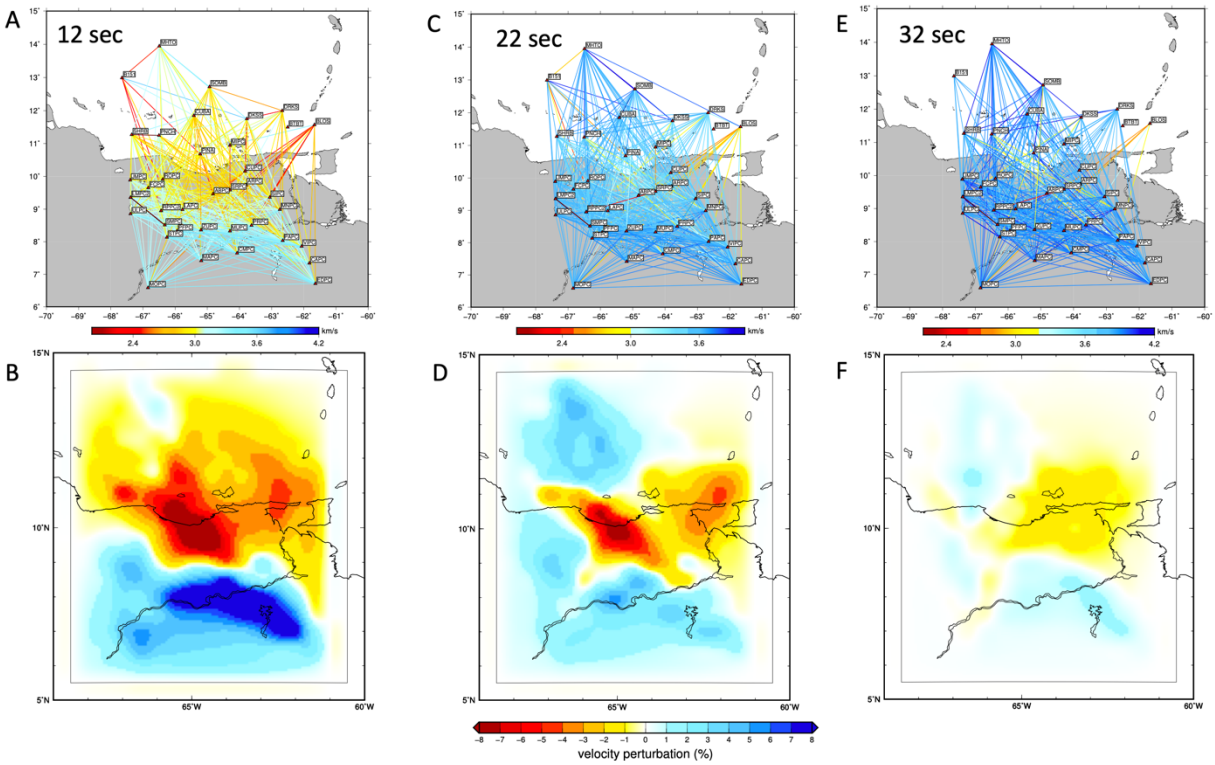

Figure S3. Similar to Figure S2, but for Rayleigh wave phase velocities.

2.3 Group Velocity (Love wave)

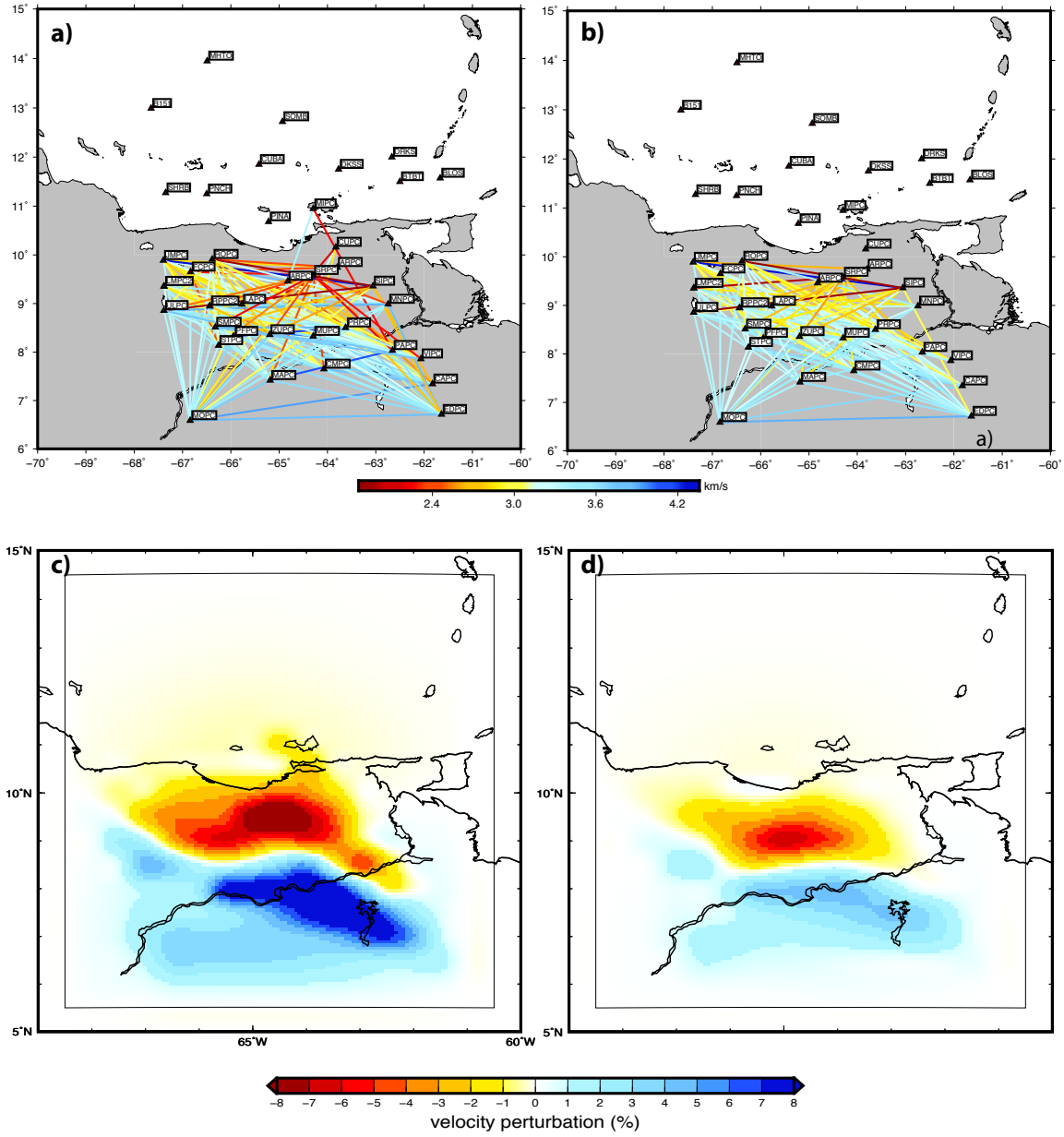

Figure S4. Similar to Figure S2, but for Love wave group velocities for 12s (left) and 20s (right) periods.

2.4 Phase Velocity (Love wave)

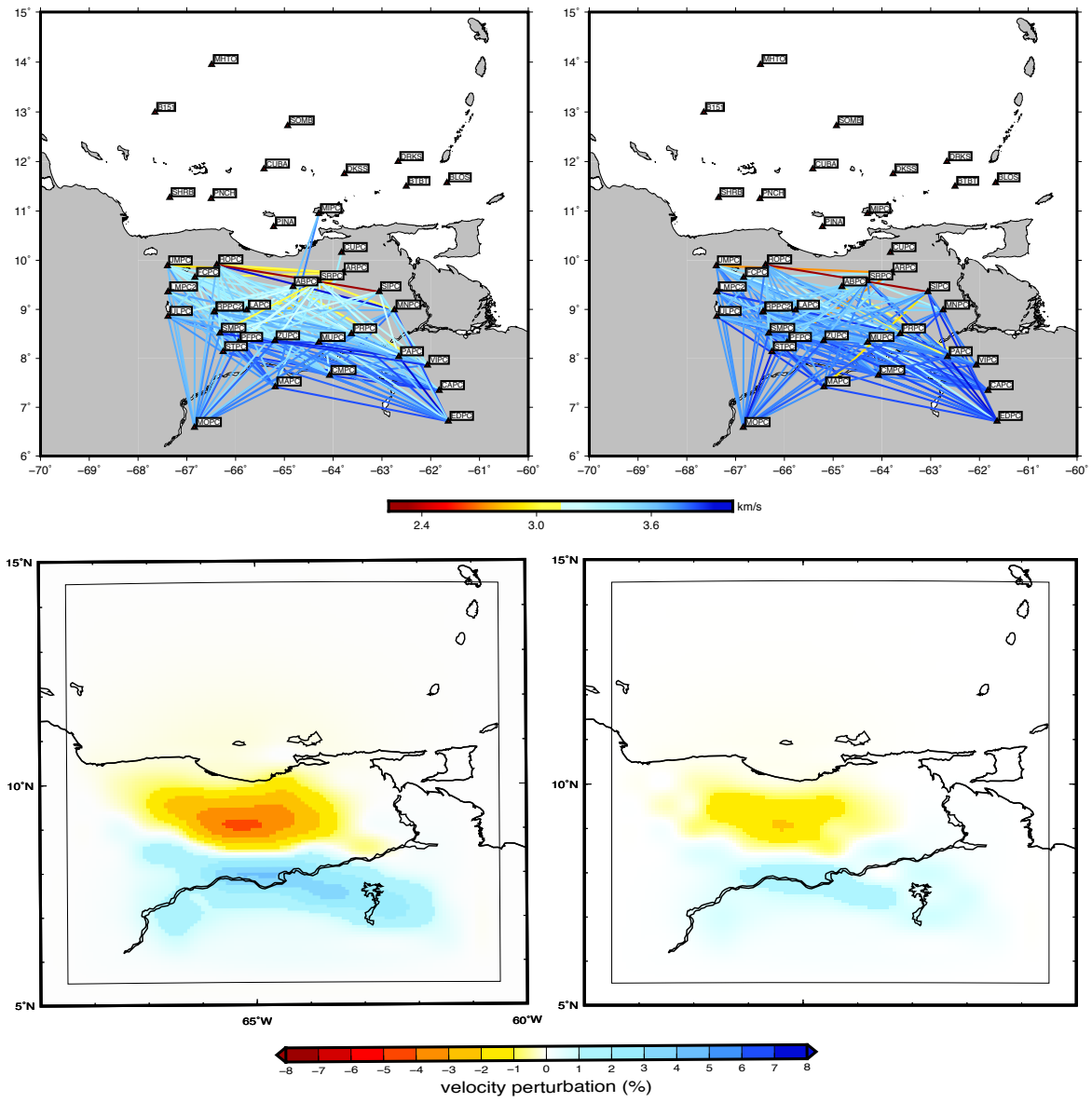

Figure S5. Similar to Figure S4, but for Love phase velocities.

3. Checkboards

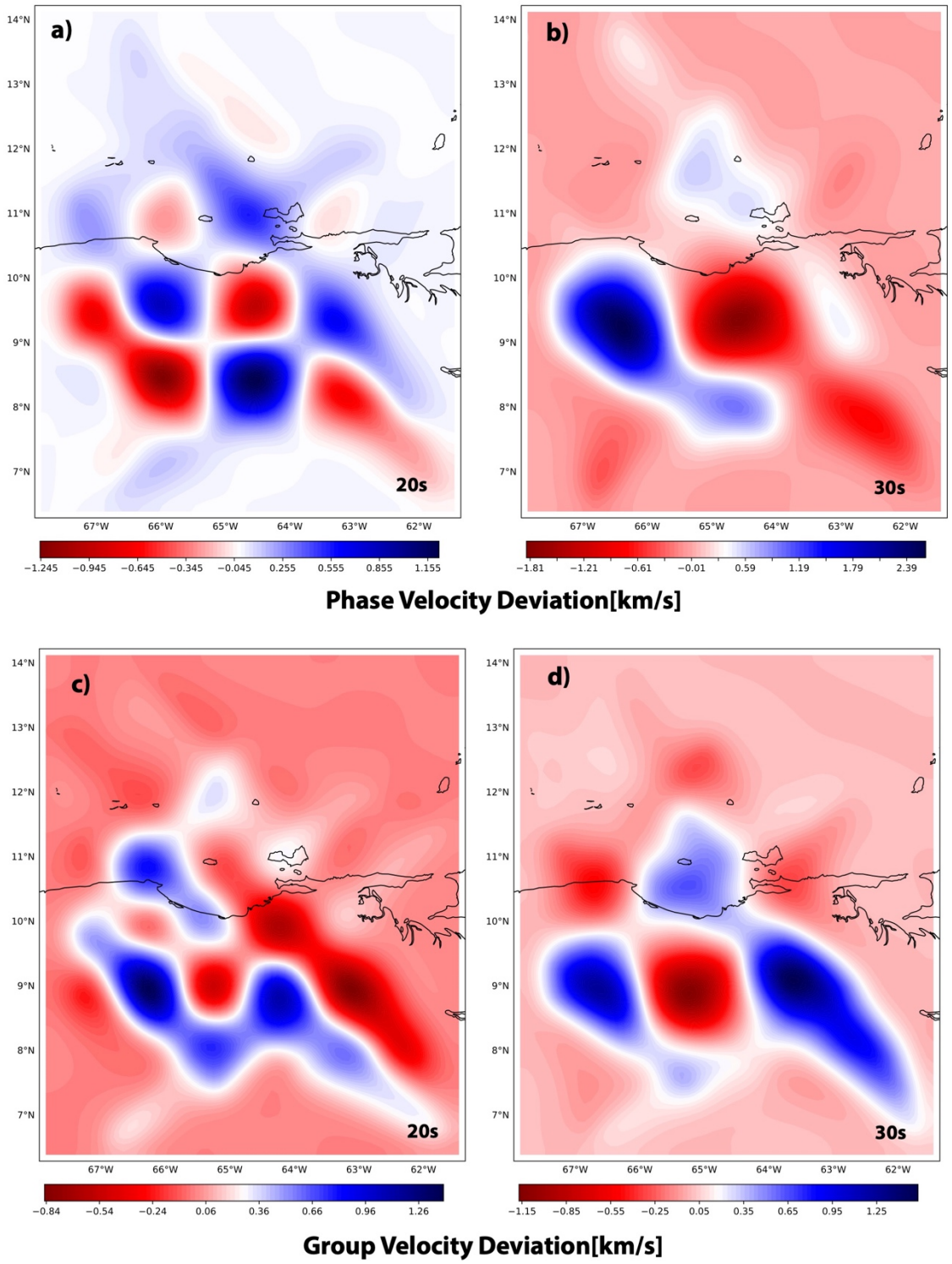

Figure S6. Checkboards corresponding to Rayleigh wave for periods 20s and 30s

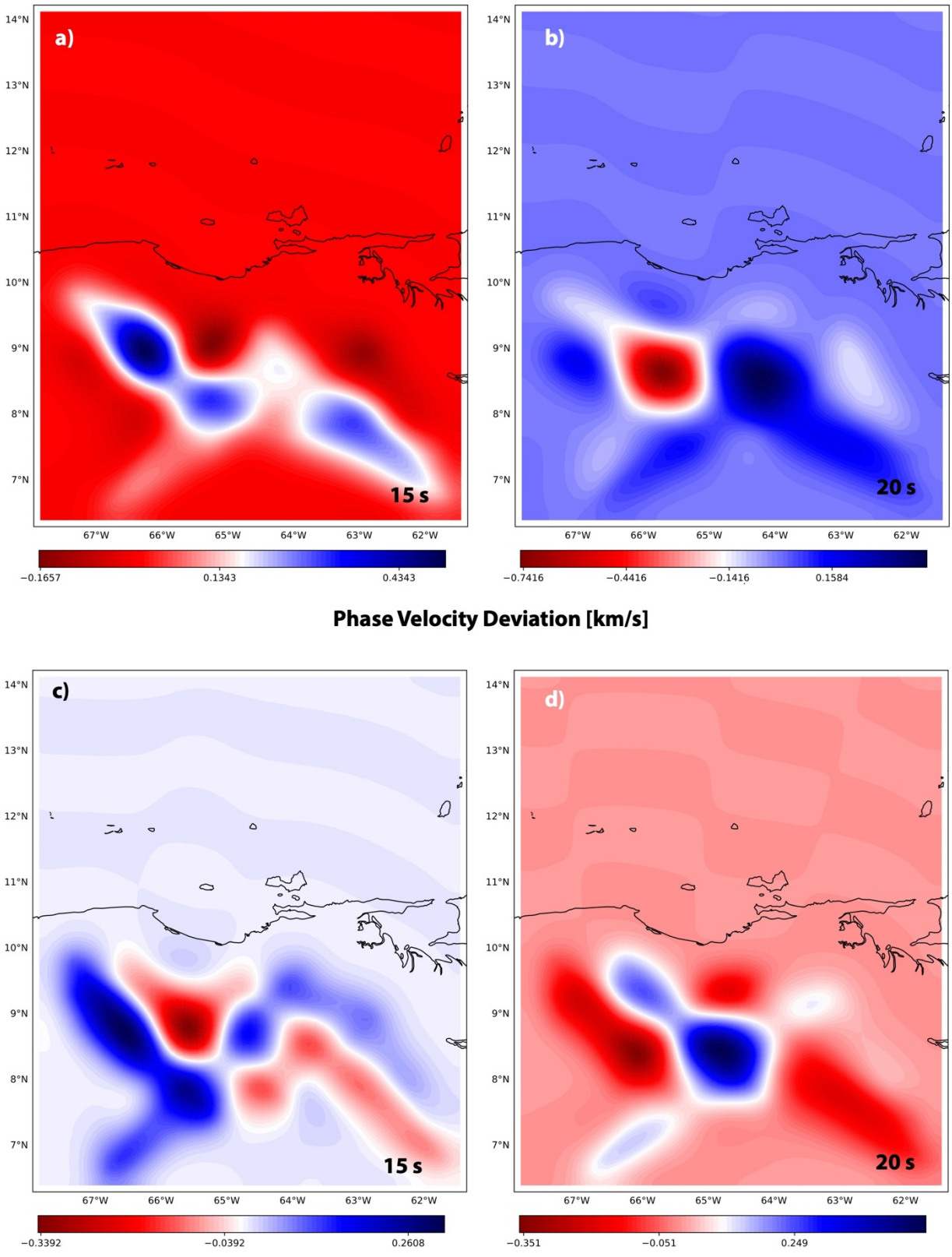

Figure S7. Checkboards corresponding to Love wave for periods 15s and 20s

4. Resolution Maps

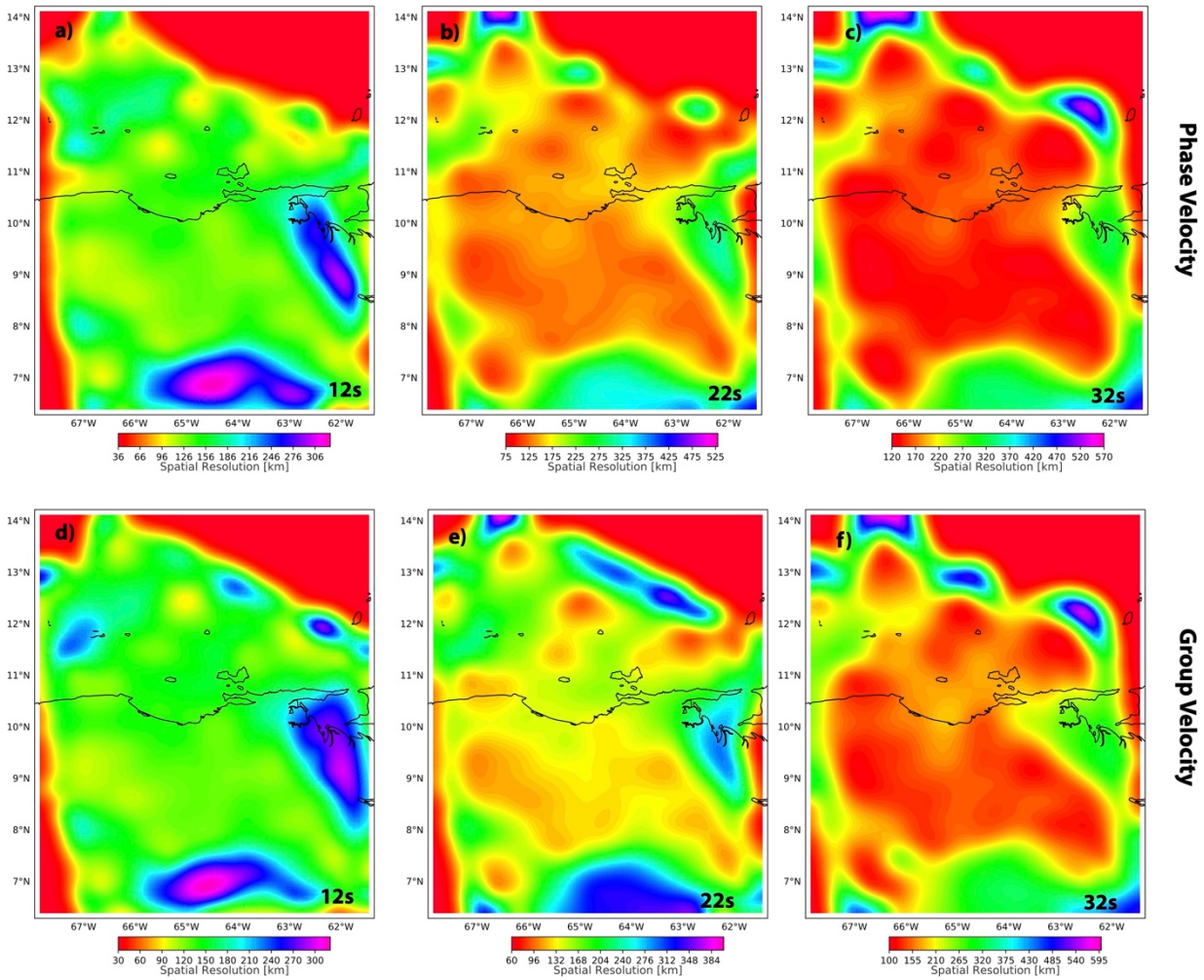

Figure S8. Resolution maps corresponding to Rayleigh wave for periods 12s, 22s and 32s.

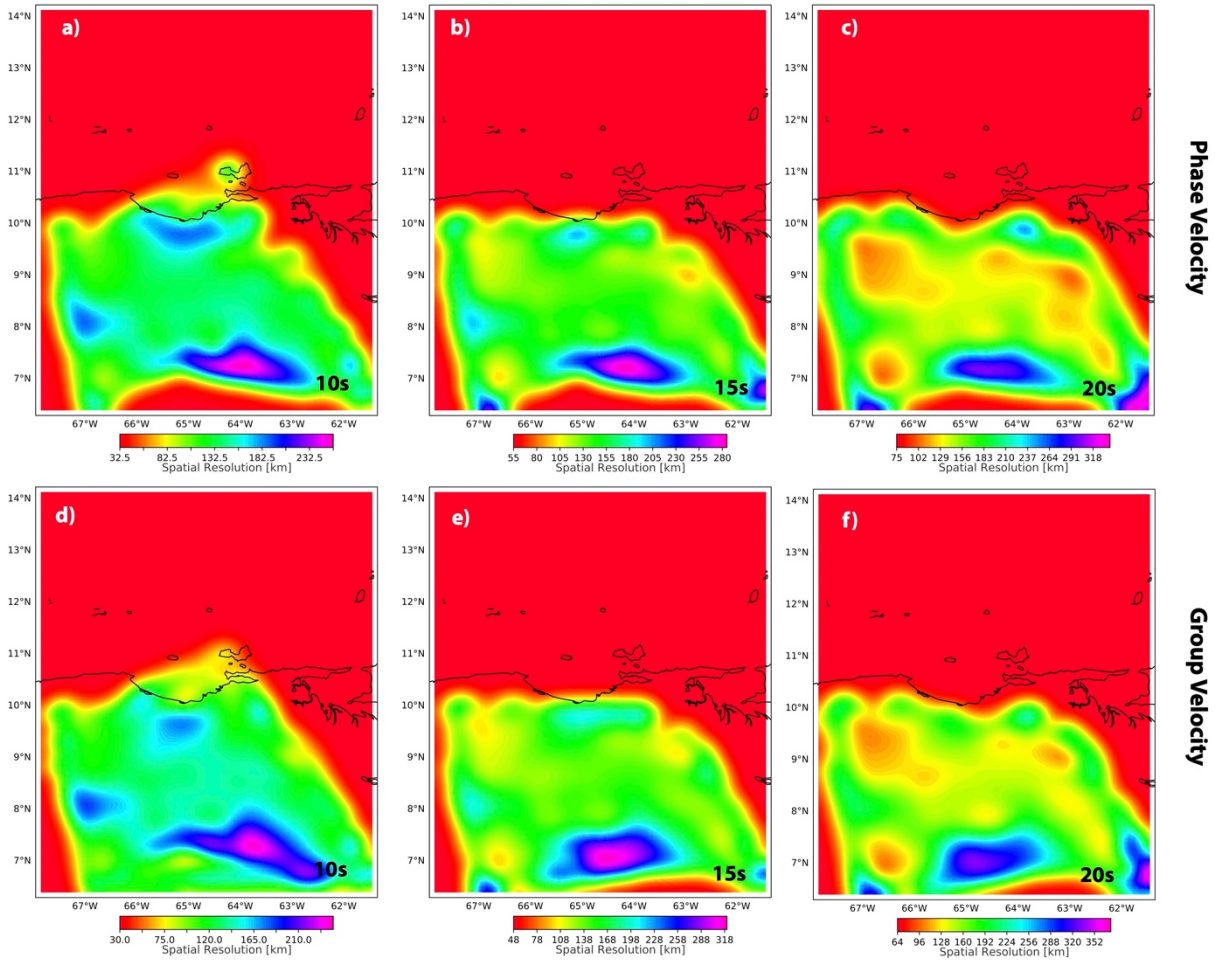

Figure S9. Resolution maps corresponding to Love wave for periods 10s, 15s and 20s.

5. Stations Orientation

In Table S1 is shown the orientation of the OBSs using the methodology described. In section 2.4

Station Name	Azimuth °	Error ° (2σ)
B151	257.5	3.0
BLOS	077.8	13.0
BTBT	-	-
CUBA	130.5	4.0
DKSS	201.1	8.0
MHTO	286.0	2.3
PINA	289.0	15.4
PNCH	176.1	4.2
SHRB	106.5	3.1
SOMB	227.3	3.5

6. Receiver Functions

In the Figure S10 is shown all of the estimated receiver functions that have been used to derive the Moho depth.

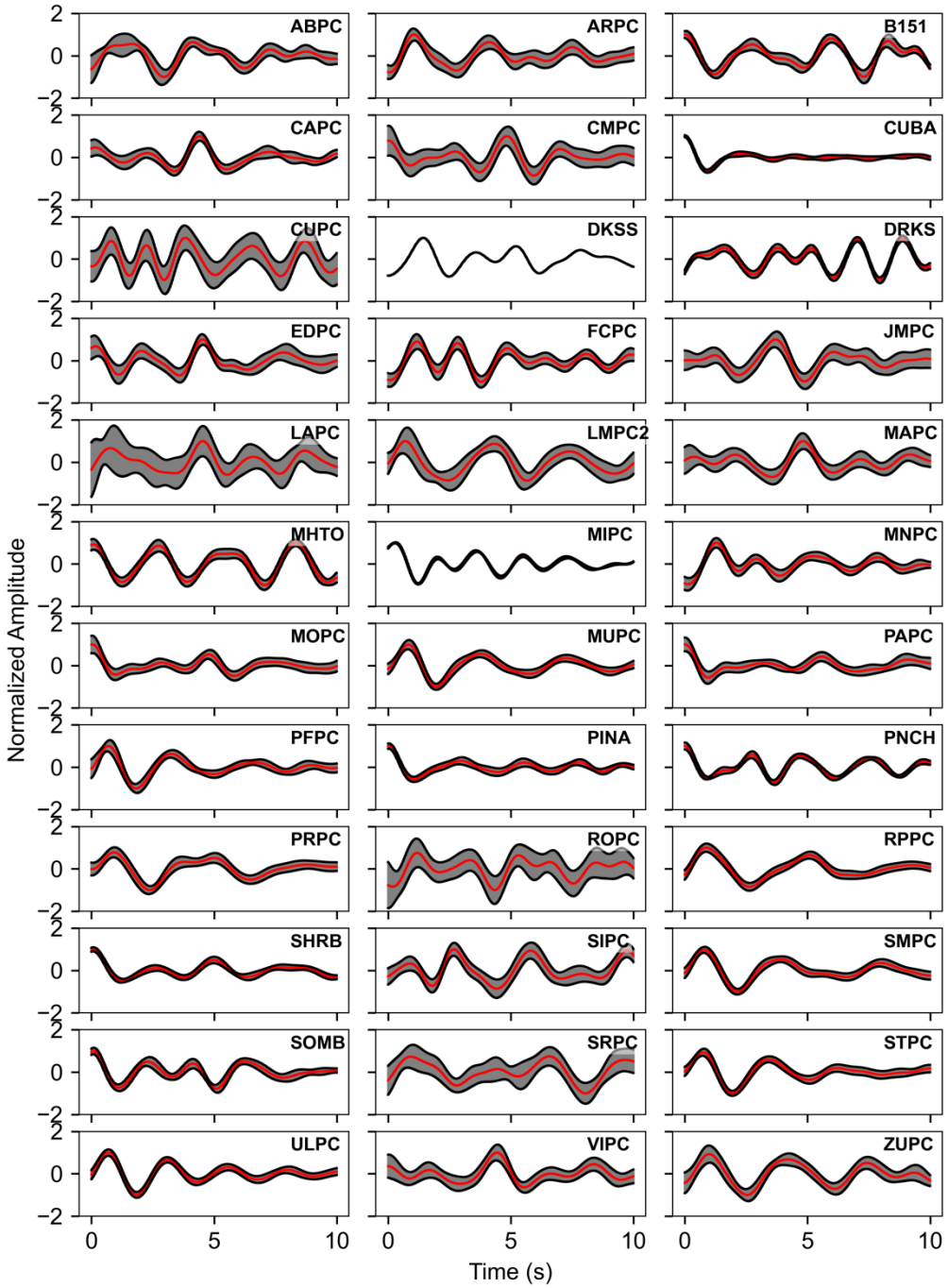

Figure S10. Receiver Functions (in red line) for the corresponding land stations and OBSs, grey shadow is the associated uncertainty.

7. Uncertainty Maps

In this section is shown 2D maps for the corresponding depth (see Fig 11), in which the grid point represents a standard deviation with respect to the Vs value.

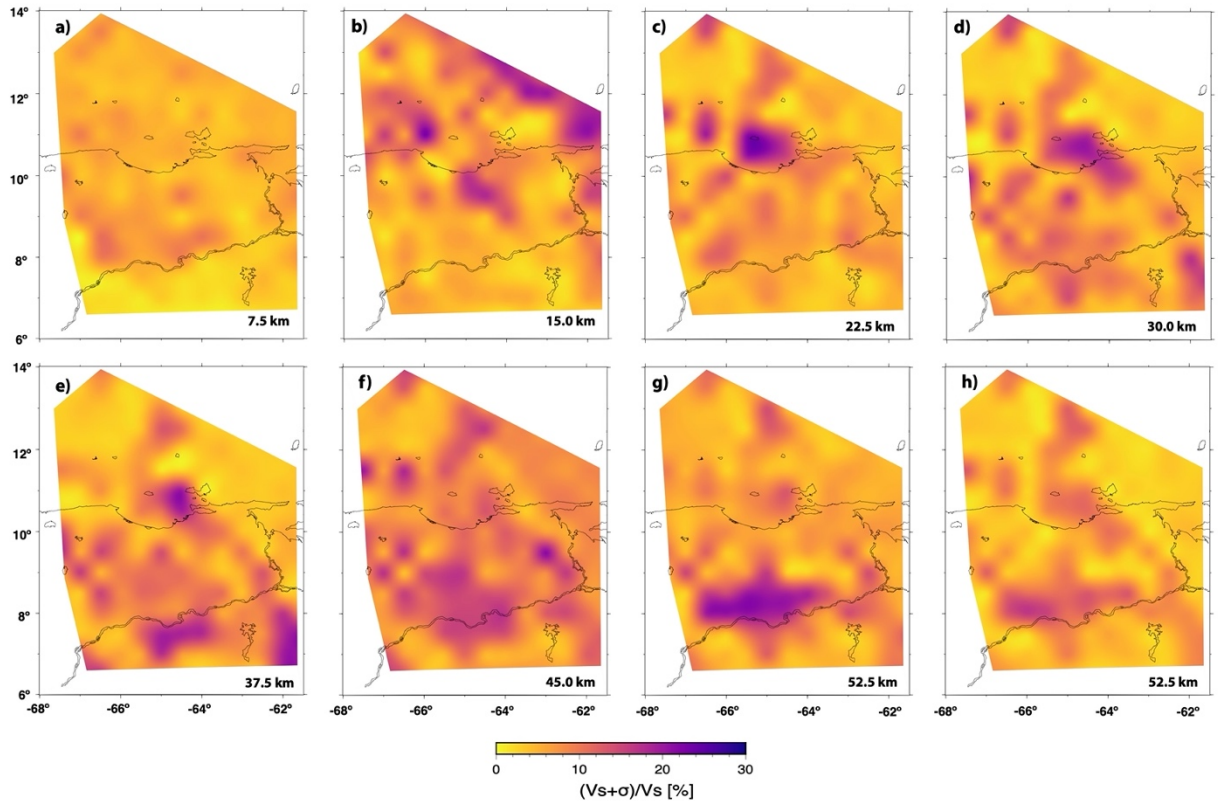

Figure S11. Horizontal slices of the standard deviation associated to the grid point of the 3D shear wave velocity model. From a) to h) increasing depth in steps of 7.5 km until 60 km. depth. VB (Venezuela Basin), GS (Guayana Shield), MB (Maturin Basin), GB (Guarico Basin), SI (Serrania del Interior), TB (Turtle the Island-Barcelona Bay) and PoP (Peninsula of Paria).

8. Vs model anomalies

We compare the 3D Vs model with the nearest Vs model for the corresponding depth of the global model ak-135-f (Kennet et al., 1995).

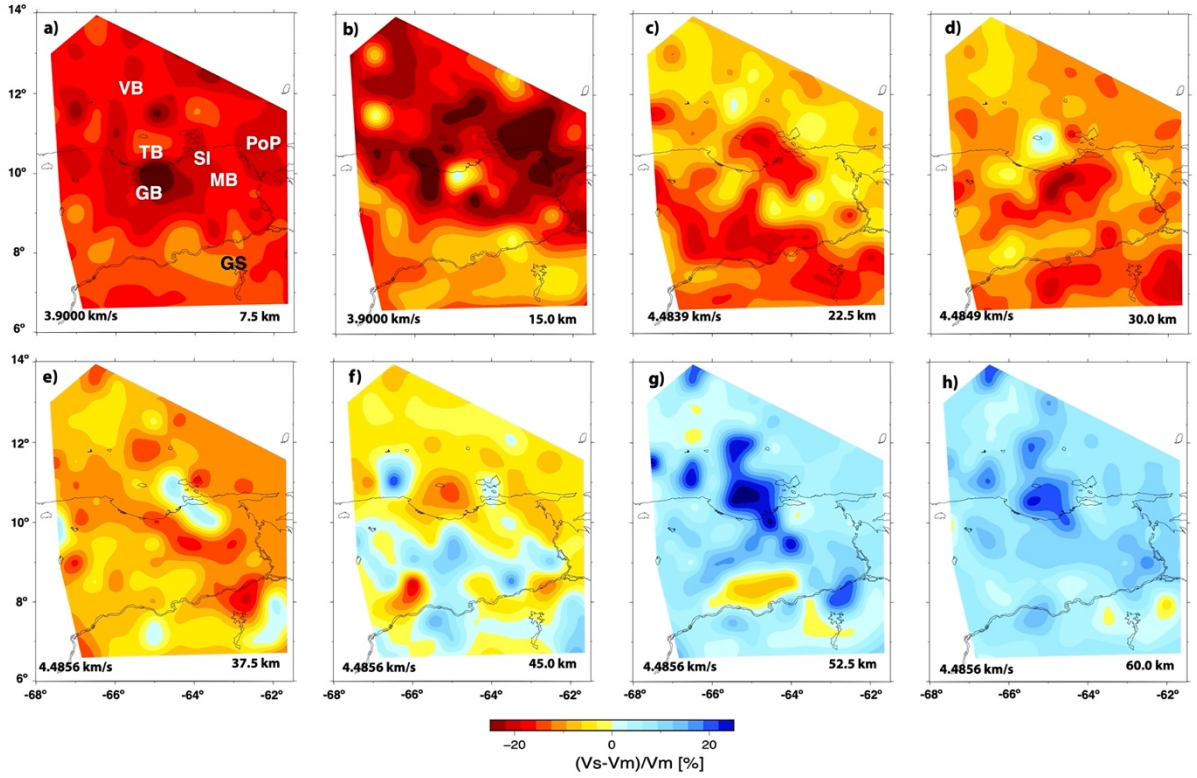

Figure S12. Horizontal slices of the comparison between the global model ak-135-f and the 3D shear wave velocity model of this study. From a) to h) increasing depth in steps of 7.5 km until 60 km. depth. VB (Venezuela Basin), GS (Guayana Shield), MB (Maturin Basin), GB (Guarico Basin), SI (Serrania del Interior), TB (Turtle the Island-Barcelona Bay) and PoP (Peninsula of Paria).

References

Kennett B.L.N., E.R. Engdahl and R. Buland. 1995. “Constraints on seismic velocities in the earth from travel times” Geophys. J. Int. 122, 108–124. https://doi.org/10.1111/j.1365-246X.1995.tb03540.x