MEETING HIGHLIGHTS

MICROBIAL ECOLOGY AND BIOGEOCHEMISTRY OF OXYGEN-DEFICIENT MARINE WATERS, SANTA CRUZ, CHILE, MARCH 18–22, 2013

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Oxygen (O_2) minimum zones (OMZs), defined here as waters with dissolved O_2 concentrations < 20 μmol kg–1, host unique microbial assemblages and play key roles in global biogeochemistry and ecology, including the production of greenhouse gases. Low O_2 systems are diverse, ranging from permanently or seasonally anoxic to suboxic and hypoxic zones in both coastal and open ocean regions. Furthermore, marine OMZs are becoming more common as a result of human-induced nutrient loading of coastal habitats and global warming-induced deoxygenation of the open ocean. An inter-disciplinary, international symposium was recently convened to provide a forum for the comparative analysis of the microbial ecology and biogeochemistry of OMZs, to compare model projections of OMZ expansion and its impact on biogeochemical cycles, to exchange information on cutting-edge field and laboratory protocols, and to build new partnerships, training opportunities, and collaborations for future OMZ research.

The symposium was organized to maximize interactions among the participants and included: (1) a broad range of authoritative presentations on OMZ ecosystem structure and function, prediction of OMZ changes and impacts, as well as pressing scientific questions and technological needs, (2) breakout groups to address key scientific questions, identify critical knowledge gaps, and propose new research directions, (3) plenary discussions, (4) interactive poster sessions, and (5) group meals.

The symposium participants concluded that there was an urgent need to develop coordinated research efforts to characterize the microbial metabolic networks underlying nutrient and energy transformation in OMZs. Significant knowledge gaps remain in our understanding of feedback mechanisms between microbial processes, biogeochemical cycles, and the climate system. These include, but are not limited to, the balance between nitrogen fixation and loss, the roles of protists and viruses, and the role of particles in sustaining microbial diversity and function. Finally, planning was initiated for an international research expedition to study the microbial community structure and biogeochemistry within a mesoscale eddy off Mauritania in August, 2014.

The resort-style venue, the Hotel Santa Cruz in Chile's wine region, provided excellent facilities and a casual atmosphere that encouraged interactions throughout the four-day symposium. The intense focus on OMZs was only briefly interrupted by an enjoyable tour of the Viña MontGras winery, complete with a tasting of some of Chile's iconic wines. The symposium was deemed productive and successful with over 50 participants from nine countries, including graduate students and early-career scientists. Attendees included microbial ecologists, physical oceanographers, marine biogeochemists, computational modelers, macrofauna ecologists, and more.

A thorough symposium proceedings is available at: http://www.moore.org/programs/science/marine-microbiology-initiative/workshops-and-convenings/omz-symposium. The symposium activities have already led to several major outcomes, including: (1) a special session on oxygen-deficient waters at the recent Ocean Sciences Meeting in Honolulu (http://www.sgmeet.com/osm2014/sessionschedule.asp?SessionID=111), (2) a successful proposal to the Scientific Committee on Ocean Research (SCOR) to establish a new SCOR Working Group on the microbial responses to ocean deoxygenation (http://www.moore.org/docs/default-source/Grantee-Resources/scor-wg-proposal-microbial-communities-responses-to-deoxygenation.pdf?sfvrsn=0); co-chairs Bess Ward, Sean Crowe, and Steven Hallam), and (3) helping to shape a Liège colloquium that will take place in May 2014 (http://modb.oce.ulg.ac.be/colloquium/). By any measure, this was a successful symposium that will stand as a benchmark in this important and timely discipline.

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