

This volume is dedicated to our colleague **Dr. MARIO BONE** who was devoted to the theoretical development of numerical hydrodynamic models and their application to the Adriatic Sea.



Dr. MARIO BONE
1946 – 2009

Dr. Mario Bone was born on 16 April 1946 in Split, where he attended elementary and secondary school. He graduated from the Natural Sciences and Mathematics Faculty in Belgrade on 30 September 1970 with a degree in meteorology. Already by the following year Dr. Bone had gained postgraduate employment in the Laboratory for Marine Physics of the Institute for Oceanography and Fisheries. He conducted his entire research career in the Laboratory for Marine Physics and, from 1995 until his retirement in August 2009, he was the head of the laboratory. He completed a masters degree in physical sciences, in the area of physical oceanography, at the Natural Sciences and Mathematics Faculty of the University of Zagreb on 19 June 1974 with a defence of his thesis entitled “Mathematical modelling of annual salinity values and their variations in the middle Adriatic” (in Croatian). His doctoral degree was awarded to him in the area of meteorological sciences on 9 December 1988 by the Physics Department of the Natural Sciences and Mathematics Faculty of the University of Belgrade following the successful defence of his dissertation entitled “Co-oscillation of the Vir Sea due to the influence of atmospheric and marine changes in the Adriatic” (in Croatian).

During his scientific career Dr. Bone, both singly and as a co-author, published 28 scientific papers in national and international journals and participated in many more national and international scientific meetings from which 17 of his works and abstracts were published in proceedings. Dr. Bone continued his training with short stays at several foreign scientific institutions (ICTP and OGS in Trieste) and during 1995 and 1996 he was an invited researcher at the “Ettore Majorana” International Centre for Science and Culture (ICSC) in Erice, Italy. He was a member of the Physics Committee of the International Commission for the Scientific Exploration of the Mediterranean Sea (CIESM) in Monaco as well as the Society for Industrial and Applied Mathematics (SIAM) in the United States.

Dr. Bone participated in the running of many scientific projects financed by the Ministry of Science of the Republic of Croatia as a researcher, and as a coordinator for the project “Physical Characteristics of the Pelagic System”. In addition, he contributed to the carrying out of numerous technical studies and surveys which the Institute conducted based on the requirements of various clients.

During his working career Dr. Bone addressed varied topics in physical oceanography including annual salinity trends, water mass circulation in the Adriatic and its sub-basins, transport and water mass exchange, turbulence in the sea, the impact of tides as well as atmospheric events on dynamic phenomena in the sea etc. However, the greatest part of Dr. Bone’s scientific work was directed towards the theoretical development of numerical hydrodynamic models and their application to the Adriatic Sea.

It should be highlighted that Dr. Bone was one of those rare oceanographers who developed his own numerical hydrodynamic model whose source computer code he personally wrote. In contrast, the majority of numerical hydrodynamic models in use today were developed by teams of oceanographers supported by globally-recognized oceanographic institutions, with other scientists then further developing and adapting the programming code to the specific physical characteristics of various seas and oceans.

Dr. Bone developed the source code for a three-dimensional non-linear layer model (z-model) with realistic layers which he successfully applied to simulations on the scale of the entire Adriatic as well as simulations of the dynamics of small coastal basins and bays. The scientific paper in which Dr. Bone described in detail this source model and its application was published in the journal *Estuarine, Coastal and Shelf Science* (1993) with his model’s subsequent improvement reported in a series of later articles. Dr. Bone improved the z-model during a twenty year period by applying various computing techniques and technologies for the implementation of the numerical scheme, defining boundary and initial conditions, input of measured data into the model etc. The source

code of the z-model was published by Dr. Bone on the Institute's website (<http://www.izor.hr/web/guest/z-model>).

The soundness of the results of the z-model which Dr. Bone developed were confirmed during the course of numerous simulations of the physical properties of the sea in the framework of a large number of projects and environmental impact studies which the Institute carried out for various purposes, including the building of sewage outflow facilities, a marina, a port and small harbours, hotel complexes, mariculture facilities, etc.

In summing up, Dr. Bone made a valuable contribution to research of various aspects of the physical attributes of the Adriatic Sea, a rare oceanographer who independently developed a numerical hydrodynamic model, and was among the first in the Mediterranean that applied complex computing techniques for the processing of oceanographic data.

Dr. Bone passed away in Split on 12 September 2009 at the age of 63 years.

Prof. Vlado DADIĆ

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