

Low oxygen environments in marine, estuarine and fresh waters

The 46th International Liege colloquium

Liège, Belgium
5th - 9th May 2014



Low oxygen conditions have been reported for various aquatic systems, from lakes, estuaries and coastal areas to off-shore regions of the World Ocean, where water ventilation is not able to renew the oxygen consumed by degradation of organic matter.

In the coastal ocean, dead zones have spread exponentially since the 1960s and have been reported for more than 400 systems. In shallow areas, where the bottom is occupied by ecologically and economically valuable benthic communities, hypoxic/anoxic conditions may lead to and have already resulted in catastrophic losses.

Eastern boundary upwelling systems (EBUSs) are characterized by high biological activity and heterotrophy that, in combination with weak ventilation, results in oxygen minimum zones (OMZs) in sub-surface waters. Suboxic waters extend from shallow depths over several hundred meters of the water column and support major perturbation of marine biogeochemical cycles.

Furthermore the OMZs play a critical role on atmospheric chemistry through emission of climate reactive trace gases.

Inland waters are hotspots of biogeochemical cycling in the terrestrial biosphere. Holomictic lakes usually present seasonally bottom anoxic waters while meromictic lakes are among the systems having a permanently anoxic deep waters, in which anaerobic processes generate reduced compounds (CH_4 , H_2S , NH_4^+ ...). The seasonal or permanent oxic-anoxic interface presents a redox gradient, in which various biogeochemical processes take place (some unique), mediated by a diverse community of microorganisms.

In the coming decades and centuries, it is foreseen that deoxygenation will increasingly stress aquatic ecosystems in a way that is currently ignored on the global scale, but admitted as only local problems. The expansion of O_2 minimum zones and resulting biogeochemical and ecological changes will make impossible the Good Environmental Status of marine and freshwater ecosystems, as well as their functioning and ability to underpin the delivery of services.

These themes are in the focus of several international initiatives (SOLAS, IMBER, GEOTRACES, CLIVAR, etc.) and projects (PERSEUS, HYPOX, EMODNET, etc.).

The 46th Liege colloquium will investigate new developments and insights related to the critical problem of low oxygen zones in marine and freshwater systems.

Thematic Sessions & Keynote speakers

1. Deoxygenation, marine resources, ecosystem functioning and structure of the foodweb.

Conveners: Lisa Levin & Carol Robinson - **Keynote: Karen Wishner**

2. Deoxygenation and biogeochemical cycles. Conveners: Jack Middelburg & Wajih Naqvi

Keynote: James Murray

3. Life and processes in redox gradients. Conveners: Sean Crowe & Steven Hallam

Keynote: Klaus Jurgens

4. Paleoproxies of hypoxia. Conveners: Caroline Slomp & Daniel Conley

Keynote: Silke Severmann

5. Modelling hypoxia. Conveners: Temel Oguz & Marilaure Grégoire

Keynotes: Eugene Turner & Dubravko Justic & Nancy Rabalais

6. Oxygen time series and instrumental developments. Conveners Allan Devol & Alberto Borges

Keynote: Niels-Peter Revsbech

7. Eastern Boundary upwelling systems (EBUS) as natural SOLAS laboratories.

Conveners: Véronique Garçon & Francisco Chavez - **Keynote: Zouhair Lachkar**

8. Deoxygenation in a global change context. Conveners: Jing Zhang & Andreas Oschlies

Keynote: Nancy Rabalais and Lothar Stramma

Scientific Committee

Steve Ashby (US)
Hermann Bange (Germany)
Alberto Borges (Belgium)
Carles Borrego (Spain)
Steven Bouillon (Belgium)
Arthur Capet (Belgium)
Francisco Chavez (US)
Daniel Conley (Sweden)
Sean Crowe (Canada)
Bronwen Currie (Namibia)
Jean-Pierre Descy (Belgium)
Allan Devol (US)
Boris Dewitte (France)
Véronique Garçon (France)
Dimitri Gutierrez Aguilar (Peru)
Marilaure Grégoire (Belgium)
Steven Hallam (Canada)
Jose Martin Hernandez-Ayon (Mexico)
Klaus Jurgens (Germany)
Sergey Konovalov (Ukraine)
Andrey Kostianoy (Russia)
Louis Legendre (France)
Lisa Levin (US)
Filip Meysman (NE)
Jack J. Middelburg (NE)
Wajih Naqvi (India)
Temel Oguz (Turkey)
Andreas Oschlies (Germany)
Aurélien Paulmier (France)
Carol Robinson (UK)
Caroline P. Slomp (NE)
Bo Thamdrup (Denmark)
Jing Zhang (China)

A special issue of *Biogeosciences* will be published with selected contributions from the colloquium

<http://modb.oce.ulg.ac.be/colloquium/>

(abstract deadline 24/01/2014)