

## **Dr. Vladimir Maderich**

Head of Marine and River System Modelling Department  
Institute of Mathematical Machine and System Problems of National Academy of  
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**Birth Date:** 15 November 1944

### **Education**

1968,M.S., Oceanography, Leningrad Hydrometeorological Institute, St.-Peterburg, Russia

1974,Ph.D., Geophysics, Hydrometeorological Centre of USSR , Moscow, Russia

1991,D. Sci., Hydromechanics, Institute of Hydromechanics NAS U, Kiev, Ukraine

### **Training**

Fluid Dynamics Laboratory, Eindhoven University of Technology, Eindhoven, the Netherlands, Joint Netherlands- Ukraine Programme - Visiting Scientist (December 1993- March, 1994)

### **Research Interests**

Large scale circulation of ocean and seas, theory of thermocline, climate changes.

Internal hydraulics of straits and estuaries.

Turbulent mixing in a stably stratified fluid, microstructure of hydrophysical fields.

Radionuclide and pollution transport in the sea.

### **Research Experience**

Aug 2005–Aug 2008 Professor (Full)

Hankuk University of Foreign Studies, South Korea · Seoul

Mar 1996–present Head of Department

National Academy of Sciences of Ukraine, Ukraine · Kiev

### **Teaching experience**

Jan 2012–present      Professor (Full)  
National Taras Shevchenko University of Kyiv, Ukraine · Kiev  
Sep 2005–Aug 2008      Hankuk University of Foreign Studies, South Korea

### **Fields of work:**

Fluid mechanics (stratified flows, turbulence modelling), oceanography (theory of thermocline, internal hydraulics, numerical models of coastal seas), meteorology (weather forecasts), environment fluid mechanics (transport of radionuclides, heavy metals, oil in water, heavy gas dispersion in atmosphere) and water quality modelling.

### **Awards and Achievements**

#### ***Award · Feb 2018***

Tutkovsky award of Ukrainian Academy of Science in field of Earth science "Mathematical modeling of the transfer of radioactivity in marine systems due to the accidents at the Chernobyl and Fukushima NPPs and its application in decision support systems for nuclear accidents".

#### ***Award · Dec 2013***

State Award of Ukraine in Science and Technology 2013 for cycle of works "Regularities of wave-vortical processes in continuum".

### **Selected Publications:**

#### ***Books***

- Lineykin P. S., Maderich V.S. (1982) Theory of oceanic thermocline, Gidrometeoizdat Publ., 269 pp.
- Maderich V.S., Nikishov V. I., Stetsenko A. G. (1988) Dynamics of internal mixing in stratified medium, Naukova Dumka Publ., 239 pp.

#### ***Journal Publications***

- Bezhenar R, Jung K T, Maderich V, et al. Transfer of radiocaesium from contaminated bottom sediments to marine organisms through benthic food chains in post-Fukushima and post-Chernobyl periods[J]. Biogeosciences Discussions,

2016, 13.

- Kantarzhi I G, Maderich V S, Koshebutskii V I. Determination of Ice Characteristics for Marine Hydroengineering Structures[J]. *Power Technology and Engineering*, 2016, 49(5):1-9.
- Maderich V, Ilyin Y, Lemeshko E. Seasonal and interannual variability of the water exchange in the Turkish Straits System estimated by modelling[J]. *Mediterranean Marine Science*, 2015, 16(2):444-459.
- Maderich V, Jung K T, Terletska K, et al. Incomplete similarity of internal solitary waves with trapped cores[J]. *Fluid Dynamics Research*, 2015, Accepted (3):035511.
- Maderich V, Ilyin Y, Lemeshko E. Seasonal and interannual variability of the water exchange in the Turkish Straits System estimated by modelling[J]. *Mediterranean Marine Science*, 2015, 16(2):444-459.
- Maderich V, Jung K T, Bezhenar R, et al. Dispersion and fate of Sr-90 in the Northwestern Pacific and adjacent seas: global fallout and the Fukushima Dai-ichi accident. [J]. *Science of the Total Environment*, 2014, s 494–495:261-271.
- Maderich V, Ilyin Y, Lemeshko E. Seasonal and interannual variability of the water exchange in the Turkish Straits System estimated by modelling[J]. *Mediterranean Marine Science*, 2015, 16(2):444-459.
- Maderich V, Bezhenar R, Heling R, et al. Regional long-term model of radioactivity dispersion and fate in the Northwestern Pacific and adjacent seas: application to the Fukushima Dai-ichi accident. [J]. *Journal of Environmental Radioactivity*, 2014, 131(5):4-18.
- Koziy L, Maderich V, Margvelashvili N, et al. Three-dimensional model of radionuclide dispersion in estuaries and shelf seas[J]. *Environmental Modelling & Software*, 1998, 13(5–6):413-420.
- Maderich V S, Zhelezniak M I. Self-similar development of a turbulent layer in a homogeneous fluid[J]. *Okeanologiya*, 1977, 17(5):784-790.
- Bezhenar R, Maderich V, Heling R, et al. Radiological assessment by compartment model POSEIDON-R of radioactivity released in the ocean following Fukushima Daiichi accident[C]// EGU General Assembly Conference. EGU General

Assembly Conference Abstracts, 2013.

- Brovchenko I, Maderich V, Jung K T. Effects of the Coriolis force on the oil spreading in instantaneous and continuous spill[J]. *International Journal on Theoretical & Applied Research in Mechanical Engineering*, 2013, 15(4):2319-3182.
- Talipova T, Maderich V, Grimshaw R, et al. Interaction of Large Amplitude Interfacial Solitary Wave of Depression with Bottom Step[J]. *Physics of Fluids*, 2010, 12(7):331-341.
- Maderich V, Konstantinov S. Asymptotic and numerical analysis of momentumless turbulent wakes[J]. *Fluid Dynamics Research*, 2010, 42(4):045503.
- Maderich V, Talipova T, Grimshaw R, et al. The transformation of an interfacial solitary wave of elevation at a bottom step[J]. *Nonlinear Processes in Geophysics*, 2009, 16(2):33-42.
- Nesterov AA, Maderich V S. Modeling of hydrodynamics and transport processes in the Dnieper–Bug Estuary[J]. *Physical Oceanography*, 2008, 18(6):345-356.
- Kanarska Y, Maderich V. Modelling of seasonal exchange flows through the Dardanelles Strait[J]. *Estuarine Coastal & Shelf Science*, 2008, 79(3):449-458.
- Maderich V, Heling R, Bezhenar R, et al. Development and application of 3D numerical model THREEETOX to the prediction of cooling water transport and mixing in the inland and coastal waters[J]. *Hydrological Processes*, 2008, 22(7):1000–1013.
- Kovalets I V, Maderich V S. Numerical Simulation of Interaction of the Heavy Gas Cloud with the Atmospheric Surface Layer[J]. *Environmental Fluid Mechanics*, 2006, 6(4):313-340.
- Maderich V, Dziuba N, Koshebutsky V, et al. An assessment of flux of radionuclide contamination through the large Siberian rivers to the Kara Sea[J]. *Radioprotection*, 2005, 40(14): S413-S419.
- Margvelashvily N, Maderich V, Zheleznyak M. THREEETOX - A computer code to simulate three-dimensional dispersion of radionuclides in stratified water bodies[J]. *Radiation Protection Dosimetry*, 1997, 73(1):177-180.

- Kanarska Yu., Maderich V. (2003) A non-hydrostatic numerical model for calculating of free-surface stratified flows in the coastal sea. *Ocean Dynamics* v.51,176-185
- Lepicard S., Heling R., Maderich V. (2003) POSEIDON/RODOS model for radiological assessment of marine environment after accidental releases: application to coastal areas of the Baltic, Black and North seas. *J. Environmental Radioactivity*, (in press)
- Maderich V. S., Brovchenko I., A. (2003) Effect of the wind wave breaking on the structure of surface turbulent layer in the ocean. *Applied Hydromechanics*, 5(77) No. 3.
- Lukyanov P.V., Maderich V.S., Stetsenko O.G. (2002) Visco-diffusive stage of mixed patch evolution in the field of internal wave. *Int. J. Fluid Mech. Research*, 27 p.
- Maderich V., Konstantinov S. (2002) Seasonal dynamics of the system sea-strait: Black Sea-Bosphorus case study. *Estuarine, Coastal and Shelf Sciences*, 55, 183-196.
- Brovchenko I., Maderich V., S. (2002) Numerical Lagrangian method for modelling of the surface oil slick spills. *Applied Hydromechanics*, 4(76), No.4, 23-31.
- Kanarskaya J. V., Maderich V. S. (2002) Non-hydrostatic model for stratified flows with free surface. *Applied Hydromechanics*, 4(76), No.3, 12-21.
- Galaktionov O., Maderich V., Nikishov V. (2001) Evolution of layered structures in the final stage of turbulent decay in a stably stratified fluid, *Dynamics of Atmosphere and Oceans*, 34 no 2-4, 125-144.
- Kovalets I., Maderich V. (2001) Numerical three-dimensional model of dense gas dispersion with use of conservative splitting schemes. *Applied Hydromechanics*, v.3 (75), N1 28-36.
- Maderich V., van Heijst G.J., Brandt A. (2001) Laboratory experiments on intrusive flows and internal waves in a pycnocline *J. Fluid Mech.*, 432, p.285-311.
- Margvelashvili N., Maderich V., Zheleznyak M. (1999) Simulation of radionuclide

fluxes from the Dnieper-Bug Estuary into the Black Sea. *J. Environmental Radioactivity*, 43, No.2, 157-171.

- Maderich V. (1999) Reconstruction and prediction of the radionuclide transport in the Mediterranean seas chain. *J. Environmental Radioactivity*, 43, No.2, 205-219.
- Iritz L., Maderich V., Margvelashvili N., Vukovic M., Zheleznyak M. (1999) A model system for advanced management of accidental toxic spill in drinking water sources: Lake Vomb case study. *Vatten*, 55, p.109-120.
- Galaktionov A., Maderich V. (1999) Dynamics of the layered structures in the final stage of turbulence decay in the stably stratified fluid. *Izv. Russian AN, Phys. Atmos. Ocean*, 35, No 6, p.829-837.
- Kovalets I., Maderich V. (1999) Dynamics and energetics of heavy gas dispersion in the surface layer of atmosphere. *Applied Hydromechanics*, v.1 (73), N4, p.12-20.
- Koziy L., Maderich V., Margvelashvili N., Zheleznyak M. (1998) Three-dimensional model of radionuclide dispersion in the estuaries and shelf seas. *J. Environmental Modeling and Software*, 13 (5-6), 413-420.
- Maderich V. (1998) Modelling of the Mediterranean System: Changes under Climate Variations and Man-made Impact. *J. Environmental Modeling and Software*, 13 (5-6), 405-412.
- Maderich V. S., Nikishov V. I. (1998) Mixing and restratification in a stably stratified fluid. *Int. J. Fluid Mech. Res.*, 23, 38-47.
- Maderich V.S., Konstantinov S.I., Kulik A.I. and Oleksiuk V.V. (1998) Laboratory modelling of the water exchange through the sea straits. *Oceanology*, 38, p.665-672.
- Margvelashvili N., Maderich V., Zheleznyak M. (1997) THREETOX - computer code to simulate three-dimensional dispersion of radionuclides in homogeneous and stratified water bodies. *Radiation Protection Dosimetry*, 73, 177-180.
- Maderich, V.S., Kulik A. I. (1992) Laboratory experiment on collapse of intrusion in a layered medium, *Izv. RAN, Phys. Atmos. Ocean*, 28, 1197--1204.
- Avdeyeva I.Yu., Maderich V.S. (1990) The Monte-Carlo simulation of the small-

scale turbulence and results of its measurements in the ocean, *Morskoy Gidrofiz. Zh.*, no. 5, 31-37.

- Maderich V.S., Efroimson V.O. (1990) To the theory of the water-exchange through straits. *Oceanology*, 30, no. 4, 567-574.
- Nikiforovich E.I., Maderich V.S. (1989) Asymptotical analysis of the Navier-Stokes equations in the problem of free convection, *Doklady AN USSR*, 308, no. 2, 307-311.
- Avdeyeva I. Yu., Maderich V.S. (1987) Energetics of turbulent patches in stably stratified ocean. *Oceanology*, 27, No 2, p.185-190.
- Maderich V.S., Efroimson V.O. (1986) The simple model of the sea with strait. *Oceanology*, 36, no. 3 p.402-408.
- Maderich V. S., Nikishov V.I. (1986) Diffusive-viscous stage of mixed patch collapse in the stratified fluid. *Izv. AN USSR, Phys. Atmos. Ocean*, 22, No 6, pp.656-658.
- Maderich V. (1982) On relation between vertical turbulent mixing in the ocean and dynamics of turbulent patches. *Oceanology*, 22, N6, pp. 936-940.
- Maderich V.S. (1978) Non-linear evolution of large-scale density anomalies in the ocean. *Izv. AN USSR, Phys. Atmos. Ocean*, 14, No 11, 1219-1222.
- Maderich V.S., Zheleznyak M.J. (1977) Self-similar development of turbulent layer in homogeneous fluid. *Oceanology*, 17, N5, pp. 784-790.
- Maderich V. S. (1976) On the theory of abyssal circulation. *Izv. AN USSR, Phys. Atmos. Ocean*, 12, No 4, 402-409.
- Maderich V.S. (1975) Dynamics of western boundary currents in the baroclinic ocean. *Oceanology*, 15, No3, 415-421.
- Maderich V. S. (1975) On the role of the upper quasi-homogeneous layer in the heat transport by the oceanic currents. *Meteorology and Hydrology*, No. 10, p. 63-72.
- Maderich V.S. (1974) Model of the anticyclone gyre in the ocean. *Izv. AN USSR, Phys. Atmos. Ocean*, 10, No 8, 830-841.
- Maderich V. S. (1974) On vertical structure of the main oceanic thermocline.

Meteorology and Hydrology, No. 10, p. 67-74.

- Conference Publications
- Kantardgi I, Maderich V, Sharova V. Water Exchange Aspects for the New Seaport in Gelendjik Bay (Black Sea) [C]// Medcoast'15, International Conference on the Mediterranean Coastal Environment. 2015.
- Maderych V, Jung K T, Terletska K, et al. Incomplete Similarity of Internal Solitary Waves with Trapped Core[C]// AGU. 2015.
- Maderich V, Kanarska Y, Fenical S, et al. 3D NON-HYDROSTATIC MODELING OF BOTTOM AND BANK STABILITY SUBJECTED BY SHIP PROPELLER JETS[C]// International Conference on Coastal Engineering. 2007.
- Brovchenko I., Kuschan A., Maderich V., Shliakhtun M., Koshebutsky V., Zheleznyak M. (2003) Model for oil spill simulation in the Black Sea. Proc. 3rd Int. Conf. Oil Spills, Oil Pollution and Remediation, 16-18 Sept. 2003, Bogazici Univ., Istanbul, p. 101-112.
- Kanarska Y. Maderich V. (2003) A non-hydrostatic numerical modeling exchange flows. Proc. of XXX IAHR Congress. Thessaloniki, Greece, August 2003. Theme A pp. 203-210.
- Brovchenko I., Kuschan, A., Maderich V., Shliakhtun M., Yuschenko S., Zheleznyak M. (2003) The modelling system for simulation of the oil spills in the Black Sea. Proc. 3rd European GOOS Conference, Elsevier (in press)
- Kanarska Yu., Maderich V. (2002) A non-hydrostatic numerical model for calculating of free-surface stratified flows in the coastal sea. Book of Extended Abstracts of 11th International Biennial Conference on Physics of Estuaries and Coastal Seas in Hamburg, September 17-20, 200, p.147-150.
- Maderich V., Dziuba N., Koshebutsky V., Zheleznyak M., Volkov V. (2002) Modelling of the seasonal dynamics of the water masses, ice and radionuclide transport in the large Siberian river estuaries. Book of Extended Abstracts of 11th International Biennial Conference on Physics of Estuaries and Coastal Seas in Hamburg, September 17-20, 2002, p.243-246.
- Maderich V., Nesterov O., Zilitinkevich S. (2002) The influence of different

parameterisations of meteorological forcing and turbulence schemes on modelling of eutrophication processes in a 3D model of estuary. Book of Extended Abstracts of 11th International Biennial Conference on Physics of Estuaries and Coastal Seas in Hamburg, September 17-20, 2002, p. 57-60.

- Hoybye J., Iritz L., Zheleznyak M., Maderich V., Demchenko R., Dziuba N., Donchitz G., Koshebutsky V. (2002) Water quality modelling to support the operation of the Kakhovka Reservoir, Dnieper River, Ukraine. Hydroinformatics 2002: Proceedings of the Fifth International Conference on Hydroinformatics, Cardiff, UK, p.946-951.
- Margvelashvili N., Maderich V., Yuschenko S., Zheleznyak M. (2002) 3D modelling of the mud and radionuclide transport in Chernobyl cooling pond and Dnieper-Boog Estuary. Fine Sediments Dynamics in the Marine Environment Proceedings of INTERCOH-2000. ed. J.C. Winterwerp and C. Kranenburg, Elsevier, p. 595-610.
- Popov A., Catsaros N., Maderich V., Yuschenko S. (2002) Reconstruction of land-to-sea radionuclide flux by POSEIDON/RODOS model chain: The Thermaikos Gulf case. Radioprotection Vol. 37,C1 In Proceedings of the Congress on the radioecology - ecotoxicology of continental and estuarine environments ECORAD 2001, p.677-682.
- Veleva B., Koziy L., Yushchenko S., Maderich V., Mungov G. (2002) Assessment of radionuclide contamination in the Black Sea using Poseidon/Rodos system. Radioprotection Vol. 37, In Proceedings of the Congress on the radioecology - ecotoxicology of continental and estuarine environments ECORAD 2001p. C1-827-832
- Johannesen, O. M., Pettersson, L. H., Gao Y., Nielsen, S.P., Borghuis, S., Strand, P., Reiersen, L. O., Bobylev, L. P., Volkov, V., Neelov, I., Stepanov, A., Bobylev, K., Zheleznyak, M., Maderich, V. (2002) Simulation for potential radioactive spreading in the 21 century from rivers and external sources in the Russian arctic coastal zone-RADARC, in The 5th Int. Conf. on Environmental Radioactivity in the Arctic & Antarctic, edited by P. Strand, T. Jolle and A. Sand, Norway Radiation

Protection Authority, Norway, p.53-57.

- Maderich V. (2000) Two-layer exchange flows through long straits with sill. - Oceanic fronts and Related Phenomena. Konstantin Fedorov Int. Memorial Symp., IOC Workshop Rep. Series, N 159, UNESCO'2000, p. 326-331.
- Koziy L., Maderich V., Margvelashvili N., Zheleznyak M. (2000) Numerical modelling of seasonal dynamics and radionuclide transport in the Kara Sea. - Oceanic fronts and Related Phenomena. Konstantin Fedorov Int. Memorial Symp., IOC Workshop Rep. Series, N 159, UNESCO'2000, p. 296-301.
- Maderich V. (1998) Modelling of the Black Sea changes under climate variations and man-made impact with use of isotope transport studies. In: Proc. Int. Seminar on the use of isotope techniques in marine environmental studies. IAEA-SR-194/16, IAEA, Vienna.
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- Nielsen S.P., Maderich V., Zheleznyak M., Dutton L.M.C., Sivintsev Y., Lystsov V., Efimov E.I., Sazykina T. (1998) Radiological assessment of the nuclear reactors with spent fuel which have been scuttled in the Kara Sea. - Proc. of International Symposium on Marine Pollution, IAEA, Vienna, p.370-371.
- Koziy L., Margvelashvili N., Maderich V., Zheleznyak M. (1998) Three-dimensional simulation of radionuclides dispersion in the stratified estuaries. Proc. of International Symposium on Marine Pollution, IAEA, Vienna, 199-204.
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in stably stratified fluids. Modelling of oceanic vortices. (Ed. G.J.F. van Heijst), Elsevier Publ., p.75-84.

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