In order to evaluate ground shaking characteristics due to surface soil layers in the urban area of Port-au-Prince, short-period ambient noise observation has been performed approximately in a 500x500m grid. The HVSR method was applied to this set of 36 ambient noise measurement points to determine a distribution map of soil predominate periods. This map reveals a general increasing trend in the period values, from the Miocene conglomerates in the northern and southern parts of the town to the central and western zones formed of Pleistocene and Holocene alluvial deposits respectively, where the shallow geological materials that cover the basement increase in thickness. The shallow shear-wave velocity structure at the National Palace place has been estimated by means of inversion of Rayleigh wave dispersion data obtained from vertical-component array records of ambient noise. Three regular pentagonal arrays were used with epicentral distance of 15 km from the capital Port au Prince, M. Navarro!

Shear Wave Velocity Structure

The shallow structure was analyzed at one site located into National Palace using the Spatial Autocorrelation method (SPAC). The S-wave velocity profile has been obtained by means of inversion from the Rayleigh wave dispersion curve Vertical components of soil motion, excited by ambient vibration, were recorded using circular-shaped arrays. Three different radii of 5, 10 and 20m were used. In order to obtain the correlation coefficient p(R), the cross correlations between records on the circle and the central station were calculated in frequency domain (Fig. 5a). Then, the phase-velocity of the Rg-wave c(f) was computed for each frequency f (Fig. 5b). A ground structure consisting of plane-horizontal homogeneous layers overlaying a half-space, defined in terms of Shear-wave velocities, was obtained by inversion of Rg-wave phase-velocity dispersion curves for the sample site. Suitable initial ground model required by the iterative inversion scheme used was built up from the dispersion curve following the k<sup>2</sup> penetration criterion (Tomkinti, 1997). The result shows a structure (Fig. 5c) with shear-wave velocity values ranging between 233 m/sec and 501 m/sec.

The fundamental resonance period of the inverted model for vertically incident S waves matches well the experimental value of 0.33 sec. computed from HV spectral ratio (Fig. 5d).

CONCLUSIONS

The predominant period map of soil obtained from ambient noise HVSR method shows a very irregular distribution of values. This fact is consistent with the lateral heterogeneity of the subsurface soil conditions in the study area. The lowest values (<0.15s) predominate in the southern area of the city, composed of Miocene conglomerates. Highest values (0.45s) are found in the central and western parts of the city, composed of Pleistocene-Holocene alluvial deposits and anthropogenic artificial fillings reclaimed from the sea.

The average shear-wave velocity value of the upper 30 m (V<sub>s30</sub>) at the National Palace was computed. The value found for V<sub>s30</sub> was 331 m/sec. According to this value, the Holocene alluvial fan deposits in this place can be classified as class D, according to NEHRP (2003) soil classification. This result is in good agreement with V<sub>s30</sub> values obtained with MASW method (Cox et al. 2011).

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