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Editorial note

This volume is dedicated to our college Dr. Mira ZORE-ARMANDA, physical oceanographer who has introduced physical oceanography to the Institute of Oceanography and Fisheries Split. One of her major contributions was identifying the main types of water in the Adriatic giving a phenomenological model of the Adriatic Sea circulation, and designated the places where these waters were formed and how they circulated in different seasons.

Dr. MIRA ZORE-ARMANDA

1930-2012

Dr. Mira ZORE-ARMANDA was born on 6th January 1930 in Zagreb, where she attended school and graduated in l948. In 1952 she graduated at the Faculty of Science in the Department of Mathematics and Physics, under the branch of Geophysics. She obtained her Ph.D. degree in physical sciences at the Sorbonne University of Paris, France in 1963.

She started working in 1952 as an assistant in the Laboratory of Hydrography of the Institute of Oceanography and Fisheries (IOF), and ultimately where she had spent her entire lifetime. She became a scientific advisor in l974.

Dr. Mira ZORE-ARMANDA paved the way for women in oceanography, when they were poorly represented. Also, she paved the way for oceanographers from a small country (Croatia), since she had experienced a lack of belief from foreigners that such a country had an organized system of oceanographic measurements. She was a versatile scholar and intellectual that is very rare nowadays.

As the first physicist working in IOF, she introduced physical oceanography into that institution. From 1952 to 1972 she led physical oceanography field work at the permanent stations of the Institute. In 1956 she went to India with a Norwegian government scholarship. In 1957/58 she was a member of the organizing committee of the International Geophysical Year, where she led the cruise for the Adriatic Sea. In 1962 she participated in the organization of joint research of the Adriatic Sea with the Woods Hole Institute (Atlantis and Bios expedition). However, she was not allowed to join the Atlantis ship cruise since women were not allowed on board in those times, as was also the case here in the Adriatic.

Based on the data from the NAJADE CICLOPE expedition she calculated geostrophic currents from which she demonstrated seasonal changes in flow regime, as confirmed by later measurements. She showed that the basic cause of these seasonal changes derived from the fact that the northern Adriatic, as a shallow area, is under high continental influence contrary to the deep southern Adriatic. It is heated more in summer and cools more in winter than the southern Adriatic and is exposed to the inflow of the river Po and other northern Italian rivers. She estimated seasonal differences in the slope of sea level along our coast, which were confirmed from tide gauge data.

Analyzing TS diagrams she identified the main types of water in the Adriatic, giving a phenomenological model of the Adriatic Sea circulation, and designated the places where these waters were formed and how they circulated in different seasons. It was shown that certain types of water form in winter, when the cooled surface waters mix vertically to great depths, and the source areas of these waters are the northern Adriatic shelf, the Jabuka pit and the southern Adriatic basin. The eastern Mediterranean type of water enters the Adriatic in the intermediate layer, while the south Adriatic water extends in the bottom layer towards the eastern Mediterranean. In monitoring water types she has also schematically shown the vertical distribution of circulation in the Adriatic by season.

Her further research carried her in several directions. She applied her knowledge of currents and water masses to the biological conditions in the Adriatic in co-authorship with her biologist colleagues. It was discussed how various physical factors affect the size of primary production in the sea and the possibility of forecasting the fish catch. A link was established between climate and oceanographic parameters and the size of primary production. A hypothesis was set out that increased primary production after three years resulted in increased fish production. In more recent studies the figures are somewhat corrected, but the first estimate was among the first works of this kind.

Dr. Mira ZORE-ARMANDA also studied the effect of meteorological factors on conditions in the sea and had recognized the broader role of long range climate factors than local meteorological conditions. From this aspect she studied the influence of meteorological conditions of the wider area from the Atlantic to the Mediterranean to the Adriatic Sea. She related the intensity of water exchange between the Adriatic and the Mediterranean to amounts of nutrients and salinity, which proved to be a good indicator for the intensity of water exchange between the Adriatic and Ionian Sea. Further

she explored the conditions of water formation types on multi-annual timescales. She noted that pressure gradients affect the geostrophic flow when viewed from an area wider than the Mediterranean and influence both seasonal and inter-annual fluctuations of circulation in the Adriatic. In terms of tele-connection she looked at the impact of the Atlantic Ocean on the Adriatic and noted that the amount of ice in the North Atlantic is highly correlated with certain phenomena in the Adriatic Sea. At that time it was pioneering work, and even today such an approach is still relevant. She realized that the Adriatic is only a small part that responds to the changes of a larger system. Subsequently she studied the relationship between the sea and atmosphere and calculated evaporation levels of the Adriatic Sea. She related the inter-annual changes in meteorological parameters with the formation of dense water in the Adriatic Sea.

With co-authors she described the general hydrographic conditions of the Adriatic on the basis of long-term data series for stations in the middle and southern Adriatic since l952. In the Seventies the attention of the Institute was focused on the protection of the Adriatic Sea from pollution and for this purpose she started to work on coastal oceanography The basic difference was in the dynamics between open and coastal waters caused by the influence of the coastal wall, which requires a compensatory flow toward and from the shore, with a very strong influence of wind on currents and the emergence of multi-day oscillations.

In 1982-1983 she led the oceanography part of the international project ALPEX, called MEDALPEX, and worked on the dynamics of the northern Adriatic, discovering the existence of the coastal front and its dependence on wind intensity. This was the first experiment of IOF with a dense network of stations in a small area.

For the purposes of modeling of the Adriatic currents, together with colleagues she explored the impact of topography on the flow through simple analytical models. She studied the influence of the Po river on the northern Adriatic circulation.

Later analysis of the long-term data has shown the impact of pollution on the open sea as well. She also presented a hypothesis about tsunamis in the Adriatic. She led 18 ecological studies among which the biggest were a study for nuclear power plant Vir and a study for the exploration of oil and gas.

Here are some other activities of Dr. M. ZORE-ARMANDA:

- leading of the UNEP-MAP project on the transport of pollutants in the coastal area.
- working in the Commission for the preparation of the MEDALPEX program in Paris 1980
- a member of the Commission for the creation of an international research project for the eastern Mediterranean (POEM).
- Has participated in seminars, conferences etc. organized by CIESM, IUGG, CNRS, UNESCO, the Royal Society, NATO and International Marine and Atmosphere Panel, and attended the conferences in Monaco 1952, Bucurest 1966, Monaco l968, Split 1976, Antalya 1978, Berlin 1980, Cannes 1982, Palma de Mallorca 1986, Athens 1988, Bern 1967, Moscow 1971, Grenoble 1975, Tokyo 1970, Paris 1972, Trieste 1971, Malta 1973, London 1981, La Spezia 1983 etc.
- a member of local organizations such as the National Committee for the Scientific Exploration of the Mediterranean, Society for the Advancement of Maritime Affairs of Yugoslavia, Council for improving Maritime Affairs at the Croatian Academy, National Committee for Geodesy and Geophysics.
- a member of international organizations like the Committee for International Exploration of the Mediterranean where she was twice a vice chairman of the Committee for Physical Oceanography.
- a member of American Meteorological Society and American Union of Geodesy and Maritime Affairs.

She participated in several courses at IOF and ICTP (Trieste), and at the Postgraduate Study of Oceanology at Zagreb University with lectures on hydrographic conditions of the Adriatic and the Mediterranean. In co-authorship she has

published a series of textbooks in six different editions, for the Maritime School, International Institute course for fisheries personnel from developing countries and Postgraduate Studies of oceanology.

She led several masters and doctoral theses and reviewed theses for the University of Alexandria and University of Bologna as well.

She motivated us to be engaged in a variety of new issues, supported our needs for new equipment and also made efforts to obtain the first data processing equipment in the Eighties, which was a basis for the future data center.

She has published over 150 scientific and technical papers some of which are still cited, and in any case are an indispensible body of work for oceanographers in the Adriatic.

As Editor-in-Chief of the Institute's publication since 1976 she pushed towards reaching higher standards in Acta Adriatica, which became an internationally recognized journal of Mediterranean Oceanography and in 2007 became one of the few Croatian journals cited in SCI-Expanded.

Mrs. Zore-Armanda retired in December 1989, but continued working as Editor-in-Chief of Acta Adriatica and subsequently published several more papers. Her tips are still very valuable and relevant.

She used to say: "One cannot be a saloon oceanographer; oceanographers must participate in the field work!" She urged for the continuation of measurements at our permanent stations. Her wish was to make measurements at the Otranto straits, and we hope to realize it with our new vessel some day.

All science re-organizations that took place during the course of her work history have not impressed her and she expressed the opinion that politics should be less involved in science.

She told us: "Stay away from lobbies, to which everything is more important than the protection of the Adriatic." She advised us that it is not worthwhile to work on economically valuable projects if these do not contribute to scientific knowledge.

Disappointed by the war situation in Croatia in the Nineties, she somewhat resignedly stated that progress of technology has not led to the advancement of humanism. However, she hoped that the independent Croatia, which governs most of the Adriatic, shall recognize and protect its great wealth – the Adriatic Sea.

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BIBLIOGRAPHY OF SELECTED PAPERS

1955. **ZORE, M.** On the seiches occurring in the Bay of Kaštela. Acta Adriat., 7(3):18.

1956. **ZORE, M.** On gradient currents in the Adriatic Sea. Acta Adriat., 8(6):38.

1956. **ZORE, M.** O gradijentskim strujama Jadranskog mora. Hidrografski godišnjak 1955:55-84.

1962. **ZORE, M.** On gradient currents in the Adriatic sea. Acta Adriat. 8(6), 2. izdanje, Published for the National Science Found. & Dpt. of Commmerce, Nolit, OTS 61-11200, 32 pp.

1958. **ZORE, M.** Some new observations on the system of Adriatic currents. Rapp. Comm. int. Mer Medit. 14:47-51.

1959. **ZORE, M.** Pojava leda u Kaštelanskom zalivu. Hidrografski godišnjak, 1958:261-264.

1960. **ZORE, M.** Preliminary results of direct current measurements in the Adriatic. Rapp. Comm. int. Mer Medit. 15(3):241-246.

1960. **ZORE, M.** Promjene razine mora uzduž naše obale u vezi sa sistemom strujanja u Jadranu. Hidrografski godišnjak, 1959:59-65.

1961. **ZORE, M.** Deep water movements in the Adriatic (A preliminarv report). Rapp. Comm. int Mer Medit., 16(3):625-630.

1962. **ZORE, M.** Određivanje tipova vode pomoću T-S dijagrama. Hidrografski godišnjak 1961:95-104.

1963. **ZORE-ARMANDA, M.** Vertikalni raspored strujanja u srednjem i južnom Jadranu. Hidrografski godišnjak, 1962:61-72.

1963. **ZORE-ARMANDA, M.** Mixing of three water types in the south Adriatic. Rapp. Comm. int Mer Medit., 17(3):879-885.

1963. **ZORE-ARMANDA, M.** Les masses d'eau de la Mer Adriatique. Acta Adriat., 10(3): 94 pp.

1963. **ZORE-ARMANDA, M.** Les masses d'eau de la Mer Adriatique. theses presentees a la faculte des sciences de l'universite de Paris pour obtenir le titre de docteur de l'Universite, Serie A, No 1039, No d'ordre 1062, 94 pp.

1964. **ZORE-ARMANDA, M**. Rezultati direktnih mjerenja morskih struja na Jadranu. Acta Adriat.,11 (41):293-308.

1964. ŽUPANOVIĆ, Š. & **M. ZORE-ARMANDA**. Fluctuations hydrographiques et peche de la sardine *(Sardina pilchardus* Walb.) sur la cote orientale de l'Adriatique moyenne. Deb. Docum. techn. 7(3):47-56.

1964. **ZORE-ARMANDA, M.** Tipovi vode u Jadranu. Acta Adriat.,10(3a):13pp.+31 diagram.

1965. **ZORE-ARMANDA, M.** Les variations saisonicres du niveau de la mer le long de la cote orientale Adriatique. Rapp. Comm. int Mer Medit. 18(3):807-810.

1966. **ZORE-ARMANDA, M.** Cycle annuel des courants et caracteristiques des eaux de l'Adriatique. Second Int. Oceanogr. Congress Moscow 1966, Abstract of Papers, No499-Slb:414-415.

1966. **ZORE-ARMANDA, M.** The svstem of currents found at a control station in the middle Adriatic. Acta Adriat., 10 (11):20 pp.

1966. **ZORE-ARMANDA, M.** Gradijent tlaka zraka u istočnom Mediteranu i salinitet jadranske vode. Hidrografski godišnjak, 1965:61-67.

1967. **ZORE-ARMANDA, M.** O sezonskim promjenama površinskog strujanja u Jadranu. Hidrografski godišnjak, 1966:69-74.

1968. BULJAN, M. & **M. ZORE-ARMANDA.** Apercu historique sur les recherches hydrographiques en mer Adriatique, en particulier des navires Ciclope, Najade et Vila Velebita. Congr. int. Hist. Oceanogr. 1, Buli. Inst. oceanogr. Monaco, No.special 2:337-349.

1968. **ZORE-ARMANDA, M**. The System of Currents in the Adriatic Sea. Stud. Rev. gen Fish. Coun. Medit., 34:48 pp.

1968. **ZORE-ARMANDA, M**. Raspored tlaka zraka u istočnom Mediteranu. Hidro-

grafski godišnjak 1967:67-78.

1969. **ZORE-ARMANDA, M.** Water exchange between the Adriatic and the Eastern Mediterranean. Deep-Sea Res.,16:171-178.

1967. **ZORE-ARMANDA, M**. Water exchange between the Adriatic and the eastern Mediterranean. Int. Union Geodesy Geoph.,XIV General Assembly, Abstract of Papers 5, p.28.

1969. **ZORE-ARMANDA, M.** Origine possible des fluctuations de la salinite de l.eau adriatique. Rapp. Comm. int. Mer Medit., 19:719-722.

1969. **ZORE-ARMANDA, M.** Evaporacija Jadranskog mora. Hidrografski godišnjak, 1968:47-56.

1969. **ZORE-ARMANDA, M.** Temperature relations in the Adriatic Sea. Acta Adriat., 13(5), 51 pp.

1969. **ZORE-ARMANDA, M.** Oceanographic conditions in the middle Adriatic area -II System of currents in the surface layer and their effect on the temperature distribution. Thalassia jugoslav., 5:465-475.

1970. **ZORE-ARMANDA, M**. Meteorološki uvjeti i mogućnost prognoze ulova male plave ribe u Jadranu. Morsko ribarstvo 22(4): 157-160.

1971. **ZORE-ARMANDA, M.,** T. PUCHER-PETKOVIĆ & I. KAČIĆ. Klimatski faktori i mogućnost predskazivanja veličine organske produkcije u Jadranu. Pomorski zbornik 9:545-559.

1971. **ZORE-ARMANDA, M.** Influence of the long term changes in the oceanographic/ meteorological conditions in the North Atlantic on the Mediterranean. The Ocean World, Proc. Joint Oceanogr. Assembly (Tokyo) 1970:151-154.

1971. PUCHER-PETKOVIĆ T., **M. ZORE-ARMANDA** & I. KAČIĆ. Primary and secondary production of the Middle Adriatic in relation to climatic factors. Thalassia jugosl., 5:301 -311.

1972. **ZORE-ARMANDA, M.** & T. PUCHER-PETKOVIĆ. Pretskazivanje o (vjerovatno) raspoloživoj količini ribe u Jadranu u 1972. godini. Morsko ribarstvo, 24(2):54-56.

1972. **ZORE-ARMANDA, M.** Calcul preliminaire de l'evaporation dans l'Adriatique. Rapp. Comm. int Mer Medit., 20(4):627-630.

1972. **ZORE-ARMANDA, M.** Response of the Mediterranean to the Oceanographic/ Meteorological conditions of the North Atlantic. Rapp. Comm. int. Mer Medit., 21(4):203-205.

1972. **ZORE-ARMANDA, M.** Repartition saisonniere de la salinite 1et regime des courants dans les eaux de l'Adriatique. Rapp. Comm. int. Mer Medit., 21(4):207-210.

1973. **ZORE-ARMANDA, M.** Količina leda u sjevernom Atlantiku i neka oceanografsko-meteorološka svojstva istočnog Mediterana. Hidrografski godišnjak, 1971:75-87.

1973. PUCHER-PETKOVIĆ, T. & **M. ZORE-ARMANDA**. Essai d'evaluation et pronostic de la production en fonction des facteurs du milieu dans l'Adriatique. Acta Adriat., l5(1), 39 pp.

1973. **ZORE-ARMANDA, M.,** I. KAČIĆ & T. PUCHER-PETKOVIĆ. Meteorological conditions and ichthyologic production in the Adriatic. Rapp. Comm. int. Mer Medit. 21(10):809-811.

1973. **ZORE-ARMANDA, M.** & T. PUCHER-PETKOVIĆ. Vjerojatna proizvodnja ribe u 1973. godini. Morsko ribarstvo, 24(4): 157-159.

1974. **ZORE-ARMANDA, M.** Formation of Eastern Mediterranean Deep Water in the Adriatic. Processus de formation des eaux oceanique profondes, Colloques Int. du C.N.R.S. 215:127-133.

1974. **ZORE-ARMANDA, M.** & T. PUCHER-PETKOVIĆ. Prognoza ulova za 1974. godinu. Morsko ribarstvo 26(2):58-59.

1974. KARLOVAC, J., T. PUCHER-PETKOVIĆ, T. VUČETIĆ & **M. ZORE-ARMANDA**. Procjena bioloških resursa Jadrana na osnovi planktona. Acta Adriat., 16(9): 157-164.

1974. **ZORE-ARMANDA, M.** Some aspects of air-sea interaction in the Eastern Mediterranean. Fisica dei mari, Atti Accad naz. Lincei, Ouaderno, 206:59-68.

1975. **ZORE-ARMANDA, M.**, I. NOŽINA & Z. VUČAK. Morske struje u području sjevernog dijela srednjeg Jadrana. Hidrografski godišnjak, 1973:65-81.

1976. **ZORE-ARMANDA, M.** & G. MLADINIĆ. Prilog poznavanju strujanja u sjeverozapadnom dijelu Jadrana. Hidrografski godišnjak, 1974:61-67.

1976. BULJAN, M. & **M. ZORE-ARMANDA.** Oceanographic properties of the Adriatic Sea. Oceanogr. Mar. Biol. Ann., 14:11-98.

1976. **ZORE-ARMANDA, M.** & T. PUCHER-PETKOVIĆ. Some dynamic and biological characteristics of the Adriatic and other basins of the Eastern Mediterranean. Acta Adriat., 18(1): 15-27.

1977. **ZORE-ARMANDA M.**, M. BONE & M. GAČIĆ. Some dynamics characteristic of the eastern Adriatic littoral. Rapp. Comm. int. Mer Medit., 24(2):49-51.

1977. **ZORE-ARMANDA, M.** Water renewal in the Basins along the Eastern Coast of the Adriatic Sea. lll[es] Journees Etud. Pollutions.C.I.E.S.M. (Split, 1976):225-226.

1978. **ZORE-ARMANDA, M.** Temperatura mora. Prilozi poznavanju vremena i klime SFRJ, Savezni hidrometeorološki zavod, sv. 414 : 103-119 + 18 pp.slika.

1979. **ZORE-ARMANDA, M.** Water renewal in the basins along the Eastern Adriatic coast. Acta Adriat.,19 (9):71-80.

1979. **ZORE-ARMANDA, M.**, M. BONE & M. GAČIĆ. Some dynamic characteristics of the East Adriatic coastal area. Acta Adriat., 19(10):81-101.

1979. **ZORE-ARMANDA, M.** Fizička svojstva mora u području otoka Hvara. Acta biologica, 8(4):65-78.

1979. **ZORE-ARMANDA M.** Destructive wave in the Adriatic. Rapp. Comm. int Mer Medit., 25/26(7):93-94.

1979. BULJAN M. & **M. ZORE-ARMANDA.** Hydrographic properties of the Adriatic sea in the period from 1965 through 1970. Acta Adriat., 20(1-2):368 pp.

1980. **ZORE-ARMANDA, M.** Some dynamic and hydrographic properties of the Kaštela Bay. Acta Adriat., 21(2):55-74.

1981. **ZORE-ARMANDA, M.** Circulation characteristics of one basin of the Eastern Adriatic coast. Rapp.Comm. int. Mer Medit. 27(6):95-97.

1983. **ZORE-ARMANDA, M.**, V. DADIĆ, M. GAČIĆ, M. MOROVIĆ & T. VUČETIĆ. MEDALPEX in the North Adriatic -Preliminary report. Institute of Oceanography and Fisheries, Split, Bilješke - Notes 50: 8 pp.

1983. **ZORE-ARMANDA, M.**, V. DADIĆ, M. GAČIĆ, M. MOROVIĆ & T. VUČETIĆ. MEDALPEX in the North Adriatic - Preliminary report. Rapp. Comm. int. Mer Medit. 28(2):61-63.

1983. **ZORE-ARMANDA, M.** & M. BONE. Topographic characteristics and current system in the Adriatic. Rapp. Comm. int. Mer Medit., 28(2):65-66.

1983. **ZORE-ARMANDA, M.** Oceanographic time series in the Adriatic Sea. UNESCO, IOC techn. series, Time series of ocean measurements, 1:43-46.

1983. **ZORE-ARMANDA, M.**, M. GAČIĆ & V. DADIĆ. Neke dinamičke karakteristike sjevernog Jadrana. Dinamika vjetra i strujanja u sjevernom Jadranu - Alpex rezultati, Savezni hidrometeorološki zavod i Institut za oceanografiju i ribarstvo, Split, 10 pp.

1983. **ZORE-ARMANDA, M.** & Z. VUČAK. Rezidualno strujanje u sjevernom Jadranu. Dinamika vjetra i strujanja u sjevernom Jadranu - Alpex rezultati. Savezni hidrometeorološki zavod i Institut za oceanografiju i ribarstvo, Split, 8 pp.

1983. **ZORE-ARMANDA, M.** Some physical characteristics of the Adriatic Sea. Thalassia jugosl., 19(1-4):433-450.

1984. **ZORE-ARMANDA, M.** & Z. VUČAK. Some properties of the residual circulation in the Northern Adriatic. Acta Adriat., 25(1/2): 101-117.

1984. **ZORE-ARMANDA, M.** Hydrographic and productivity conditions of the Palagruža region in the Middle Adriatic. Acta Adriat., 25(1/2): 119-138.

1984. **ZORE-ARMANDA, M.** & V. DADIĆ. Some

dynamic properties of the channel Virsko more (Eastern Adriatic coast). Acta Adriat., 25 (1/2): 139-159.

1985. **ZORE-ARMANDA, M.** & V. DADIĆ. Response to the wind forcing in the basins of the east Adriatic coast. Rapp. Comm. int. Mer Medit., 29(3):p.99.

1985. **ZORE-ARMANDA, M.** Klimatske karakteristike mora u srednjem Jadranu. Geofizika 2:180-193.

1986. GAČIĆ M., **M. ZORE-ARMANDA**, Z. VUČAK & A. SMIRČIĆ. Some observations on the relationship between wind and current in the North Adriatic. Rapp. Comm. int. Mer Medit., 30(2).

1986. **ZORE-ARMANDA, M.,** M. GAČIĆ, A. SMIRČIĆ & Z. VUČAK. Some features of the early and late phase of the deep water formation in the Adriatic Sea. Rapp. Comm. int. Mer Medit., 30(2).

1987. **ZORE-ARMANDA, M.** & M. GAČIĆ. Effects of bura on the circulation in the North Adriatic. Annales Geophvsicae, 5B(1):93-102.

1987. **ZORE-ARMANDA, M.** & M. BONE. The Effect of Bottom Topography on the Current System of the Open Adriatic Sea. Boli. Ocean. Teor. Appl., 5(1):3-18.

1987. **ZORE-ARMANDA, M.,** M. MOROVIĆ, L. STOJANOSKI & I. VUKADIN. Da li je u toku eutrofikacija otvorenog Jadrana? Pomorski zbornik, 25:627-634.

1988. **ZORE-ARMANDA, M.** Seasonal variations of oceanographic properties in the Middle Adriatic. Rapp. Comm. int. Mer Medit., 31 (2):p. 196.

1988. **ZORE-ARMANDA, M**., L. STOJANOSKI & I. VUKADIN. Time series of oceanographic parameters: Eutrophication of the open Adriatic waters. FAO Fisheries Report, 394:71-77.

1988. **ZORE-ARMANDA, M.** Tsunami na Jadranu? Pomorski zbornik, 26:657-668.

1989. SMIRČIĆ, A., **M. ZORE-ARMANDA** & M. GAČIĆ. Cirkulacija vode u Kaštelanskom zaljevu. Hidrografski godišnjak, 1988:29-36.

1991. **ZORE-ARMANDA, M**., M. BONE, V. DADIĆ, M. MOROVIĆ, D. RATKOVIĆ, L STOJANOVSKI & I. VUKADIN. Hydrographic properties of the Adriatic Sea in the period from 1971 through 1983. Acta Adriat., 32 (1): 1-547.

1991. **ZORE-ARMANDA, M.** Natural characteristics and climatic changes of the Adriatic Sea. Acta Adriat., 32 (2): 567-587.

1993. **ZORE-ARMANDA, M.** & B. GRBEC. Unusual sea temperature conditions in the Adriatic in summer 1992, Bilješke -Notes, Institut za oceanografiju i ribarstvo, Split, pp. 1-8

1995. **ZORE-ARMANDA, M.**, M. BONE, V. DADIĆ & Z. VUČAK. Neka novija saznanja o strujanju u sjevernom Jadranu, Pomorski zbornik, 33: 305-328.

1996. **ZORE-ARMANDA, M.** Razvoj oceanografskih istraživanja u vodama Palagruže. Zbornik Palagruža, Jadranski dragulj, Split, pp. 317-327.

1996. **ZORE-ARMANDA, M**., M. BONE, V. DADIĆ, M. GAČIĆ, V.KOVAČEVIĆ & Z. VUČAK. Ecological study of gas fields in the northern Adriatic, 4. Circulation. Acta Adriat., 37(1/2): 35-68.

1998. GRBEC, B., M. MOROVIĆ & **M. ZORE-ARMANDA.** Some new observations on the long-term salinity changes in the Adriatic Sea. Acta Adriat., 39(1): 3-12.

1998. GRBEC, B., M. MOROVIĆ, **M. ZORE-ARMANDA** & N. LEDER. Interannual salinity fluctuations in the Middle Adriatic Sea. Rapp. Comm. int. Mer Medit., 35:148-149.

1998. **ZORE-ARMANDA, M.,** V. DADIĆ, G. BEGPAKLAR & N. LEDER. Analiza rezultata mjerenja struja u Kaštelanskom zaljevu, Zbornik, Kaštela kolijevka Hrvatske (izd. Milan Hodžić), Matica Hrvatska Kaštela, pp. 338-345.

1999. ŠIMUNOVIĆ, A., C. PICCINETTI & **M. ZORE-ARMANDA.** Kill of benthic organisms as a response to an anoxic state in the northern Adriatic (a critical review). Acta Adriat., 40(1): 37-64.

1999. **ZORE-ARMANDA, M.** Razvoj istraživanja hidrografskih svojstava Sredozemlja, Pomorski zbornik, 37:189-207.

2001. **ZORE-ARMANDA, M**., M. MOROVIĆ & P. LA

VIOLETTE. Divergence in the current field in the North Adriatic. Acta Adriat., 42 (1): 5-13.

2002. BEG PAKLAR, G., **M. ZORE-ARMANDA** & V. DADIĆ. Currents in the Kaštela Bay: empirical analysis and results of a numerical model. Acta Adriat., 43(1): 33-64.

2003. GRBEC, B., M. MOROVIĆ & **M. ZORE-ARMANDA.** Mediterranean oscillation index and its relationship with salinity fluctuations in the Adriatic Sea. Acta Adriat., 44(1): 61-76.

2004. **ZORE-ARMANDA, M.** Development of Mediterranean physical oceanography, An overview. In Ocean Sciences Bridging the Millennia, A spectrum of historical accounts. Proceedings of ICHO VI, Oingdao, China, 1998, In: S Morcos *et al*. (Editors). UNESCO, Paris and China Ocean Press, Beijing, pp. 179-195.