

CNRS Senior Research Scientist (*Directeur de recherche CNRS de classe exceptionnelle*)

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Born 14 December 1958 in Antibes, France. French citizen. Married, no children.

### **Educational background**

- 1994: *Habilitation*, Biological Oceanography, University of Nice, France
- 1987: Ph. D., Biological Oceanography, University of Aix-Marseille II, France
- 1982: M. Sc. in Oceanography, University of Aix-Marseille II

### **Professional background**

- 2015-present: Associate Scientist, Institute for Sustainable Development and International Relations, France
- 2005-present: Research Professor (*Directeur de recherche CNRS de classe exceptionnelle*), Laboratoire d'Océanographie de Villefranche, France
- 1998-2004: Group leader, Laboratoire d'Océanographie de Villefranche, France
- 1998-2004: Group leader, Monaco Scientific Center, Principality of Monaco
- 1990-1992: Research Scientist, CNRS and University of Perpignan, France
- 1988-1990: Postdoctoral Research Scientist, Australian Institute of Marine Science
- 1985-1987: Reader, University of Nice, France

### **Awards**

- 2020: Ruth Patrick Award, Association for the Sciences of Limnology and Oceanography
- 2018: Elected member, Academia Europaea
- 2014: Member, European Academy of Sciences
- 2014: Blaise Pascal Medal in Earth and Environmental Sciences, European Academy of Sciences
- 2012: Vladimir Vernadsky Medal, European Geosciences Union
- 2005: Union Service Award, European Geosciences Union
- 2002: Outstanding reviewer, Limnology & Oceanography
- 2001: Oceanography medal of the *Société d'Océanographie de France*

### **Research interests**

- Carbon and carbonate cycling in coastal ecosystems
- Response of marine organisms and ecosystems to global environmental changes, including ocean acidification
- Ocean-based solutions

### **Editorial activities**

- 2021-present: Editor, *Cambridge Prisms: Coastal Futures*
- 2011: Editor of *Ocean acidification*, a book published by Oxford University Press
- 2010-present: Editor, *Biogeosciences*
- 2006-present: Topic Editor, *The Encyclopedia of Earth*
- 2004-2009: Founding Editor-in-Chief, *Biogeosciences*
- 2002-2014: Biogeosciences Editor, *The Eggs*
- 2002-2004: Editor, *Surveys in Geophysics*
- 1997-2005: Editor, *Coral Reefs*

### **Recent professional activities**

- 2021-present: Member, Scientific Advisory Board, Research Mission of the German Marine Research Alliance (Marine carbon sinks in decarbonisation pathways; CDRmare)

- 2021-present: President, Ocean Acidification & other ocean Changes – Impacts and Solutions (OACIS), Prince Albert II of Monaco Foundation
- 2021-present: Member, Scientific Committee, Ocean Solutions program, CNRS and Ifremer
- 2021-present: Member, Scientific Committee, BNP Paribas Foundation
- 2021-present: Member, International Advisory Board of the Aqaba Marine Park, Jordan
- 2021-present: Member, Agence de sécurité sanitaire, environnementale et de gestion des risques, Métropole Nice Côte d'Azur
- 2018-present: Member, Scientific and Technical Advisory Committee, Copernicus Marine Environment Monitoring Service
- 2018-present: Co-chair, International SSC, The Oceans in a High CO<sub>2</sub> World 5, Lima, 2022
- 2017-2019: Coordinating Lead and Contributing Author, IPCC Special Report on the Ocean and Cryosphere in a Changing Climate
- 2017-2018: Contributing Author, IPCC Special Report on Global Warming of 1.5 °C
- 2016-2019: SCOR Working Group #149: Changing Ocean Biological Systems: how will biota respond to a changing ocean?
- 2016: Member, Scientific Committee, Earth and Environment of the European Academy of Sciences
- 2015-2020: Chair, Ocean Acidification and Biodiversity Program, French Environment Ministry
- 2015-present: Regional expert group on climate in Provence Alpes-Côte d'Azur
- 2015-2018: Member, Scientific Council, Ocean-Climate Platform, Unesco
- 2015-2016: Member, Scientific Council, French Arctic Program
- 2014: Chair, International SSC, The Oceans in a High CO<sub>2</sub> World 4, Hobart, 2016
- 2014: Elected member, European Academy of Sciences
- 2013-2020: Member of the Scientific Council of the French Parliamentary Office for Scientific Research and Innovation
- 2013-2021: President, Monegasque Association for Ocean Acidification.
- 2010-2014: Lead and Contributing Author, Working Group II of the 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)
- 2008-2012: Scientific Coordinator of [EPOCA](#), the European Project on Ocean Acidification
- 2001-2005: Founding President, Biogeosciences Division of the European Geosciences Union

### **Recent grants (partial listing)**

- The future of Arctic coastal ecosystems - Identifying transitions in fjord systems and adjacent coastal areas (FACE-IT), European Commission H2020 (2020-2024)
- *La conchyliculture dans un monde riche en CO<sub>2</sub>*, European Maritime and Fisheries Fund France (2020-2022)
- Southern Ocean pH Monitoring, Prince Albert II of Monaco Foundation (2017-2018)
- The Ocean Solutions Initiative, Veolia Foundation, Prince Albert II of Monaco Foundation, Ocean Acidification International Coordination Centre and French Facility for Global Environment (2016-2020)
- Integrated Arctic Observation System (INTAROS), European Commission (2016-2020)
- HighCO<sub>2</sub>Seas, Total Foundation (2016, led by Stazione Zoologica, Napoli)
- *Small islands addressing climate change: towards storylines of risk and adaptation* (STORISK), ANR (2016-2021)
- AWIPEV-CO<sub>2</sub>, French Polar Institute (2014-2020)
- The Oceans 2015 Initiative, Prince Albert II of Monaco Foundation, Ocean Acidification International Coordination Centre, BNP Paribas Foundation (2014-2015)
- European Ocean Free Carbon Dioxide Enrichment Experiment, eFOCE, BNP Paribas Foundation (2011)
- Mediterranean Sea Acidification in a changing climate, MedSeA, European Commission (2011)
- Arctic CO<sub>2</sub> enrichment experiments, French Polar Institute (2009)
- European Project on Ocean Acidification, EPOCA, European Commission (2008). I coordinated this large-scale integrating project which comprised 32 partner institutions and more than 160 scientists

Some key and recent papers—Complete list: <https://bit.ly/2Ynsybi>

- Google Scholar: 30,116 citations; h-index: 84
- Web of Science: 200 items; 16,022 citations; h-index: 64
- Highly cited researcher 2021
- 9 highly cited papers and one hot paper in the fields of Environment and Ecology<sup>1</sup>

- <2014 Gattuso J.-P., Frankignoulle M. & Wollast R., 1998. Carbon and carbonate metabolism in coastal aquatic ecosystems. *Annual Review of Ecology and Systematics* 29:405-434.
- Gattuso J.-P., Frankignoulle M. & Smith S. V., 1999. Measurement of community metabolism and significance of coral reefs in the CO<sub>2</sub> source-sink debate. *Proceedings of the National Academy of Science U.S.A.* 96:13017-13022.
- Gattuso J.-P. & Buddemeier R. W., 2000. Ocean biogeochemistry: calcification and CO<sub>2</sub>. *Nature* 407:311-312.
- Gattuso J.-P. & Hansson L. (eds.), 2011. *Ocean acidification*, 326 p. Oxford: Oxford University Press.
- Kroeker K., Kordas R., Crim R., Hendriks I., Ramajo L., Singh G., Duarte C. & Gattuso J.-P., 2013. Impacts of ocean acidification on marine organisms: quantifying sensitivities and interaction with warming. *Global Change Biology* 19:1884-1896.
- Wong P. P., Losada I. J., Gattuso J.-P., Hinkel J., Khattabi A., McInnes K., Saito Y. & Sallenger A., 2014. Coastal systems and low-lying areas. In: Field C. B. et al. (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 361-409. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Gattuso J.-P., Hoegh-Guldberg O. & Pörtner H.-O., 2014. Coral reefs. In: Field C. B. et al. (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 97-100. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Gattuso J.-P., Brewer P., Hoegh-Guldberg O., Kleypas J. A., Pörtner H.-O. & Schmidt D., 2014. Ocean acidification. In: Field C. B. et al. (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 129-131. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- Gattuso J.-P., Kirkwood W., Barry J. P., Cox E., Gazeau F., Hansson L., Hendriks I. E., Kline D. I., Mahacek P., Marker M., Martin S., McElhany P., Peltzer E. T., Reeve J., Roberts D., Saderne V., Tait K., Widdicombe S. & Brewer P., 2014. Free-ocean CO<sub>2</sub> enrichment (FOCE) systems: present status and future developments. *Biogeosciences* 11:4057-4075.
- 2015 Gattuso J.-P., Magnan A., Billé R., Cheung W. W. L., Howes E. L., Joos F., Allemand D., Bopp L., Cooley S., Eakin C. M., Hoegh-Guldberg O., Kelly R. P., Pörtner H., Rogers A. D., Baxter J. M., Laffoley D., Osborn D., Rankovic A., Rochette J., Sumaila U. R., Treyer S. & Turley C., 2015. Contrasting futures for ocean and society from different anthropogenic CO<sub>2</sub> emissions scenarios. *Science* 349:aac4722.
- Orr J. C., Epitalon J.-M. & Gattuso J.-P., 2015. Comparison of ten packages that compute ocean carbonate chemistry. *Biogeosciences* 12:1483-1510.
- Riebesell U. & Gattuso J.-P., 2015. Lessons learned from ocean acidification research. *Nature Climate Change* 5:12-14.
- 2016 Cox T. E., Gazeau F., Alliouane S., Hendriks I., Mahacek P., Le Fur A. & Gattuso J.-P., 2016. Effects of *in situ* CO<sub>2</sub> enrichment on structural characteristics, photosynthesis, and growth of the Mediterranean seagrass *Posidonia oceanica*. *Biogeosciences* 13:2179-2194.
- Magnan A. K., Colombier M., Billé R., Hoegh-Guldberg O., Joos F., Pörtner H.-O., Waisman H., Spencer T. & Gattuso J.-P., 2016. Implications of the Paris Agreement for the ocean. *Nature Climate Change* 6:732-735.
- Moya A., Howes E. L., Lacoue-Labarthe T., Forêt S., Hanna B., Medina M., Munday P. L., Ong J.-S.,

<sup>1</sup>Highly cited papers received enough citations to place them in the top 1% of their academic field based on a highly cited threshold for the field and publication year (Clarivate Analytics, the company producing the Web of Science).

Teyssié J.-L., Torda G., Watson S.-A., Miller D. J., Bijma J. & Gattuso J.-P., 2016. Near-future pH conditions severely impact calcification, metabolism and the nervous system in the pteropod *Heliconoides inflatus*. *Global Change Biology* 22:3888-3900.

- Kapsenberg L., Alliouane S., Gazeau F., Mousseau L. & Gattuso J.-P., 2017. Coastal ocean acidification and increasing total alkalinity in the northwestern Mediterranean Sea. *Ocean Science* 13:411-426.
- 2018 Bittig H. C., Steinhoff T., Claustre H., Fiedler B., Williams N. L., Sauzède R., Körtzinger A. & Gattuso J.-P., 2018. An alternative to static climatologies: robust estimation of open ocean CO<sub>2</sub> variables and nutrient concentrations from T, S, and O<sub>2</sub> data using Bayesian neural networks. *Frontiers in Marine Science* 5:328.
- Boyd P. W., Collins S., Dupont S., Fabricius K., Gattuso J. P., Havenhand J., Hutchins D. A., Riebesell U., Rintoul M. S., Vichi M., Biswas H., Ciotti A., Gao K., Gehlen M., Hurd C. L., Kurihara H., McGraw C. M., Navarro J. M., Nilsson G. E., Passow U. & Pörtner H.-O., 2018. Experimental strategies to assess the biological ramifications of multiple drivers of global ocean change - a review. *Global Change Biology* 24:2239-2261.
- Cramer W., Guiot J., Fader M., Garrabou J., Gattuso J.-P., Iglesias A., Lange M. A., Lionello P., Llasat M. C., Paz S., Peñuelas J., Snoussi M., Toreti A., Tsimplis M. N. & Xoplaki E., 2018. Climate change and interconnected risks to sustainable development in the Mediterranean. *Nature Climate Change* 8:972-980.
- Gattuso J.-P., Magnan A. K., Bopp L., Cheung W. W. L., Duarte C. M., Hinkel J., Mcleod E., Micheli F., Oschlies A., Williamson P., Billé R., Chalastani V. I., Gates R. D., Irisson J.-O., Middelburg J. J., Pörtner H.-O. & Rau G. H., 2018. Ocean solutions to address climate change and its effects on marine ecosystems. *Frontiers in Marine Science* 5:337.
- Hoegh-Guldberg O., Jacob D., Taylor M., Bindi M., Brown S., Camilloni I., Diedhiou A., Djalante R., Ebi K., Engelbrecht F., Guiot J., Hijioka Y., Mehrotra S., Payne A., Seneviratne S. I., Thomas A., Warren R. & Zhou G. [J.-P. Gattuso contributing author], 2018. Impacts of 1.5°C global warming on natural and human systems. In: Masson-Delmotte V., Zhai P., Pörtner H.-O., Roberts D., Skea J., Shukla P. R., Pirani A., Moufouma-Okia W., Péan C., Pidcock R., Connors S., Matthews J. B. R., Chen Y., Zhou X., Gomis M. I., Lonnoy E., Maycock T., Tignor M. & Waterfield T. (Eds.), *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, pp. 175-311. Geneva: Intergovernmental Panel on Climate Change.
- Kapsenberg L., Miglioli A., Bitter M. C., Tambutté E., Dumollard R. & Gattuso J.-P., 2018. Ocean pH fluctuations affect mussel larvae at key developmental transitions. *Proceedings of the Royal Society of London. Series B: Biological Sciences* 285:20182381.
- Orr J. C., Epitalon J.-M., Dickson A. G. & Gattuso J.-P., 2018. Routine uncertainty propagation for the marine carbon dioxide system. *Marine Chemistry* 207:84-107.
- 2019 Abram N., Gattuso J.-P., Prakash A., Chen L., Chidichimo M. P., Crate S., Enomoto H., Garschagen M., Gruber N., Harper S., Holland E., Kudela R. M., Rice J. D., Steffen K. & von Schuckmann K., 2019. Framing and context of the report. In: Pörtner H.-O., Roberts D., Masson-Delmotte V. & Zhai P. (Eds.), *Special Report on Ocean and Cryosphere in a Changing Climate*, pp. 73-129. Geneva: Intergovernmental Panel on Climate Change.
- Bitter M. C., Kapsenberg L., Gattuso J.-P. & Pfister C. A., 2019. Standing genetic variation fuels rapid adaptation to ocean acidification. *Nature Communications* 10:5821.
- Díaz-Castañeda V., Cox T. E., Gazeau F., Fitzner S., Delille J., Alliouane S. & Gattuso J. P., 2019. Ocean acidification affects calcareous tube growth in adult stage and reared offspring of serpulid polychaetes. *Journal of Experimental Biology* 222.
- IPCC, 2019. Summary for Policymakers. In: Pörtner H.-O., Roberts D. C., Masson-Delmotte V., Zhai P., M T., Poloczanska E., Mintenbeck K., Nicolai M., Okem A. & Petzold J. (Eds.), *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*, pp. 3-35. Geneva: Intergovernmental Panel on Climate Change.
- Magnan A. K., Garschagen M., Gattuso J.-P., Hay J. E., Hilmi N., Holland E., Isla F., Kofinas G., Losada I. J., Petzold J., Ratter B., Schuur T., Tabe T. & van de Wal R., 2019. Integrative cross-chapter box on low-lying islands and coasts. In: Pörtner H.-O., Roberts D., Masson-Delmotte V. & Zhai P. (Eds.), *Special Report on Ocean and Cryosphere in a Changing Climate*, pp. 657-674. Geneva: Intergovernmental Panel on Climate Change.

- Stark J. S., Peltzer E. T., Kline D. I., Queirós A. M., Erin Cox T., Headley K., Barry J., Gazeau F., Runcie J. W., Widdicombe S., Milnes M., Roden N. P., Black J., Whiteside S., Johnstone G., Ingels J., Shaw E., Bodrossy L., Diego Gaitan-Espitia J., Kirkwood W. & Gattuso J. P., 2019. Free Ocean CO<sub>2</sub> Enrichment (FOCE) experiments: scientific and technical recommendations for future in situ ocean acidification projects. *Progress in Oceanography* 172:89-107.
- von Schuckmann K., Le Traon P.-Y., Smith N., Pascual A., Djavidnia S., Gattuso J.-P., Grégoire M. & Nolan G., 2019. Copernicus Marine Service Ocean State Report. *Journal of Operational Oceanography* 12:S1-S123.
- 2020** Coppola L., Boutin J., Gattuso J.-P., Lefèvre D. & Metzl N., 2020. The carbonate system in the Ligurian Sea. In: Migon C., Nival P. & Sciandra A. (Eds.), *The Mediterranean Sea in the era of global change (volume 1) - Evidence from 30 years of multidisciplinary study of the Ligurian sea*, pp. 79-104. London: ISTE Science Publishing LTD.
- Duarte C. M., Agustí S., Barbier E., Britten G. L., Castilla J. C., Gattuso J.-P., Fulweiler R. W., Hughes T. P., Knowlton N., Lovelock C. E., Lotze H. K., Predragovic M., Poloczanska E., Roberts C. & Worm B., 2020. Rebuilding marine life. *Nature* 580:39-51.
- Fourrier M., Coppola L., Claustre H., d'Ortenzio F., Sauzède R. & Gattuso J. P., 2020. A regional neural network approach to estimate water-column nutrient concentrations and carbonate system variables in the Mediterranean Sea: CANYON-MED. *Frontiers in Marine Science* 7:620.
- Gattuso J.-P., Epitalon J.-M., Lavigne H. & Orr J., 2020. seacarb: seawater carbonate chemistry. R package version 3.2.13. <https://CRAN.R-project.org/package=seacarb>
- Gattuso J.-P., Gentili B., Antoine D. & Doxaran D., 2020. Global distribution of photosynthetically available radiation on the seafloor. *Earth System Science Data* 12:1697-1709.
- 2021** Bitter M. C., Kapsenberg L., Silliman K., Gattuso J.-P. & Pfister C. A., 2021. Magnitude and predictability of pH fluctuations shape plastic responses to ocean acidification. *The American Naturalist* 197:486-501.
- Carbonne C., Teixidó N., Moore B., Mirasole A., Guttierrez T., Gattuso J.-P. & Comeau S., 2021. Two temperate corals are tolerant to low pH regardless of previous exposure to natural CO<sub>2</sub> vents. *Limnology and Oceanography*.
- Duvat V. K. E., Magnan A. K., Perry C. T., Spencer T., Bell J. D., Wabnitz C., Webb A. P., White I., McInness K. L., Gattuso J.-P., Graham N. A. J., Nunn P. D. & Le Cozannet G., 2021. Risks to future atoll habitability from climate-driven environmental changes. *WIREs Climate Change* 12:e700.
- Gattuso J.-P., Williamson P., Duarte C. & Magnan A. K., 2021. The potential for ocean-based climate action: negative emissions technologies and beyond. *Frontiers in Climate* 2:575716.
- Kleypas J., Allemand D., Anthony K., Baker A. C., Beck M., Hale L. Z., Hilmi N., Hoegh-Guldberg O., Hughes T., Kaufman L., Kayanne H., Magnan A., Mcleod E., Mumby P., Palumbi S., Richmond R., Rinkevich B., Steneck R. S., Voolstra C. R., Wachenfeld D. & Gattuso J.-P., 2021. Designing a blueprint for coral reef survival. *Biological Conservation* 257:109107.
- Magnan A. K., Pörtner H.-O., Duvat V. K. E., Garschagen M., Guinder V. A., Hoegh-Guldberg O., Zommers Z. & Gattuso J.-P., 2021. Estimating the global aggregated risk of anthropogenic climate change. *Nature Climate Change* 11:879-885.
- von Schuckmann K., Le Traon P.-Y., Smith N., Pascual A., Djavidnia S., Gattuso J.-P. (eds), 2021. Copernicus Marine Service Ocean State Report, Issue 5. *Journal of Operational Oceanography* 14:1-185.
- Williamson P., Pörtner H.-O., Widdicombe C. E. & Gattuso J.-P., 2021. Ideas and Perspectives: When ocean acidification experiments are not the same, repeatability is not tested. *Biogeosciences* 18:1787-1792.
- 2022** Jiang L.-Q., Pierrot D., Wanninkhof R., Feely R. A., Tilbrook B., Alin S. R., Barbero L., Byrne R. H., Carter B. R., Dickson A. G., Gattuso J.-P., Greeley D., Hoppema M., Humphreys M. P., Karstensen J., Lange N., Lauvset S. K., Lewis E., Olsen A., Pérez F. F., Sabine C., Sharp J., Tanhua T., Trull T., Velo A., J. Allegra A. J., Barker P., Burger E., Cai W.-J., Chen C. T. A., N Cross J. N., Garcia H., Hernandez-Ayon J. M., Hu X., Kozyr A., Langdon C., Lee K., Salisbury J., Wang Z. A. & Xue L., in press. Best practice data standards for discrete chemical oceanographic observations. *Frontiers in Marine Science*.