

## PREFACE

Tsunami is a Japanese word with the English translation “harbor wave”. A tsunami can be generated by any disturbance that displaces a large water mass from its equilibrium position. In the case of earthquake-generated tsunamis, the water column is disturbed by the uplift or subsidence of the sea floor. Submarine landslides, which often accompany large earthquakes as well as collapses of volcanic edifices can also disturb the overlying water column as sediment and rock slump downslope and are redistributed across the sea floor. Similarly, a violent submarine volcanic eruption can create an impulsive force that uplifts the water column and generates a tsunami. Conversely, supermarine landslides and cosmic body impacts disturb the water from above as momentum from falling debris is transferred to the water into which the debris falls. Generally speaking, tsunamis generated from these mechanisms, unlike the Pacific-wide tsunamis caused by some earthquakes dissipate quickly and rarely affect coastlines distant from the source area. The tsunami’s energy flux which depends on both its wave speed and wave height remains nearly a constant. Consequently, as the tsunami’s speed diminishes as it travels into shallow water, its height grows.

An earthquake off the western coast of northern Sumatra, measuring 9.0 on the Richter scale, shook the earth’s crust for a terrifying eight minutes, triggering an intensely destructive tsunami on December 24, 2004. The waves unleashed by the earthquake carried an astonishing impulsive force, hitting Sumatra less than 15 minutes later and crossing the Indian ocean at nearly 500 miles per hour. They hit the east African coastline seven hours later, 3100 miles away from the epicenter. The tsunami had an overwhelming human and physical impact. The disaster caused \$10 billion in damages in barely 24 hours. More than 220 000 people lost their lives and 400 000 homes were reduced to rubble.

This issue is dedicated to the fluid dynamic modeling and prediction of tsunami hazards. The editors are grateful to Dr. William Begell for his encouragement in this effort.

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