

CURRICULUM VITAE

Maurizio Azzaro, Ph.D.

Researcher at the *Institute of Polar Sciences*
National Research Council (CNR-ISP)

ERC Panels: *LS8 and LS9*

ORCID: *0000-0001-7885-2340*

SCOPUS: <https://www2.scopus.com/authid/detail.uri?authorId=6602752439>

ResearchGate: https://www.researchgate.net/profile/Maurizio_Azzaro_Di_Rosamarina

Main Research Fields

Biologist and Naturalist, Dr. Azzaro has carried out his research in several marine and terrestrial environments, from transitional aquatic ecosystems to the oceans' abyssal depths. His main research interest deals with the trophodynamics of the coastal and pelagic microbial loop (including viruses, prokaryotes and eukaryotes) and ascertaining how they vary in response to different typologies of anthropogenic or natural perturbations, including climate change.

Particular attention is paid to:

- Microbial biodiversity and functions in polar ecosystems in a changing climate;
- Biological carbon pump and metabolic rates of CO₂ sequestration in the marine environments, especially in the deep-sea;
- Search for novel extreme systems in Antarctica, which may be terrestrial analogues of planets and moons in our solar system;
- Relationships between chemical contamination (e.g. heavy metals, petroleum, plastics) and prokaryotic biodiversity in polar areas; bioremediation potential of microbes;
- Development of new technologies for sampling activities in marginal areas of glaciers at sea;
- Conservation and protection of terrestrial and marine ecosystems, especially within the Antarctic Treaty Consultative Meeting (ATCM) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Institutional Responsibilities

- **2019-present.** Head of the Institute of Polar Sciences in the section of Messina (Italy).
- **2019-present.** Member of the advisory board representative of researchers (CNR-ISP);
- **2018-present.** Vice President of the Committee for Polar Research (CRP - as an expert for the National Marine Biology), organ of the Italian National Research Council (CNR) with a mandate to carry out the planning and coordination of scientific research in the Italian National Research Program in Antarctica (PNRA).
- **2018-present.** He is among the experts of the *Enlarged Working Group* (GLA) of the Italian Ministry of Foreign Affairs and International Cooperation (MAECI) for Antarctic issues. The present assignment involves the participation in the meetings of the GLA convened by the MAECI, and the international missions that the same Ministry deems appropriate, in particular in the field of ATCM (*Antarctic Treaty Consultative Meeting*), CEP (*Committee for Environmental Protection*) and CCAMLR (*Commission for the Conservation of Antarctic Marine Living Resources*). As part of the same assignment, he participates in the discussion of the "Bill

drawing up provisions for the implementation of international obligations deriving from Italy's participation in the Antarctic Treaty system";

•**2018-present.** Member of the "Antarctic Interlaboratory System" Management Committee (SIA) of the Italian National Antarctic Research Program (PNRA). The SIA aims to strengthen in a coordinated way a network of laboratories in Italy, where instruments of significant scientific and technological value, of great interest for the Antarctic scientific community (national and otherwise) and immediately usable by it, and destined for the examination, characterization and analysis of inorganic and biological materials collected in Antarctica;

•**2017-present.** Member of the Pool of Experts of United Nations (UN) for Global Reporting and Assessment of the state of the Marine Environment, including socio-economic aspects (World Ocean Assessment II);

•**2014-present.** Member of the Italian CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) Commission. Ministry for the Environment and Land Protection (DM dell'08-08-2014 n.0000211);

•**2018.** Coordinator of Scientific Activities carried out at the Antarctic Research Station "Mario Zucchelli" within the XXXV Italian Antarctic Expedition (First Period);

•**2018.** Coordinator of Scientific Activities carried out at the Antarctic Research Station "Mario Zucchelli" within the XXXIV Italian Antarctic Expedition (First Period);

•**2017-2018.** Coordinator of Scientific Activities carried out at the Antarctic Research Station "Mario Zucchelli" within the XXXIII Italian Antarctic Expedition (Second and Third Periods);

•**2016-2018.** Member of the advisory board representative of research and technologist staff (IAMC-CNR);

•**2013-2018.** Referent of the Italian National Research Council (CNR) for marine acidification (8B12) in the context of the Marine Strategy Framework Directive (MSFD);

•**2011-2018.** Member of the Committee for Polar Research (CRP);

•**2017.** Member of the Working Group (10 Italian Scientists), appointed by the Italian National Scientific Commission for Antarctica (CSNA), who has developed the Italian monitoring plan for the Marine Protected Area in the Ross Sea Region (CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources - April 26-28, 2017, Farnesina, Rome, Italy);

•**2016.** He was member of the Italian MIUR (Ministry of Education, University and Research) delegation at SCAR 2016 (The Scientific Committee on Antarctic Research) - Kuala Lumpur (Malaysia) - for the Marine Biology;

•**2013-2016.** Member of the Pool of Experts of United Nations (UN) for Global Reporting and Assessment of the state of the Marine Environment, including socio-economic aspects (World Ocean Assessment I);

•**2014-2015.** Member of the working group "Collection and storage of samples taken in Antarctica" appointed by Italian Ministry of Education, University and Research (MIUR) to verify the actual procedure of PNRA and propose a system update;

•**2010-2013.** Advisory member to the group "carbon budget" of the Committee Oceanography Italian (COI).

•**2011.** In September 2011 he was a member of CNR's delegation in Korea at KOPRI, representing Italian Polar Marine Biology, for a bilateral meeting on the topic of polar areas.

Research Projects

Participation at EC and national projects (>40). PI or WP leader in Mediterranean Sea (EU Marine Strategy, VECTOR, SESAME), Antarctica (CELEBeR, ClicPER-ECO, RESTORE, IPECA) and Arctic (Sponge-POP, Arca) projects.

- **2020-present.** Scientific coordinator of a research unit in PNRA (Italian National Research Program in Antarctica) project Robotic-based invESTigation and mOnitoring Ross sEa (RESTORE)
- **2020-present.** Scientific coordinator of a research unit in PNRA (Italian National Research Program in Antarctica) project Interactions between Permafrost and Ecosystems in Continental Antarctica (IPECA)

- **2017-present.** Scientific coordinator of a research unit in PNRA (Italian National Research Program in Antarctica) project "Climate Change and Permafrost Ecosystems in Continental Antarctica (Clic-PerEco);
- **2016-present.** Scientific coordinator of a research unit in PNRA project "CDW effects on glacial melting and on bulk of Fe in the Western Ross Sea (CELEBER)";
- **2013-2016.** He participated in the project PERSEUS (Policy-oriented marine Environmental Research for the Southern European Seas) to study the biogeochemistry of the central Mediterranean sea (Adriatic and Ionian seas);
- **2015.** Scientific coordinator of a research unit in ARCA project (ARctic: present Climatic change and pAst extreme event);
- **2014.** Scientific coordinator of project "Sponge associated culturable microbiome able to degrade persistent organic pollutant along the Pasvik River and the Bokfjorden" (SPONGEPOP) that has been granted INTERACT Transitional Access to Bioforsk Svanhovd Research Station in Norway;
- **2011-2012.** Join the line of research of the Department of Earth and Environment (CNR TA.P04.001.002) - Microbial processes involved in the carbon cycle of coastal and pelagic zones, both in the Mediterranean and polar areas;
- **2008-2010.** Scientific coordinator of activities in the sub-project VECTOR (Vulnerability of Coastal and Marine Ecosystems Italian to climate change and their role in carbon cycles Mediterranean) in the context of lines: 1) CARADRI (The role of the continental shelf in the northern Adriatic carbon cycles in the Mediterranean), (Line 6-3), 2) CARPEL (the carbon cycle in the pelagic Mediterranean), (central-southern Tyrrhenian Sea: Line 8-2; southern Adriatic: Line 8-1, Trans -med: Line 8-5);
- **2008-2010.** He participated in "Italy-China Joint Project Proposal "Understanding expression and regulation of microbial enzymes Involved in organic matter decomposition at different trophic levels and the interrelationship between alkaline phosphatase and eutrophication in Italian and Chinese water bodies" of the MIUR;
- **2007-2009.** He participated in the SESAME project (Southern European Seas: Assessing and Modelling Ecosystem changes) U.O. Bacterial Biomass, Production and Respiration in the Ionian sea, FP 6 EU;
- **2005-2009.** He participated in the module CNR (TA.P02.016.002): "Suspended particles and microorganisms in biogeochemical processes". The module was relating to the Project: Changes in the biogeochemistry of the sea;
- **2005-2009.** He participated in the module CNR (TA.P02.006.004) "Role of microorganisms in biogeochemical cycles of the ocean Antarctic and oxidation processes in polar environments". The module was relating to the Project: The polar ocean system;
- **2006.** He participated in the RSTL - CNR cod. 483: Ecological analysis of microbial communities and their efficiency in the meso-and remineralization bati-pelagic in the Mediterranean Sea: relationships with climate change and the trophic structure of the main water masses, 2008, CNR;
- **2004-2006.** He participated in the project ABIOCLEAR (Antarctic BIOgeochemical cycles-CLimatic and palEoclimAtic Recostructions), U.O. Microbial biomass and activities, PNRA;
- **2003-2005.** He participated in the European program Mediterranean Forecasting System Towards Environmentale Prediction (2003-2006). His job was to coordinate logistical support for the testing of a Glider;
- **2003-2005.** He participated in the "Monitoring Program to control the coastal marine environment facing the Sicilian Region" in respect of areas "Gulf of Milazzo" and "AMP Cyclops";
- **2000-2004.** He participated in the program: Cluster 10 - "Strengthening of research networks in depressed areas" funded by MIUR, project "Creation and activation of an

integrated network of coastal platforms and mobile vehicle equipped for Advanced Systems of water monitoring (SAM-Workpackage 1 , SAM-Workpackage 2);

- **1999-2002.** He participated in the project BIOESOS II (Biogenic Sedimentation in the Southern Ocean: The relationship between biogeochemical processes, the CO₂ balance and climate change. Remote sensing, testing and modeling);
- **1999-2002.** He participated in the program TALASTRO (I, II, III, IV) within the Project NEMO (NEutrIn Monitoring Observatory);
- **1999-2002.** He participated in the Italian National Program Marine Ecosystems: SINAPSI (Seasonal, Interannual and decadal variability of the atmosphere, ocean and related marine ecosystems);
- **1999-2000.** He participated in the project "Environmental surveys to support the assessment of the effects induced by the systems testing and remediation pilot in the Mar Piccolo of Taranto";
- **1999.** He participated in the EMTEC project (Eastern Mediterranean Transient and impact on the Ecosystem);
- **1998.** He participated in the MATER project (Mass Transfer and Ecosystem Response);
- **1996-1998.** He participated in the project PRISMA II (Rehabilitation and Protection of the Adriatic Sea) in the thematic area "Biogeochemical Cycles";
- **1995.** He participated in the program of study of the Strait of Magellan (PNRA);
- **1995.** He participated in the program POEM-LIWEX 95 (Ionian Sea and the Eastern Mediterranean);
- **1994-1995.** He participated in the program ROSSMIZE (ROSS Melting Ice Zone) in Antarctica;
- **1993.** He participated in the "Hydrodynamics of the Strait of Messina and its influence on the levels of plankton biocenosis";
- **1992.** He participated in the program POEM 7 (Physical Oceanography of Eastern Mediterranean);
- **1989-1991.** He participated in the strategic project "Monitoring of marine pollution in Southern Italy" of the CNR. Integrated system for monitoring the Augusta roadstead I. Preliminary studies for the positioning of oceanographic buoys.

Field experiences

In the framework of several national and international research projects, Maurizio Azzaro participated to sampling campaigns in Antarctic and Arctic (e.g., Arctic Norway and Svalbard Islands) areas, as well as to oceanographic cruises in the Mediterranean Sea (he was the Scientific Coordinator of seven oceanographic cruises on board the R/V Urania). Some expeditions in polar areas are listed below.

- **2019.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project CliCPerEco);
- **2018.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project ANT-Biofilm);
- **2017-2018.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project ANT-Biofilm);
- **2016-2017.** He took part in a scientific expedition in the Ross Sea, within the Italian National Research Programme in Antarctica (PNRA) (Project CELEBER);
- **2017.** He took part in a scientific expedition to the Kongsfjorden (organization and logistics of the CNR in Ny Alesund, Svalbard Islands) (Project UVASS);
- **2015.** He took part in a scientific expedition to the Kongsfjorden (organization and logistics of the CNR in Ny Alesund, Svalbard Islands) (Project ARCA);
- **2014.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project Ecology of Permafrost);

- 2014.** He took part in two sampling campaigns (in May and July) in the Pasvik Valley (Arctic Norway), within the INTERACT-EU Program (Project SpongePOP);
- 2013.** He took part in a scientific expedition to the Kongsfjorden (organization and logistics of the CNR in Ny Alesund, Svalbard Islands) (Project MYKA);
- 2012.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project SICAF);
- 2005.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project ABIOCLEAR);
- 2001.** He took part in a scientific expedition in Terra Nova Bay, within the Italian National Research Programme in Antarctica (PNRA) (Project BIOSESO).

Editorial Activity

- 2021.** Editor of *Frontiers in Marine Science: Section Marine Biogeochemistry*.
- 2014-present.** Review Editor of *Frontiers in Marine Science: Section Marine Biogeochemistry*.
- 2020-21.** Guest Co-Editor of *Water* for the Special Issue in *Microbial Life in the Cold: A Focus on Extreme Aquatic Environments*.
- 2019-20.** Guest Co-Editor of *Microorganisms* for the Special Issue in *Polar microbial ecology: the role of microbes in the functioning of extremely cold ecosystems*.

Working Experiences in scientific fields

- 2018-2019.** Researcher at the Institute for Marine Biological Resources and Biotechnology of the National Research Council (CNR-IRBIM);
- 2006-2018.** Researcher at the Institute for the Coastal Marine Environment of the National Research Council (CNR-IAMC);
- 1999-2006.** Technician at the Istituto Sperimentale Talassografico, Messina.
- 1997-1999.** Term-Contract worker for the Istituto Sperimentale Talassografico in Trieste for biochemical analyses in the Adriatic Sea;
- 1994.** Term-Contract worker for the Consorzio per il Centro Interuniversitario di Biologia Marina "G. Bacchi" in Livorno for oceanographic studies in the Straits of Messina;

Education

- 2008.** Ph. D. in Science and Engineering of the Sea, University of Naples Federico II, Italy;
- 1997.** Degree in Natural Sciences, University of Messina, Italy;
- 1995-1996.** Research grant at the Istituto Sperimentale Talassografico, Messina.
- 1994.** He qualified to practice as a biologist at the University of Messina;
- 1993.** Degree in Biological Sciences, University of Messina, Italy.
- 1989-1991.** Research grant at the Istituto Sperimentale Talassografico, Messina for the physical and biological characterization of seawater.

Scientific Production

To date, Maurizio Azzaro has published more than 80 papers in highly ranked scientific journals, including *Scientific Reports*, *Biotechnology Advances*, *Science of the Total Environment*, *Soil Biology and Biochemistry*, *Microbial Ecology*, more than 150 communications at national and international conferences/workshops/congresses, and 15 chapters on scientific monographs.

Maurizio Azzaro has a Hirsch factor (H-index) of 19 and over 1213 citations (*source: Google Scholar*).

Recent Research and Review papers (last 5 years)

1. Azzaro M., Aliani S., Maimone G., Decembrini F., Caroppo C., Giglio-F., Langone L., Misericocchi S. Cosenza A., Azzaro F., Rappazzo A.C., Cabral A.S. Paranhos R., Mancuso M., La Ferla R. (2021) Short-term dynamics of nutrients, planktonic abundances, and

- microbial respiratory activity in the Arctic Kongsfjorden (Svalbard). *Polar Biology*, <https://doi.org/10.1007/s00300-020-02798-w>.
2. Lo Giudice A., Conte A., Papale M., Rizzo C., Azzaro M., Guglielmin M. (2021) Prokaryotic Diversity and Metabolically Active Communities in Brines from Two Perennially Ice-Covered Antarctic Lakes. *Astrobiology*, <https://doi.org/10.1089/ast.2020.2238>;
 3. Galgani F., Stoen-Brien A., Weis J., Ioakeimidis C., Schuyler Q., Makarenko I., Griffiths H., Bondareff J., Vethaak D., Deidun A., Sobral P., Topouzelis K., Vlahos P., Lana F., Hasselov M., Gerigny O., Arsonina B., Ambulkar A., Azzaro M., Bebianno M.G. (2021) Are litter, plastic and microplastic quantities increasing in the ocean? *Microplastics and Nanoplastics* volume 1, Article number: 2.;
 4. Caruso G., Madonia A., Bonamano S., ...Marcelli M., Azzaro, M. (2020) Microbial abundance and enzyme activity patterns: Response to changing environmental characteristics along a transect in Kongsfjorden (Svalbard islands). *Journal of Marine Science and Engineering*, 8(10), pp. 1–23, 824;
 5. Gentile G., Maimone G., La Ferla R., Azzaro M., et al. (2020) Phenotypic Variations of *Oleispira antarctica* RB-8(T) in Different Growth Conditions. *Current Microbiology*, 77(11), pp. 3414–3421;
 6. Papale M., Rizzo C., Fani R., ...Azzaro M., Lo Giudice, A. (2020) Exploring the Diversity and Metabolic Profiles of Bacterial Communities Associated With Antarctic Sponges (Terra Nova Bay, Ross Sea). *Frontiers in Ecology and Evolution*, 2020, 8, 268
 7. Zaccone R., Misić C., Azzaro F., Azzaro M., et al (2020) Regulation of microbial activity rates by organic matter in the Ross Sea during the austral summer 2017. *Microorganisms*, 8(9), pp. 1–25, 1273
 8. Sannino C., Borruso L., Mezzasoma A., Battistel, D., Zucconi, L., Selbmann, L., Azzaro, M. et al (2020) Intra- and inter-cores fungal diversity suggests interconnection of different habitats in an Antarctic frozen lake (Boulder Clay, Northern Victoria Land). *Environmental Microbiology*, 22(8), pp. 3463–3477
 9. Porcino, N., Cosenza, A., Azzaro, M. (2020) A review on the geochemistry of lakes in Victoria Land (Antarctica). *Chemosphere*, 2020, 251, 126229
 10. Rizzo, C., Conte, A., Azzaro, M., et al (2020) Cultivable bacterial communities in brines from perennially icecovered and pristine antarctic lakes: Ecological and biotechnological implications. *Microorganisms*, 2020, 8(6), 819
 11. Azzaro M., Pachard T.T., Monticelli L.S., et al. (2019) Microbial metabolic rates in the Ross Sea: The AbioClear project. *Nature Conservation Open Access*, 34, 441-475;
 12. Song C., Cao X., Zhou Y., Azzaro M., et al. (2019) Nutrient regeneration mediated by extracellular enzymes in water column and interstitial water through a microcosm experiment. *Science of the Total Environment*, 670, 982-992;
 13. Laganà P., Caruso G., Corsi I., Bergami E., Venuti V., Majolino D., La Ferla R., Azzaro M., Cappello S. (2019) Do plastics serve as a possible vector for the spread of antibiotic resistance? First insights from bacteria associated to a polystyrene piece from King George Island Antarctica). *International Journal of Hygiene and Environmental Health*, 222 (1) 89-100;
 14. Zaccone, R., Azzaro, M., Caruso, G., et al. (2019) Effects of climate changes on the microbial activities and prokaryotic abundances in the euphotic layer of the Central Mediterranean Sea. *Hydrobiologia*, <https://doi.org/10.1007/s10750-019-04023-0>;
 15. Caputo S., Papale M., Caputo S., Papale M., Rizzo C., Giannarelli S., Conte A., Moscheo F., Graziano M., Aspholm P.E., Onor M., De Domenico E., Misericocchi S., Michaud L., Azzaro M., Lo Giudice A. (2019) Metal Resistance in Bacteria from Contaminated Arctic Sediment is Driven by Metal Local Inputs. *Arch Environ Contam Toxicol.*, 77(2): 291-307;
 16. Lo Giudice A., Azzaro M. (2019) Diversity and ecological roles of prokaryotes in the changing Antarctic marine environment. In *The Ecological Role of micro-organisms in*

- the Antarctic Environment, Castro Sowinski (Ed.), Springer Polar Sciences, Springer Nature Switzerland, Chapter 6: 109-131;
17. Lo Giudice A., Azzaro M., Schiaparelli S. (2019) Microbial symbionts of Antarctic marine benthic invertebrates. In *The Ecological Role of micro-organisms in the Antarctic Environment*, Castro Sowinski (Ed.), Springer Polar Sciences, Springer Nature Switzerland, Chapter 13: 277-296;
 18. Borruso L., Sannino C., Selbman L., Battistel D., Zucconi L., Azzaro M., et al. (2018) A thin ice layer segregates two distinct fungal communities in Antarctic brines from Tarn Flat (Northern Victoria Land). *Scientific Reports*, 8 (1), 6852;
 19. Song C., Cao X., Zhou Y., Azzaro M., et al. (2018) Different pathways of nitrogen and phosphorus regeneration mediated by extracellular enzymes in temperate lakes under various trophic state. *Environmental Science and Pollution Research*, 25 (31), 31603-31615;
 20. Papale M., Conte A., Mikkonen A., Michaud L., La Ferla R., Azzaro M., et al (2018) Prokaryotic assemblages within permafrost active layer at Edmonson Point (Northern Victoria Land, Antarctica). *Soil Biology and Biochemistry*, 123, 165-179;
 21. Zaccone R., Azzaro M., et al. (2018) Trophic structure and microbial activity in a spawning area of *Engraulis encrasicolus*. *Estuarine, Coastal and Shelf Science*, 207, 215-222;
 22. Piermattei V., Madonia A., Bonamano S., Martellucci R., Bruzzone G., Ferretti R., Odetti A., Azzaro M., et al. (2018) Cost-effective technologies to study the arctic ocean environment. *Sensors*, 18 (7), 2257;
 23. Placenti F., Azzaro M., et al. (2018) Biogeochemical patterns and microbial processes in the Eastern Mediterranean Deep Water of Ionian Sea. *Hydrobiologia*, 815 (1), 97-112;
 24. La Cono V., Ruggeri G., Azzaro M., et al. (2018) Contribution of bicarbonate assimilation to carbon pool dynamics in the deep Mediterranean Sea and cultivation of actively nitrifying and CO₂-fixing bathypelagic prokaryotic consortia. *Frontiers in Microbiology*, 9, 3;
 25. Laganà P., Votano L., Caruso G., Azzaro M., et al. (2018) Bacterial isolates from the Arctic region (Pasvik River, Norway): assessment of biofilm production and antibiotic susceptibility profiles. *Environmental Science and Pollution Research*, 25 (2), 1089-1102;
 26. Alder V., Azzaro M., et al. (2017) Southern Ocean. In book: *First Global Marine Assessment*, Chapter: 36H, Publisher: Oceans and Law of the Sea, United Nations, pp.41;
 27. Malone T., Azzaro M., et al. (2017) Primary Production, Cycling of Nutrients, Surface Layer and Plankton. In book: *First Global Marine Assessment*, Chapter: 6, Publisher: Oceans and Law of the Sea, United Nations, pp.67;
 28. Misić C., Covazzi Harriague A., Giglio F., La Ferla R., Rappazzo A.C., Azzaro M. (2017) Relationships between electron transport system (ETS) activity and particulate organic matter features in three areas of the Ross Sea (Antarctica). *Journal of Sea Research*, 129, 42-52;
 29. Zappalà G., Bruzzone G., Azzaro M., Caruso G. (2017) New advanced technology devices for operational oceanography in extreme conditions. *International Journal of Sustainable Development and Planning*, 12 (1), 61-70;
 30. Caruso G., Azzaro M., Monticelli L.S., Leonardi M., Cao X., Zhou Y. and Song C. (2017) Seasonal variations in microbial parameters and trophic states in a large Chinese shallow lake (Lake Taihu). *Fresenius Environmental Bulletin*, 26 (1a): 785-796;
 31. La Ferla R., Azzaro M., et al. (2017) Prokaryotic abundance and activity in permafrost of the Northern Victoria Land and Upper Victoria Valley (Antarctica). *Microbial Ecology*, 74 (2), 402-415;
 32. Caroppo C., Pagliara P., Azzaro F., Misericocchi S., Azzaro M. (2017) Late Summer Phytoplankton Blooms in the Changing Polar Environment of the Kongsfjorden

- (Svalbard, Arctic). *Cryptogamie, Algologie*, 38 (1), 53-72;
33. Caruso G., Azzaro M., et al. (2016) Microbial community and its potential as descriptor of environmental status. *ICES J. Mar. Sci.*, doi: 10.1093/icesjms/fsw101;
 34. Forte E., Dalle Fratte M., Azzaro M., Guglielmin M. (2016) Pressurized brines in continental Antarctica as a possible analogue of Mars. *Scientific Reports*. DOI: 10.1038/srep33158;
 35. Caruso G., La Ferla R., Azzaro M., et al. (2016) Microbial assemblages for environmental quality assessment: Knowledge, gaps and usefulness in the European marine strategy framework directive. *Crit. Rev. Microbiol.*, doi: 10.3109/1040841X.2015.1087380;
 36. Zappalà G., Bruzzone G., Caruso G., Azzaro M. (2016) Development of an automatic sampler for extreme polar environments: first in situ application in Svalbard Islands. *Rend. Fis. Acc. Lincei*, doi:10.1007/s12210-016-0539-1.

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