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Tide Gage Response to Tsunamis. Part II: Other Oceans and Smaller Seas

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ABSTRACT

Extending previous work in the North Pacific, tsunami response was examined in the Atlantic and Indian oceans, and in three smaller seas, with the objective of exploring scale effects.

Energy diffusing from the Chilean tsunami of 22 May 1960 was tracked through windows around Antarctica into all three oceans, simultaneously reaching maximum intensity about 39 h after quake time.

In smaller seas, spectral response was, again, characteristically an exacerbation of normal background, with principal energy in the fundamental pumping mode of the local coastal shelf. Subsequent to diffusion, isotropic energy decay was uniformly exponential, except that the diffusion and decay (e -folding) times were different in each sea. An ad hoc, energy-flux decay model, with a constant, linear friction coefficient, suffices to explain the observed decay times in terms of basin geometries.

The model has several spinoffs: it accounts for about half the observed coastwise variation in tsunami intensity; it may possibly supply the missing fraction of tidal energy dissipation necessary to balance that predicted from astronomical evidence.

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