ATTENUATION OF RAYLEIGH WAVES IN EUROPE AND EASTERN NORTH AMERICA

Julio Mezcua

Licenciado En Ciencias Fisicas
Graduado En Ciencias Fisicas

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A knowledge of the internal constitution of the Earth requires information about the different parameters which determine and designate the constitution. One of these, the internal friction parameter, specifies how much the Earth's material departs from the perfect elasticity. In the present investigation we are concerned with the study and calculation of this parameter on a regional scale, that is for Europe, Canada and the eastern United States.

Rayleigh waves generated by two nuclear explosions at Novaya Zemlya and recorded by the WWSS and Canadian Networks were digitized and Fourier analyzed to obtain the amplitude spectrum density at each of the stations. After corrections for instrument response and geometrical spreading, the Fourier amplitudes were fitted by a least-squares approximation to a function in which the amplitudes decrease exponentially with epicentral distance. Values of the attenuation coefficient and the internal friction parameter were obtained for several possible combinations of explosions

and path. Also the amplitude density spectrum was obtained at a reference distance. In general it agrees with that expected by theory.

The values of the internal friction parameter Q obtained from the calculation of the attenuation coefficient suggest that it is independent of frequency in the range 0.04 to 0.08 Hz, and has a mean value for Europe, Canada and the eastern United States of about 400. Beyond these frequency limits, scatter in the data gives uncertainty in the results, especially at the higher frequencies.