Anjan Kundu

Tsunami and Nonlinear Waves

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(Editor)

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With 170 Figures

Springer

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In memory of those died on December 26, 2004
in the Indian Ocean Tsunami

Preface

Unimaginable catastrophe struck the coasts of Indian Ocean in the morning of January 26, 2004, wiping out more than 275,000 human life at a stroke from the face of the earth. It was the killer Tsunami, that originated its journey at the epicenter of the earthquake (of intensity 9.2) near Banda Aceh in Indonesia and traveled as long as to Port Elizabeth in South Africa, covering a distance of more than 8,000 km and bringing unprecedented devastation to the countries like Indonesia, Thailand, Sri Lanka, India and others.

All of us were shocked saddened and felt helpless, wanted to do something in accordance to our own ability. I as a scientist working in India and interested in nonlinear dynamics, soliton and related phenomena, decided to contribute by organizing a dedicated effort by world experts to study different aspects of the Tsunami and other oceanic waves with special emphasis on the nonlinear connection of this problem. Our Centre for Appl. Math. & Comp. Sc. (CAMCS) of our Institute, specially my colleague Prof Bikas Chakrabarti enthusiastically supported the idea and came along with the support of a generous fund.

In contrast to the conventional linear theory of Tsunami, our emphasis on nonlinearity is in part related to my own conviction for its need, especially for describing the near-shore evolution of the waves with varying depth. The other motivation was the realization that, though a large mass of literature is already devoted to Tsunami and related topics, no consolidated collective study has been dedicated to nonlinear aspects of Tsunami and other oceanic waves. This was in spite of the fact that the results obtained through conventional studies are not all convincing and conclusive and in spite of a group of internationally well known experts, as evident from the present volume, have long been emphasizing on the importance of nonlinearity in this regard.

Therefore as a first step we organized an international meeting on the same topic: *Tsunami & Nonlinear Waves* in Saha Institute of Nuclear Physics, Calcutta (March 6-10, 2006). That helped us not only to identify and contact the leading experts in this field, but also to spend a highly beneficial and stimulating week in interacting and exchanging thoughts and experiences

with some of them. I am also thankful to the Springer-Verlag for offering to publish this edited volume with interest in their Geo-Science series. This volume is based not only on selected lectures presented in the conference (Caputo (France), Dias (France), Fujima (Japan), Lakshmanan (India), Rao (India), Segur (USA), Shankar (India)), but also on the contributions from other experts well known in the field: Grimshaw (UK), Kharif (France), Madsen (Denmark), Weiss (USA), Yalciner (Turkey), Zakharov (USA) and their collaborators, who could not participate in the conference.

This volume has 14 chapters which I have divided loosely into 2 parts: *Propagation* and *Source & Run up*, for convenience, though many chapters in fact are overlapping. I have also tried to arrange the chapters from more theoretical to more application oriented, though again not in a strict sense. The overall emphasis is on theoretical and mathematical aspects of the oceanic waves, though the authors have given ample introduction to their subjects, starting the material from the beginning before taking the readers to the applicable research level with needed scientific rigor.

Hope this volume will be equally interesting and fruitful to the experts actively working or planning to work in this field, as well as to the common people who got interested in the subject just after 2004 and even to the Government bureaucrats, who are forced now to take interest in such events.

Calcutta, December 2006 *Anjan Kundu*

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