

## Scaling Relations of Earthquake Parameters in the Red Sea Region

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(Received 19/7/1422 H; accepted for publication 26/1/1423 H)

**Abstract.** Scaling relations for the attenuation of intensity and peak ground acceleration in terms of epicentral and hypocentral distances, surface-wave and body-wave magnitudes, and focal depth were preliminarily developed in the Red Sea region. The attenuation relations were determined empirically from homogeneous modeling of the modified isoseismal maps of earthquake events originating from different areas in the region, observed PGA data, and conversion of intensity to magnitude with focal depth.

The obtained scaling equations were generally expressed in the form:  $I = a_i M_i - b_i \log(D-t-D_i) - c_i D - d_i \log(h) + e_i$

$I = a_i M_i - b_i \log(r/h) - c_i(r-h) -$

$d_i \log(h) + e_i$

$\log(PGA) = a_i M_i - b_i \log(D+D_i) - c_i D - d_i \log(h) + e_i$

where the coefficients  $a_i$ ,  $b_i$ ,  $c_i$ ,  $d_i$  correspond to the type of: magnitude, distance, anelastic attenuation coefficients, and focal depth respectively.  $D_i$  is the approximate radius of perceptibility of the meizoseismal area corresponding to the type of attenuation coefficient, and  $e_i$  the different constant terms. The findings can be considered as preliminary endeavors in providing the necessary means of estimating ground motion in the Red Sea region. The scaling relations could assist in the formulation of rational decision and strategies in environmental protection.