Preface and Acknowledgments

Shallow water acoustics is a very active area of underwater acoustics research, as the continental shelves and slopes have great economic, social, and military importance to humans, and all these areas interact with ocean sound. However, books dedicated to this specific topic are in short supply, and indeed the book "Shallow Water Acoustics" published over two decades ago in Russian by the two Russian authors of this present book was the first volume specifically dedicated to this branch of underwater acoustics. The authors then had this book translated into English, and it represented the state of the art up to about 1995. However, a *huge* amount of research has been done in this area in the last 15 years, and so we thought that it would be a good thing for the three of us to collaborate on a book that would update the coverage of the field, as well as point out more strongly where we thought the future might lie. As the Office of Naval Research (ONR) was publishing a book series on underwater sound, and was amenable to the idea, we signed on with them and produced this book, guided by a technical Editorial Board that reviewed and critiqued our work.

It may seem strange to some that a book on underwater sound was written jointly by an American and two Russians, but in fact it is a rather natural development given the history of the last 50 years. During the Cold War era, both the USA and Russia developed considerable expertise in underwater sound, and had large communities working in the area. And though (obviously) any transfer of classified work was and is strictly prohibited by both countries, the transfer of basic research knowledge was and still is fairly open. Indeed, American researchers studied the works of the famous Russian acoustician Leonid Brekovskikh, while Russian researchers were just as familiar with the textbooks by Bob Urick and Clarence Clay. When the Cold War subsided in around 1990, actual meetings of Russian and American investigators became common, and indeed that is when the three authors of this book first met, at a port call of the Russian research vessel Akademik Sergey Vavilov in Boston, MA. What struck us all was just how much we had in common scientifically – we spoke one common language well, even if the Russians' English was poor and the American's Russian nonexistent. We were excited about the basic

acoustics science, and as the international doors had opened sufficiently, we started to collaborate.

In the post-Cold War era, Russian support for experimental ocean acoustics dropped precipitously, and seagoing efforts became few and far between. However, a strong community with a good understanding of experiments and a sterling knowledge of theory existed, and started to look outwards for collaboration and funding. US funding also dropped some, but ONR still maintained a vibrant ocean acoustics program, including a strong experimental and technological component. Given the data coming out of the US program, and the analysis capabilities of the Russian researchers, a natural partnership was possible, and indeed came to fruition in many cases, not just for this book. This bit of technological symbiosis has been good for all concerned, and we fervently hope it will continue.

Regarding the book itself, we have written a book that is intended for graduate students, postdocs, and more advanced researchers, that is also a cross between a research monograph and a textbook. As there are few textbooks in this area (see the above remarks), we thought that covering the elements of the field, but at an advanced level, would be useful On the other hand, we also wanted to provide a monograph that showed the state of the art in research, and also tried to point the way for future efforts. This made the book a bit of a balancing act, and we hope that it has succeeded.

We also have couched much of the physics of this book in terms of the modal picture, which we think is the most natural one for shallow water. That is not to say that we have avoided ray theory or WKB, but that our emphasis has been on lower frequency modal work. We also note that some of the physics can be explained in the ray picture as well as the mode, and indeed one of our Editorial Board members, Dr. Ira Dyer, is a strong advocate of looking at things that way. Our feeling is that, once you have understood the physics in one picture or the other, you can understand it both ways – the picture translation is not so hard.

One might also notice a bias in the experimental data discussed to the Barents Sea and the East Coast of the USA. This is because these are the places that were most frequented experimentally by the authors and their home Institutions (Voronezh State University, the General Physics Institute and the Woods Hole Oceanographic Institution). We are most familiar with the data from these areas, and so naturally used them first for examples.

Next, you will note in reading this book that it speaks with both a Russian and an American (New Jersey) accent, depending on the section. We have tried hard to make things grammatically correct, and clear as well, but the "linguistic lilt" of the various sections we left intact. As all of us are fans of the great physicist Richard Feynman, we think that speaking in your own voice is no crime, and has a noble precedent. Feynman would have contended, as we do, it is what you say about the science, and not the regional accent that counts.

As with any larger piece of work, many people were involved and contributed to its completion. From the Russian side, the authors would like to acknowledge Fyodor V. Bunkin, Yuri A. Kravtsov, and the many other colleagues from the A.M. Phokhorov General Physics Institute and the Voronezh State University

whose work in the execution of large-scale experiments on the shelf of the Barents Sea and the interpretation of the results was invaluable. From the American side, the author also warmly acknowledges the numerous colleagues with whom he has gone to sea, analyzed data, and argued over what it all means at meetings, workshops, seminars, and other venues. Regarding funding, all the authors give their heartfelt thanks to the US Office of Naval Research and the Robert W. Morse Senior Scientist Chair at WHOI, both of which paid for the majority of this work. From the Editorial side, the efforts of the Editorial Review Board (Drs. Ralph Goodman (deceased), Ira Dyer, Jeffrey Simmen, and Finn Jensen have been enormously helpful. The enthusiasm and project management of Dr. Ellen Livingston is also warmly appreciated. Also, our great thanks to Ms. Sheila Hurst for her editorial work and skills, and Ms. Gretchen McManamin for her administrative assistance.

Finally, our thanks to our wives and families, who put up with our often erratic and travel heavy oceanographer lifestyles, which are prerequisites to writing such a book. The only *really* hard thing about being an oceanographer is being away from such wonderful families for long periods of time.

Voronezh, Russia Boris Katsnelson
Moscow, Russia Valery Petnikov
Woods Hole, MA, USA James Lynch



http://www.springer.com/978-1-4419-9776-0

Fundamentals of Shallow Water Acoustics
Katsnelson, B.; Petnikov, V.; Lynch, J.F.
2012, XVI, 540 p., Hardcover
ISBN: 978-1-4419-9776-0