

CMST News

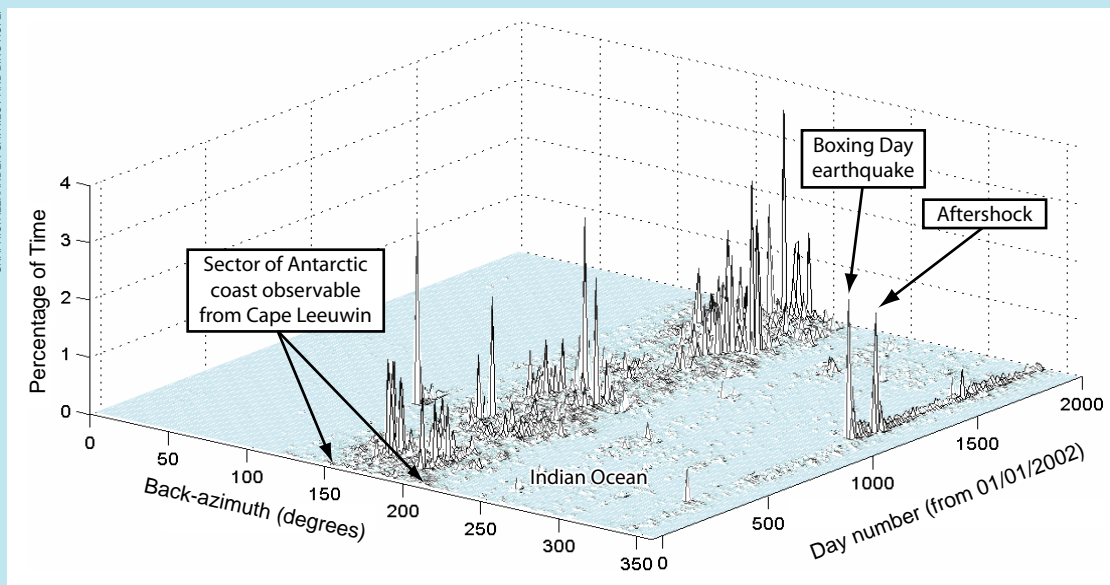
The Newsletter of the Centre for Marine Science & Technology

#11

Listening to Antarctic Ice Cracking from Australia

The rate of ice break up, or ice calving, from the Antarctic ice shelves is one of the major indicators of global climate change. While calving of massive pieces of ice is well observed by satellite, numerous ice shelf breaks of smaller volume are not monitored and statistically analysed. Moreover, the calving events are preceded by ice cracking, which is not remotely observable by ordinary means. Ice cracking and breaking events make loud noises, which spread in ice to the water in the surrounding ocean. The sound signal can then propagate in the ocean over thousands of kilometres with little loss of energy, so that a single underwater sea-noise recording system located far away from the Antarctic coast can listen to a large sector of the Antarctic Ice Shelf. CMST is currently conducting a

GRAPHIC: ALEXANDER GAVRILOV AND BING HU LI



Low-frequency noise incidence as observed from the Cape Leeuwin underwater listening station 2002-2007.

detailed analysis of seven years of sea noise recordings from the CTBTO underwater listening station at Cape Leeuwin, Western Australia. The figure above shows that the section of Antarctic coast observable from Cape Leeuwin is particularly noisy. In comparison, the Indian

Ocean and the Australian continent are relatively quiet. One other interesting aspect of this figure is the visibility of the 2004 Boxing Day earthquake in Indonesia. Prior to the event, this region was relatively quiet,

but after the earthquake it is quite noisy. An article about this work was recently published in the prestigious journal *Science* ("Listening to Distant Ice Crack", 18 July 2008).

Marine Habitat Mapping

CMST was recently commissioned by the Western Australian Department of Water to determine the spatial presence of seagrass in selected regions of the Swan River by conducting sidescan sonar surveys. Backscatter data for ten survey areas in the Swan River were collected over a three week period using an Edgetech 4200 sidescan sonar. Several weeks were then spent processing the data and generating habitat maps for each of the survey areas. Seagrass distribution and

other measures of seagrass condition are routinely used as broad scale biological indicators of marine and estuarine health. To date the distribution of seagrass in the Swan-Canning Estuary has been assessed using aerial photographs but with little or no ground-truthing to verify the images. Aerial images are prone to several errors and ground-truthing by divers is labour intensive and also prone to error. Sidescan sonar provides a viable alternative to aerial surveys and divers.



Vessel track and initial habitat classification from one of the Swan River acoustic surveys.

Free Sail Analysis

In celebration of ten successful years of use, CMST is releasing the popular and highly capable software SailTool as Freeware. The program permits the user to perform a range of sail and rigging measurements from digital photographs which have been taken of yachts. The measurements can then be used as part of the objective assessment of yacht performance.

The first version of SailTool was released in September 1998 and was used by the Australian Yachting Federation in its training program for the Sydney 2000

Olympics - a campaign that was very successful with four gold medals. Since that time SailTool has been used by other competitive sailors (including an America's Cup syndicate), sail makers and universities around the world.

The measurement capabilities of SailTool include sail shape, mast bend, leech twist, spinnaker head angle, and more. The program runs under Windows and includes an extensive help file.

Further details about the freeware version of SailTool are available from the CMST website: www.cmst.curtin.edu.au/sailtool



SailTool analysis of sail shape on an America's Cup Yacht

Australian Sea Lions

CMST researcher Chandra Salgado is involved in several research projects investigating the Australian Sea Lion which frequent the Western Australian south-west coast.

The most recently initiated project was the 'Age Estimation of Western Australian Sea Lions using Teeth Structure as a Determinant'. Estimating the age at mortality is important for understanding population dynamics, demographics and life history. This work was supported by the WA Department of Fisheries (DoF) and Department of Environment and Conservation (DEC).

Another project completed late last year considered the impacts of tourism on sea lions at Carnac Island.

Thirdly, honours student Kelly Kueh is currently investigating the effectiveness of using Near Infrared Spectroscopy (NIRS) analysis of scat material as a means to quantify the diet of Australia Sea Lions. It is normally very difficult to study their diet because they only eat at sea and are swift and deep divers. This technique has been successfully used with seals and it is hoped will also be successful with our own uniquely Australian species.

These projects are aimed at building a growing knowledge of this vulnerable species and are being conducted in cooperation with various groups including Richard Campbell from DoF/DEC, and AQWA.



A sleeping Australian Sea Lion at Carnac Island

PHOTO: CHANDRA SALGADO

many questions about the health of the river, and whether future generations will experience the diversity of natural life and human uses that we now enjoy. To protect the river for the future, we need to better understand the health of the river ecosystem and how human pressures affect it.

The SRDRP will focus on the health and welfare of bottlenose dolphins as an indicator of river health. Dolphins provide an ideal indicator species for

assessing the health of the Swan River ecosystem. As top predators, dolphins provide an ecological index for the structure and function of the entire river ecosystem. As mammals, dolphins provide a biological surrogate for assessing how environmental threats could affect human health. Dolphins are an icon of the Swan River and provide a charismatic and accessible focal point capable of uniting a diverse range of stakeholders.

Swan River Dolphins

CMST and Murdoch University have established the Swan River Dolphin Research Program (SRDRP). The aim of the SRDRP is to study the Swan River ecosystem by gathering information on dolphin ecology, dolphin prey species, and interactions with

human activities. The Swan River runs through the heart of Perth and for many Western Australians, the river is the defining feature of WA's capital. However, despite its beauty and iconic value, the Swan River ecosystem faces an uncertain future. There are

The Centre for Marine Science & Technology (CMST) conducts world-class consulting, research, development and education for the marine industry and for government agencies.

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CMST Lunchbox Seminars

CMST holds weekly seminars, with speakers from interstate and overseas, as well as CMST staff.

The schedule of seminars is listed on our website: www.cmst.curtin.edu.au/seminars

If you would like to receive email updates regarding CMST seminars, simply send an email to the following address: seminars@cmst.curtin.edu.au