LIBRO DE RESÚMENES

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UNIVERSIDAD TECNOLÓGICA NACIONAL, FACULTAD REGIONAL BUENOS AIRES,
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Esta publicación compila los resúmenes de los trabajos científicos presentados en la **XXX Reunión Científica de la Asociación Argentina de Geofísicos y Geodestas (AAGG 2024**), realizada en el Aula Magna de la Facultad Regional Buenos Aires de la Universidad Tecnológica Nacional, sita en Av. Medrano 951 de la Ciudad Autónoma de Buenos Aires, Argentina, del 15 al 19 de abril de 2024. La reunión contó con la presencia de astrónomos, geofísicos, geodestas, agrimensores, oceanógrafos, hidrólogos, meteorólogos, climatólogos, geólogos, glaciólogos y profesionales e investigadores de disciplinas relacionadas con las Ciencias de la Tierra, del Agua y de la Atmósfera. Además, lo hicieron funcionarios, docentes, estudiantes y público en general.

Las disciplinas abordadas durante la reunión son las siguientes:
Geofísica, Meteorología, Climatología, Oceanografía, Geodesia, Geofísica Aplicada, Sismología, Vulcanología, Física Solar, Geomagnetismo, Geomática aplicada a los procesos en las Ciencias de la Tierra, Hidrología, Ciencias de la Criósfera y Comunicación pública de la ciencia.

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VARIABILITY OF SURFACE DEPOSITS AND THEIR IMPACT ON GROUND MOTION: AN ANALYSIS IN NORTHEAST BUENOS AIRES, ARGENTINA

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The utilization of ambient noise, especially through the Horizontal to Vertical Spectral Ratio (HVSR), has been widely employed in ground motion research. The peaks present in HVSR curves provide valuable information about the site's resonant frequency and, to some extent, about the potential amplification of ground motion at that frequency. Specifically, the frequency at which a clear and dominant peak is identified in the HVSR curve corresponds to the site's resonant frequency, while the amplitude of that peak is associated with the magnitude of ground motion amplification at that particular frequency. In areas with multilayered geological deposits, it is common to find more than one peak present in HVSR curves, adding complexity to the analysis. The variability in the frequencies of these peaks is influenced by various local geological variables. Therefore, understanding the interplay between local geology and the variability in HVSR peak frequencies is paramount for accurate ground motion prediction studies and for effectively assessing seismic risk.

In this study, we present the preliminary results of an ambient seismic noise investigation conducted in the northeast of Buenos Aires province, Argentina. The local geology features a metamorphic rock basement located approximately 450 meters deep, followed by a multilayer sequence of siliciclastic sediments. The surface deposits in the study area vary between the Continental Plain and the Coastal Plain. In the Continental Plain, they consist of loessic clayey deposits that shape undulating terrain. As for the Coastal Plain, bordering the estuary of the Rio de la Plata, the clayey loessic deposits are covered by a thin layer, typically thinner than 5 - 10 meters in thickness, of muddy clayey deposits.

We recorded ambient noise at 65 sites in the study area, distributed across the Continental Plain and the Coastal Plain. For this purpose, we used a Geotiny! 24-bit digital seismometer (https://geobit-instruments.com/), a compact device that integrates a three-dimensional accelerometer and seismometer. All stations recorded ambient seismic noise for approximately 25 minutes at a sampling rate of 200 samples per second, avoiding rain and strong wind conditions. The data obtained were analyzed using the HVSR technique, through the open-source software Geopsy (http://www.geopsy.org/). This technique estimates the relationship between the Fourier amplitude spectra of the horizontal (H) and vertical (V) components of ambient noise vibrations recorded at a single station. The raw data were divided into 25-second

windows, selecting the most stationary time windows using an anti-triggering algorithm to avoid disturbances due to transient noise. We then proceeded to compute and smooth the Fourier amplitude spectra for the selected time windows of each component. The HVSR curves were calculated by taking the mean square of the two horizontal components. The resulting horizontal spectrum was divided by the spectrum of the vertical component. To verify the occurrence of site-specific directional effects, which may cause incorrect regional interpretation, we rotated the NS and EW motion components from 0 (north) to 180 (south) in 10° intervals to calculate the rotated HVSR, and in general no clear directionality was found.

The results show two consistent peaks throughout the study area. The peak at lower frequencies develops at frequencies below 0.5 Hz, while the peak at higher frequencies shows greater variability, ranging from approximately 2 to 14 Hz. To investigate the causes of the variability of the high-frequency peak, we compared the results with local geology. We found a strong correlation between the peak frequency and the presence of thin, muddy deposits. Data acquired in sectors without these deposits showed peaks with average values of 8.4 Hz, but with considerable dispersion, ranging from 4.9 to 13.6 Hz. On the other hand, measurements made on the layer of muddy deposits showed average values of 2.8 Hz, with lower dispersion. Our experimental results highlight the significant effect that the presence of a thin surface layer can have on HVSR studies, which is likely to be eliminated when carrying out any type of foundation work. This underscores the importance of considering local geology when assessing seismic risk and planning urban development and infrastructure in areas prone to ground motion.

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