Mesocosm Facility for Ocean Acidification Impact Study of Xiamen University (FOANIC-XMU)

The pH of the world's oceans is falling as a result of anthropogenic CO_2 emissions to the atmosphere. Such an ocean acidification phenomenon is progressive at an unprecedented rate in Earth's history. The rate of change has been estimated to be faster than at any time in the last 300 million years. The acidity of surface oceans is predicted to increase by 150% by the end of this century. The far-reaching effects of ocean acidification on food webs, biodiversity, fisheries and aquaculture and then societies are of general concerns to scientific communities and general peoples. Predicting how organisms and ecosystems will change in response to ocean acidification remains challenging.

To explore mechanistic influences of ocean acidification, Mesocosm Facility for Ocean Acidification Impact Study of State Key Laboratory of Marine Environmental Science (MEL, Xiamen University) (FOANIC-XMU) has been successfully set up in Wuyuan Bay (N24°31′ 48″ , E118°10′ 47″). The floating platform, the dimension size is 35×7m, has 9 mesocosms with volume of 4 cubic meters and is fully solar-powered for uses of instruments, with 3 independent rooms (9 m^2 each). Activities on the platform are monitored and recorded continuously. Different levels of CO_2 in the mesocosms can be achieved by the commercially available CO_2-enriching device (CO_2 enrichlor, Ruihua, Wuhan, China). Ocean acidification (OA) conditions can be induced gradually with aeration from the CO_2 enrichlors. Effects of OA on phytoplankton species competition, primary productivity, food chain effect and microbial processes will be examined by MEL group and their collaborating scientists to look into the species/community/ecosystem-level impacts. This facility is open to other scientific communities or individual scientists.

Current activities:

- The first experiment has been carried out to understand the competition of different phytoplankton groups, mainly diatoms and coccolithorphores under ambient and elevated CO_2 concentrations, which are achieved with a CO_2-enriching device.
- The leading PI of this experiment is Prof. Kunshan Gao, while Profs. Minhan Dai, Hongbin Liu (HKUST) and Bangqin Huang's group are involved.

近海海洋环境科学国家重点实验室（厦门大学）
State Key Laboratory of Marine Environmental Science (Xiamen University)

海洋酸化影响研究中水量试验平台

人类活动排放的CO_2持续增加，导致海洋的pH下降，引起海洋酸化；海洋的这种酸化速率，是迄今地球历史上3亿年间最快的。上层海洋的酸化，至本世纪末，将导致pH下降0.4（氢离子增加150%）。海洋酸化对生物、食物链、生物多样性、生态系统及社会的影响，引起科学界及社会的广泛关注。预测海洋生物及生态系统对海洋酸化的响应面临种种挑战。

为了探讨海洋酸化对海洋生物及生态系统的影响及其机制， 厦门大学近海海洋环境科学国家重点实验室在五缘湾建成"海洋酸化影响研究中水量试验平台"（FOANIC-XMU）（N24°31′48″, E118°10′47″）。该平台尺寸为35米×7米，有9个容量为4立方米的培养水体框架，且全太阳能供电，供仪器测定等使用，并建有3个面积为9平米的实验室。平台上的活动，可实时监控并录像。培养水体中的不同CO_2浓度通过CO_2加富器（武汉瑞华）控制实现。酸化状态通过CO_2加富逐渐形成。厦门大学的研究团队及其合作者，将研究酸化对浮游植物种间竞争、初级生产力、食物链效应以及微生物过程的影响，进而探究海洋酸化对海洋物种，群落和生态系统层面的影响。该平台对外单位的科学家或团队开放。

目前活动：

该试验平台已经完成了第一个实验，探讨了CO_2浓度升高对浮游植物种群竞争及生理过程的影响。CO_2加富器被用来控制海水中的CO_2分压。

此次实验的项目负责人为高坤山教授，同时戴民汉、刘红斌（香港科技大学）和黄邦钦等教授的实验组均有参与。

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