



Singapore-MIT Alliance for Research and Technology

31 May 2013

Feature story

SMART lady researchers “deep dive” into corals

(Story in conjunction with World Environment Day on 5 Jun 2013)

Not many people are aware that there are big live corals around Singapore. And not many are aware that corals grow by forming layers, much like trees that form growth ring each year. Because these coral layers “lock-in” certain chemicals under different environmental conditions, they can serve as great archives of past environmental changes. Studying these coral bands can provide us with important information on environmental changes, including regional climate change and heavy metal (such as lead) pollution. By analysing these corals, researchers from the Singapore MIT-Alliance for Research and Technology (SMART) can look back over multiple decades, even hundreds of years, to track environmental changes through time.

Two lady researchers, from SMART’s *Center for Environment Sensing and Modeling (CENSAM), literally dive deep into the waters around Singapore in search of big corals, retrieve coral cores (corals are not damaged in the process of getting the cores) and date them by putting them through x-rays and fluorescent light to uncover the clearest picture of the growth banding of the coral. Further, they analyse the geochemistry of the corals back in the SMART labs. Their research activities also include regularly taking seawater and air samples in the field to conduct environmental quality measurements.

Dr. Intan Suci Nurhati, Postdoctoral Associate (and a climate scientist) and Jani Thuaibah Isa Tanzil, Research Engineer (and a marine ecologist) study corals to seek answers to these scientifically and societally important questions:

1. Is our monsoon changing? By extracting geochemical signal in corals, they can tell how sea-surface temperature and salinity may have changed over the past century. With this information, they can infer how fast our ocean is warming and how rainfall intensity is changing (i.e. more rainfall, less saline seawater). It is worthy to mention that there is a lack of long (decades to centuries long) instrumental climate data, which challenges climate scientists to characterize anthropogenic (human impact on environment) climate change. By looking to the past, corals could provide the crucial piece to the puzzle on understanding our regional climate change.
2. How have human activities modified the chemistry of our marine environments over the past decades? They tackle this question by measuring the level of heavy metals (such as lead or Pb), which is a trace of regional industrial activities in our oceans.
3. How are Singapore corals evolving in our changing environments? They investigate how Singapore corals have responded to their changing environments by studying the geochemistry, as well as growth patterns of corals over the past decades.

A diving expedition was held on 30 May 2013 at Pulau Hantu. The media briefing today will include the tour of CENSAM's laboratory.

Underwater video footages (3 min, mpg format) and photos will be made available upon request. Please give video and photo credits to SMART.

**Note: Please use the American spelling for 'Center' and 'Modeling'; and note that the short-form of SMART is in full caps.*

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About SMART

The SMART Centre is a major research enterprise established by the Massachusetts Institute of Technology (MIT) in partnership with the National Research Foundation of Singapore (NRF) since 2007. It is the first entity in the Campus for Research Excellence and Technological Enterprise (CREATE) developed by NRF.

The SMART Centre serves as an intellectual hub for research interactions between MIT and Singapore. Cutting-edge research projects in areas of interest to both Singapore and MIT are undertaken at the SMART Centre. SMART comprises an Innovation Centre and five Interdisciplinary Research Groups (IRGs): BioSystems and Micromechanics (BioSym), Center for Environmental Sensing and Modeling (CENSAM), Infectious Diseases (ID), Future Urban Mobility (FM) and Low Energy Electronic Systems (LEES).

About CENSAM

Using measurements from a variety of sensors and sensor networks, the Center for Environmental Sensing and Modeling (CENSAM) IRG aims to develop an accurate and predictive model of the natural and built environment of Singapore that seamlessly transitions between different scales, from the level of a single building or facility to the level of the state, including the surrounding seas.

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