

Name: PÖRTNER, HANS-O.,hans.poertner@awi.de.

Education: University of Münster and Düsseldorf,

PhD in animal physiology, 1983, Habilitation 1990;

Research fellowship, German Research Council, Dalhousie and Acadia Universities,Nova Scotia;

Heisenberg fellow, German Research Council, Lovelace Medical Foundation, Albuquerque, NM;

Current Position: Professor and Head, Div. of Integrative Ecophysiology,

Alfred Wegener Institute for Marine and Polar Research, Bremerhaven, FRG,

Research interests:

Effects of climate warming, ocean acidification, hypoxia on marine animals and ecosystems:

1. Physiological, biochemical and molecular mechanisms limiting tolerance and biogeography in invertebrates and fish. Cellular and whole animal energy budgets in various climate regimes. Molecular mechanisms of adaptation and limitation.
2. The concept of oxygen and capacity limited thermal tolerance (OCLTT) as a matrix integrating temperature, oxygen and CO₂ effects on marine animals and ecosystems,
3. Roles of climate oscillations in evolutionary history

More than 250 ISI publications, h-index 46(+), appr. 7400 lifetime citations

Numerous invited contributions and keynotes

Recent professional honours

- Nomination as Member, Core Writing Team, IPCC AR5 Synthesis Report 2012
- Elected Member, Board of referees: Physics, Chemistry and Biology of the Oceans, German Research Council (DFG) February 2012
- Offer of appointment (January 18, 2012) as the W.F. James Professor of Pure and Applied Sciences at St. Francis Xavier University, Antigonish, Nova Scotia.
- International Advisory Board, Micro-B3 (Biodiversity, Bioinformatics, Biotechnology) EU 7FP Large Scale Research program, 2012
- Nomination as Coordinating Lead Author of IPCC AR5, chapter Ocean Ecosystems 2010

Editor:

"Oceans in a high CO₂ world", Guest editor Biogeosciences 2012

Associate editor "Physiology", Marine Biology 2007 – present

Co-editor: Journal of Thermal Biology 2012 - present

Key publications (personal view, *six most important)

Pörtner, H.O., D. Karl, P. Boyd, S. Lluch-Cota, Y. Nojiri, D. Schmidt, P. Zavialov (2013) IPCC WGII Fifth Assessment Report, Globaland Sectoral Aspects, Chapter 6: Ocean Systems. SOD in review

Wittmann A.C.,H.O. Pörtner (2013) Sensitivities of extant animal taxa to ocean acidification. Nature climate change (revised)

*Pörtner H.O. (2012) Integrating climate-related stressor effects on marine organisms: unifying principles linking molecule to ecosystem-level changes. *Marine Ecology Progress Series* 470: 273-290.

*Pörtner H.O.(2010) Oxygen and capacity limitation of thermal tolerance:a matrix for integrating climate related stressors in marine ecosystems. *J. Exp. Biol.* 213, 881-893.

Pörtner H.O., Schulte P.M., Wood C.M., Schiemer F. (2010). Niche dimensions and limits in fishes: An integrative view. Illustrating the role of physiology in understanding ecological realities. *Physiol. Biochem. Zool.* 83, 808–826.

- Kassahn K., Crozier R.H., Pörtner H.O., Caley M.J. (2009) Animal performance and stress: responses and tolerance limits at different levels of biological organisation. *Biol Rev.* 84, 277-292. doi:10.1111/j.1469-185X.2008.00073.x
- Pörtner H.O., A.P. Farrell, R. Knust, G. Lannig, F.C. Mark, D. Storch (2009) Adapting to climate change - response. *Science* 323, 876-877.
- Pörtner H.O. (2008) Ecosystem effects of ocean acidification in times of ocean warming: a physiologist's view. *Mar. Ecol. Progr. Ser.* 373, 203-217
- *Pörtner H.O., Farrell A.P. (2008) Physiology and climate change. *Science* 322, 690-692.
- *Pörtner, H.O., Knust R. (2007) Climate change affects marine fishes through the oxygen limitation of thermal tolerance. *Science* 315, 95 - 97.
- Pörtner H.O. (2006) Climate dependent evolution of Antarctic ectotherms: an integrative analysis (EASIZ, SCAR). *Deep Sea Research II* 53, 1071-1104.
- Pörtner, H.O., Langenbuch M., and Reipschläger A. (2004) Biological impact of elevated ocean CO₂ concentrations: lessons from animal physiology and earth history. *J. Oceanogr.* 60, 705-718.
- Pinz, I., H.O. Pörtner (2003) Metabolic costs induced by lactate in the toad *Bufo marinus*: new mechanism behind oxygen debt? *J. appl. Physiol.* 94, 1177-1185
- Pörtner, H.O. (2002) Environmental and functional limits to muscular exercise and body size in marine invertebrate athletes. *Comp. Biochem. Physiol.* 133A, 303-321.
- Pörtner H.O. (2002) Physiological basis of temperature dependent biogeography: tradeoffs in muscle design and performance in polar ectotherms. *J. exp. Biol.* 205, 2217-2230.
- Pörtner H.O. (2002) Climate change and temperature dependent biogeography: systemic to molecular hierarchies of thermal tolerance in animals. *Comp. Biochem. Physiol.* 132A, 739-761.
- Pörtner H.O. (2001) Climate change and temperature dependent biogeography: oxygen limitation of thermal tolerance in animals. *Naturwissenschaften* 88, 137-146
- Pörtner, H.O., B. Berdal, R. Blust, O. Brix, A. Colosimo, B. De Wachter, A. Giuliani, T. Johansen, T. Fischer, R. Knust, G. Lannig, G. Naevdal, A. Nedenes, G. Nyhammer, F.J. Sartoris, I. Serendero, P. Sirabella, S. Thorkildsen, M. Zakhartsev (2001) Climate induced temperature effects on growth performance, fecundity and recruitment in marine fish: developing a hypothesis for cause and effect relationships in Atlantic cod (*Gadus morhua*) and common eelpout (*Zoarces viviparus*). *Continental Shelf Research* 21, 1975-1997.
- Buchner, T., D. Abele, H.O. Pörtner (2001) Oxyconformity in the intertidal worm *Sipunculus nudus*: The mitochondrial background and energetic consequences. *Comp. Biochem. Physiol.* B 129, 109-120.
- Frederich, M., H.O. Pörtner (2000) Oxygen limitation of thermal tolerance defined by cardiac and ventilatory performance in the spider crab *Maja squinado*. *Am. J. Physiol* 279, R1531-R1538.
- Frederich, M., F.J. Sartoris, W. Arntz, H.O. Pörtner (2000) Haemolymph magnesium regulation in decapod crustaceans: physiological correlates and ecological consequences in polar areas. *J. exp. Biol.* 203, 1383-1393
- *Pörtner, H.O., C. Bock, A. Reipschläger (2000) Modulation of the cost of pH_i regulation during metabolic depression: a ³¹P-NMR study in invertebrate (*Sipunculus nudus*) isolated muscle. *J. exp. Biol.* 203, 2417-2428.
- Zielinski, S., H.O. Pörtner (2000) Oxidative stress and antioxidative defense in cephalopods: a function of metabolic rate or age? *Comp. Biochem. Physiol.* 125B, 147-160.
- Pörtner, H.O., I. Hardewig, L.S. Peck (1999) Mitochondrial function and critical temperature in the Antarctic bivalve, *Laternula elliptica*. *Comp. Biochem. Physiol.* 124A, 179-189.
- Hardewig, I., L.S. Peck, H.O. Pörtner (1999) Thermal sensitivity of mitochondrial function in the Antarctic Notothenioid, *Lepidonotothen nudifrons*. *J. comp. Physiol.* B 169, 597-604.
- van Dijk, P., I. Hardewig, H.O. Pörtner (1997) The adjustment of intracellular pH after temperature change in fish: relative contributions of passive and active processes. *Am. J. Physiol.* 272, R84-R89.
- Reipschläger, A., H.O. Pörtner (1996) Metabolic depression during environmental stress: the role of extracellular versus intracellular pH in *Sipunculus nudus*. *J. exp. Biol.* 199, 1801-1807.
- Finke, E., H.O. Pörtner, P.G. Lee, D.M. Webber (1996) Squid (*Lolliguncula brevis*) life in shallow waters: Oxygen limitation of metabolism and swimming performance. *J. exp. Biol.* 199, 911-921.
- Pörtner, H.O., E. Finke, P.G. Lee (1996) Metabolic and energy correlates of intracellular pH in progressive fatigue of squid (*Lolliguncula brevis*) mantle muscle. *Am. J. Physiol.* 271, R1403-1414.
- Pörtner, H.O. (1995) pH homeostasis in terrestrial vertebrates: a comparison of traditional and new concepts. *Adv. Comp. Env. Physiol.* 22, 51-62.
- Pörtner, H.O., L.G.S. Branco, G.M. Malvin, S.C. Wood (1994) A new function for lactate in the toad *Bufo marinus*. *J. appl. Physiol.* 76, 2405-2410.
- Pörtner, H.O., M.K. Grieshaber (1993) Critical PO₂ (s) in oxyconforming and oxyregulating animals: gas exchange, metabolic rate and the mode of energy production. In: The vertebrate gas transport cascade: adaptations to environment and mode of life (ed. Bicudo, J.E.P.W.). CRC Press Inc., Boca Raton FL, U.S.A., pp. 330-357.

- Pörtner, H.O. (1990) Determination of intracellular buffer values after metabolic inhibition by fluoride and nitrilotriacetic acid. *Respir. Physiol.* 81, 275-288.
- *Pörtner, H.O., R.G. Boutilier, Y. Tang, D.P. Toews (1990) Determination of intracellular pH and PCO₂ after metabolic inhibition by fluoride and nitrilotriacetic acid. *Respir. Physiol.* 81, 255-274.
- Pörtner, H.O. (1990) An analysis of the effects of pH on oxygen binding by squid (*Illex illecebrosus*, *Loligo pealei*) haemocyanin. *J. exp. Biol.* 150, 407-424.
- Pörtner, H.O. (1987) Anaerobic metabolism and changes in acid-base status: Quantitative interrelationships and pH regulation in the marine worm *Sipunculus nudus*. *J. exp. Biol.* 131, 89-105.
- *Pörtner, H.O. (1987) Contributions of anaerobic metabolism to pH regulation in animal tissues: theory. *J. exp. Biol.* 131, 69-87.