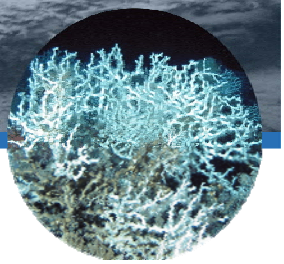


Introduction

During the 4th International Symposium on Deep Sea Corals in Wellington New Zealand (2008), the Netherlands (Royal NIOZ) was invited to organise the forthcoming ISDSC 5, in recognition of the considerable research efforts being carried out in either EU/ESF or national (NWO) framework.
Over the years ISDSC has become the major conference for all aspects of cold-water coral research. Crossing the boundaries between marine geology, geochemistry, biology and physics, the meeting addressed key scientific issues such as biodiversity and ecosystem functioning, paleoceanography and climate change, as well as policy, management and conservation and related issues**.** The above topics were discussed in a global context, alongside dedicated science-policy interface sessions outlining the most recent developments in management and conservation.
Applied aspects including (potential) reservoir capacities of carbonate mounds, deep-water reef development and mound (dia)genesis were also addressed.

Finance

Conference fees were as follows:

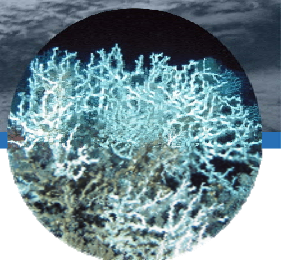
Early Registration	
Full member	400 Euro
One day	150 Euro
PhD Student	275 Euro
Graduate Student	250 Euro
Workshop participation	100 Euro

Student registration was only accepted if accompanied by a letter of the university or institute.

Student Support
ISDSC 5 supported 10 students* or early career scientists with a maximum amount of 500 Euros each. Awards included submission and acceptance of abstract for either poster or oral presentation.
* Out of these M. Thierens (AWI) was liaised to COCARDE/ERN

Abstract submission and acceptance
Conference participants could submit up to two abstracts as first author, however only one abstract will be accepted for an oral presentation.
Authors were informed on acceptance 6 weeks after submission, following review by members of the Scientific Committee and the Organizing Committee.

Workshop
A workshop **'Identification of deep-sea corals from imagery data'** focusing on deep-water coral identification from imagery, convened and organised by Ifremer in association with the French Marine Protected Areas Agency, EU FP 7 program Coral FISH, and the University of Plymouth was successfully held on Sunday April 1 in Artis , preceding the actual symposium. This workshop aimed at bringing together international coral taxonomy experts and professionals working in the field of image analysis to allow an applied approach to using imagery for coral identification. The workshop involved presentations from coral experts



covering the various coral groups, highlighting the main morphological features which are used to identify coral species from imagery, as well as diagnostic features that may be used to differentiate between similar taxa.

Keynotes

A schedule was followed where each day started with an invited keynote speaker highlighting (aspects of) the theme to be discussed that day. After the lunch break a key note talk by a younger, upcoming scientist presenting his/her newest results was given. At the end of each day a reputed invited scientist summarized the presentations of that day in relation to the current state of knowledge.

A total of 14 keynote presentations were given by international experts selected by the Organizing Committee and by the Scientific Committee.* The presentations by young upcoming scientists were all by female scientists.**

*An invited presentation, related to COCARDE goals and objectives was given by Prof. Dr. Jean Pierre Henriet.

**The presentation of Dr. Bodil Wesenberg Lauridsen was also liaised with COCARDE.

Program

The Symposium addressed the following main themes:

1.**Biodiversity and Ecosystem functioning** with as topics: Biodiversity and Biogeography; Ecosystem dynamics and functioning; Coral Taxonomy, Connectivity and genetics; Coral Biology, Reproduction and Larval dispersal; Feeding Strategy and food web structure; Coral Communities and associated benthic habitats; Experimental studies.

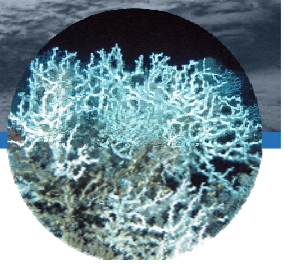
2.**Environmental conditions and constraints** including the topics Ocean circulation and conditions; Hydrodynamics; Food supply and forcing; Particle fluxes and forcing; Environmental constraints & Pressures; Acidification; Habitat characterization, mapping, GIS applications; In-situ and laboratory experiments, New Technology.

3.**Paleoceanography and climate change**, with topics such as Watermass proxies & reconstructions; New geochemical proxies in deep sea corals; Climate records from deep sea corals, mounds and reefs; Coral Reef and Mound Archives; Paleoproductivity; Paleohabitats; Reef and Mound structures in time and space; Carbonate Systems and Diagenesis; New tools and techniques.

4.**Policy, Management and Conservation** related to Pollution and threats; National and international Management Conservation strategies; Marine protected areas; Predictive habitat mapping and modeling; Threats and Anthropogenic impacts.

A total of 85 oral presentations were given, in addition 98 posters were presented (see appendix 2, for full program)

Summary of results

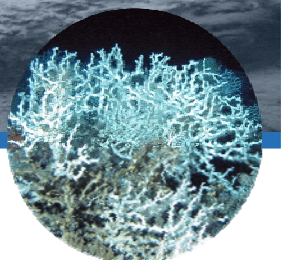


The importance of taxonomy and phylogenetic classification to establish basic names and thus our understanding of distributions and biogeographic patterns of CWC in the North Atlantic was emphasized, as this will extend to better understanding and recognition of previously unknown ecologies and modes of life (ecological diversity). Even in areas that have historically been well sampled (though not necessarily specifically for deep-sea corals), much of the diversity is still unknown or undescribed. Molecular phylogenetic analysis and morphologic examination of polyps will allow to examine and establish the origin of deep-sea corals and to understand patterns of diversity, in order to protect hotspots
Little is yet known about the nature of connectivity (particularly in the deep sea), nor of the potential for larval dispersal out of MPAs into unprotected area. Identification of genetic structure within global species (such as *D. dianthus*) may provide insight as to how diversity is being maintained in the deep sea. Genetically-based studies only may not allow us to discriminate morphological variations (phenotypes) in relation to different environmental conditions but need to be combined with morphometric and molecular analyses of specimens from different and widely separated geographic areas.

In the field of habitat mapping and (palaeo) environmental characterisation it is evident that understanding of environmental controls has vastly improved and that unifying trends in the history of Atlantic CWC ecosystem are becoming apparent. There is an apparent need to further establish links between biological & palaeoceanographic histories of the Atlantic margins , also in the light of genetic connectivity and evolution of CWC ecosystems along both margins.
Large- & meso-scale environmental controls such as depth, temperature, oxygen, aragonite saturation state, nutrients, surface water productivity, DIC,DOC, as well as complex or abrupt topography constraints and near bed small and large scale hydrodynamic situations in and around CWC occurrences need to be better established and measured, to allow understanding if and how habitat heterogeneity controls (patchy) CWC distributions. This will also support GIS modelling applications of effects of climate change and of ocean acidification (by 2099, 70% of the currently known CWC sites will be in undersaturated water) , and thus may affect establishment of MPA's as future CWC refuges.

Better habitat suitability models e.g., including data on (now largely lacking) abundance, connectivity and environmental forcing factors should be developed and applied, while environmental tolerances of individual species must be quantified. Laboratory experiments can identify the individual species condition as a function of environmental variables and new environmental "proxies" can be tested and validated . Models will never replace ship operated surveys and will always remain a complimentary technique however, with ever increasing potential for development of habitat suitability and understanding of environmental conditions.DWC proxy and distribution work remains critical for validating and improving the models.

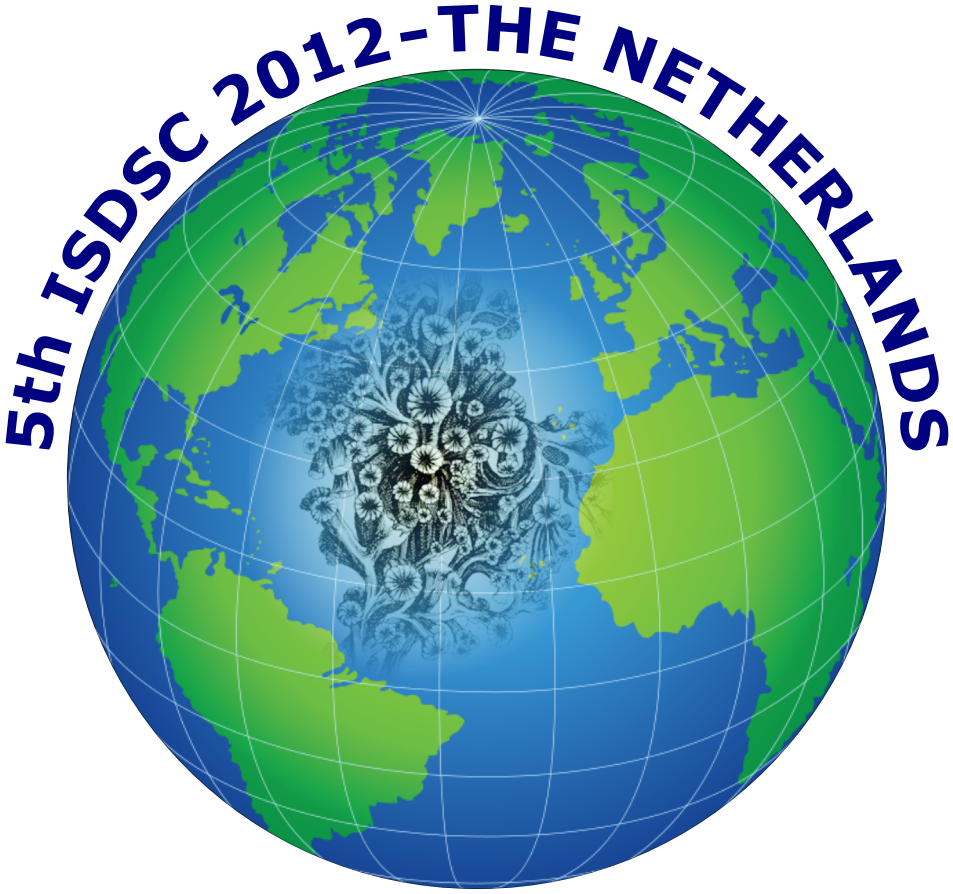
Conservation strategies have a high need of geographic information on scales of 10s – 100s – 1000s km^2 and of current human use of watermass or seabed, as well as summary products and reports that integrate available knowledge. Robust data management & models should be capable of putting site-specific field research results in a broader regional context . In the future the integration of regional databases – incorporating abundance/density measures, and use of refined predictive models that integrate temporal scales & connectivity shall be used for planning and attempts of conservation.



Geochronology is fundamental to our understanding of the temporal and spatial distribution of CWC and conceptually correction of methodological biases reveals even clearer climate oscillations than considered before. Age patterns measured in of CWC clearly reveal shifts of ocean circulation and ecosystems depth and strength through periods of climate transitions and instability. The Nd isotopic composition seems an outstanding direct tracer of advection and mixing and its marine cycle is intensely studied today, leading to improved and absolute measures of mid depth Atlantic gyre dynamics. Li/Mg ratios and clumped isotopes measured in CWC skeletons do reflect reconstruction of past seawater temperatures, efforts to derive productivity measures are well underway. It is expected that technical developments in this field will be enormous as numerous CWC species are available for climate studies and the results are likely to reach far into other science fields.

With regards to the development, occurrence and distribution of carbonate mounds it became clear that Mound Provinces can be considered the result and expression of the convergence of fluxes of energy and matter – in advective, convective and diffusive ways. Basins with mounds are controlled by the physiography of the oceanic basins in relation to the climate drivers and ocean circulation and ventilation. Mounds form prominent palaeoenvironmental archives, with a possible bias induced by diagenesis. The latter aspect is also prominent in relation to studies of their potential as hydrocarbon reservoir capacities .
A comparison between recent carbonate mounds and the drivers of their development with carbonate mounds on geological time scales supplies a time window that allow us to identify key controls and patterns, forming the red thread in mound development. The role of the Petroleum Industry as future sponsor was also highlighted, concluding that attempts to make long term agreements for R& D work jointly with industry should be started now, in addition to increasing public awareness of the role and importance of biodiversity and ecosystem dynamics of the CWC.

Appendix 1: Budget and realization as of March 2012
Appendix 2: ISDSC 5 Program and Abstract Book



PROGRAM and ABSTRACTS

www.deepseacoral.nl

Coral image on cover: Pontoppidan (1752)

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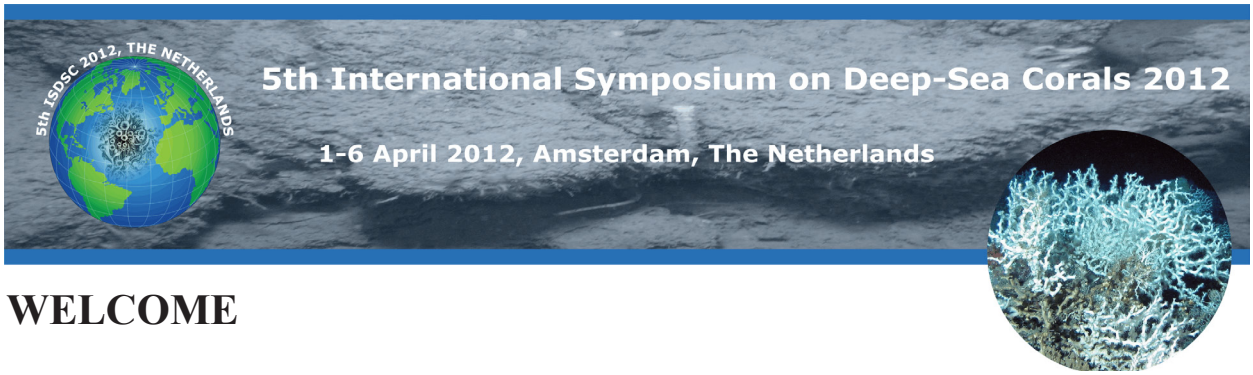

WELCOME

We heartily welcome all participants to ISDSC 5, Amsterdam, the Netherlands, and hope you will all enjoy an interesting and stimulating week.

Over the years the ISDSC has become the major conference for all aspects of cold-water coral research. Crossing the boundaries between marine geology, geochemistry, biology and physics, the meeting will address key scientific issues such as coral carbonate mound initiation, environmental forcing factors and effects of climate change, their role in past and present biogeography, deep-water reef development and diagenesis as well as more applied aspects including (potential) reservoir capacities of carbonate mounds, ecosystem functioning and biodiversity. The above topics will be discussed in a global context, alongside dedicated science-policy interface sessions outlining the most recent developments in management and conservation.

The program of the 5th International Symposium on Deep Sea corals is thematically composed and offers discussion and results of a great variety of subjects of study, together comprising an unprecedented overview of the state of the art in cold-coral research, thanks to all your inputs.

The actual Symposium is preceded by a workshop on coral identification based on imagery data, initiated and organized by Ifremer.

Out of all inputs received, the contributions submitted for theme I and II formed by far the majority and it has been hard for the reviewers to distinguish between selection for oral or poster presentation, with in mind to allow presentation of a (more or less) balanced view of scientific developments in all four themes during the oral presentations as well as during the poster sessions. To highlight the poster contributions, two specific Poster sessions are held, addressing respectively Theme I contributions (Tuesday 3 April) and Themes II-IV (Thursday 5 April), while all posters will be on display the entire week.

We have followed a schedule with each day starting with an invited keynote speaker highlighting aspects of the theme to be discussed that day, and after the lunch break a key note talk by a younger, upcoming scientist presenting his/her newest results. At the end of the sessions a reputed scientist will summarize the findings of that day in relation to the current state of knowledge.

Selected papers from the conference are scheduled to be published in a special thematic volume of Deep Sea Research Volume II as Proceedings of the 5th ISDSC. It is the intention to have the Proceedings published in late 2013 or early 2014. Instructions regarding submission and time schedule will be posted in due time on the ISDSC 5 Website (www.deepseacoral.nl).

We thank all sponsors who made this Symposium possible, the contributors for their enthusiasm, support and input, the reviewers for their willingness to read tens of abstracts as well as the members of the Scientific Committee whom supported us by giving their views on choices, procedures and progress.

Tjeerd van Weering, Furu Mienis, Ingrid de Raad & Jan Nieuwenhuizen.

GENERAL INFORMATION

The ISDSC 5 is hosted by the Royal Netherlands Institute for Sea Research and will be held at the Artis Conference Centre (Plantage Middenlaan 41), situated in the centre of Amsterdam. Artis is one of the oldest Zoos of Europe and the Conference Centre is situated in a historical building consisting of two meeting rooms (De Koningszaal and De Tijgerzaal) annex to each other, where **oral presentations, poster presentations and exhibits** will be held (see Artis floorplan page 10 and 11). **Coffee/teabreaks and lunches** will be served in the Flamingo room. Times are indicated in the scientific program.

The **registration/information desk** at the main entrance of the Artis conference centre will be opened on:
- Sunday 1 April between 16.00-18.00
- Monday 2 April between 8.00 and 17.30
- Tuesday 3 April between 8.00 and 18.00
- Wednesday 4 April between 8.00 and 13.00
- Thursday 5 April between 8.00 and 18.00
- Friday 6 April between 8.00 and 17.00

At the registration desk you will receive your name badge, program and abstract book, conference bag and a confirmation of payment and participation letter.

Smoking is prohibited in the Artis conference premises.

We would like to ask you **to turn off your mobile phones** during the scientific sessions of the conference.

We would like to ask all ISDSC 5 participants to wear their **name badge** at all times during the conference. Badge security is in place at the entrance of the conference centre.

Several laptops with **internet access** are available for ISDSC 5 participants. Laptops are located at the entrance of the Koningszaal. It is also possible to login on the WiFi network.
(**username: Koningszaal, password: artisdepartis**).

Public transport (tram and metro) is the easiest and cheapest way to travel around in Amsterdam. Daily tickets can be bought in the tram/metro. It is also possible to buy one ticket for several days at the Central Station. More information is given in the Amsterdam passport in your conference bag. Be aware that **taxis** are very expensive in Amsterdam.

The organisation of ISDSC 5 is not responsible for your **accomodation**. No accounts can be charged to the organisation of ISDSC 5. We would like to ask you to store luggage on the departure date in the hotels.

All ISDSC 5 participants will receive **one free ticket for the Artis Zoo**. Artis is open every day between 9.00-18.00. A map of the zoo is printed on page 268 of the program and abstracts book.

The **general emergency phone number** in the Netherlands for police, ambulance and fire is 112. Give your name and identify where you are (address, hotel name, ...)

The **icebreaker** will take place on Monday afternoon at 17.30 in the Flamingoroom.

The **conference diner** will be held in Restaurant In de Waag (Nieuwmarkt). The diner will start at 19.30. The location of restaurant In de Waag is indicated on the Amsterdam City Centre map (page 267).

A **farewell drink** will take place on Friday afternoon at 17.00 in the Flamingo room.

PRESENTERS INFORMATION

We will stick to the current ISDSC practice of plenary sessions. To encourage as much lively interaction and discussion as possible, the time allocated for **oral contributions** will be limited to 15-minutes slots (12 minutes presentation and 3 minutes discussion). We would like to ask all speakers to stick to the allocated time.

Speakers are asked to **upload** their presentation well in advance on the laptop in the Koningszaal. An assistant will be available to assist with the uploading of your presentation.

Each day will start with a **keynote speaker** addressing the theme of that day. The afternoon starts with an invited topical keynote talk, by a young scientist. A third keynote speaker at the end of each afternoon will include a critical review and outlook of the contributions presented, combining the recent state of the art with the presented results. The time allocated for keynote lectures is 25 minutes, followed by a discussion of 5 minutes.

Posters will be on display during the entire duration of the conference. Two thematic poster sessions will be held on Tuesday (Theme I) and Thursday (Theme II, III and IV) afternoon. Time will be allocated during the poster sessions for short poster presentations by the authors. Each presenter is provided with a 2 m high and 1 m wide poster board. Push pins and other materials are available during the conference at the registration desk. Posters can be mounted on Monday and must be removed on Friday after the last session. Your **assigned poster board number** is listed between [XX] in the program and abstract book on the pages 28-36

At the end of the conference **prices for the best Student poster** will be awarded. You can sign up for the student poster price at the registration desk at the beginning of the conference.

A **workshop** 'Identification of deep-sea corals from imagery data' focusing on deep-water coral identification from imagery, convened and organised by Jaime Davies, Inge van den Beld, (Ifremer) in association with the French Marine Protected Areas Agency, CoralFISH, NOAA and the University of Plymouth will be held on Sunday 1 April.

We plan to publish the **Conference Proceedings** in a special volume of Deep Sea Research Part II. Participants of ISDSC 5 are encouraged to submit a paper. Deadline for submission of title and abstract for the Conference Proceedings is June 15th, 2012. Full texts and illustrations by September 31st, 2012. Detailed instructions will follow on the website and will be presented during the symposium

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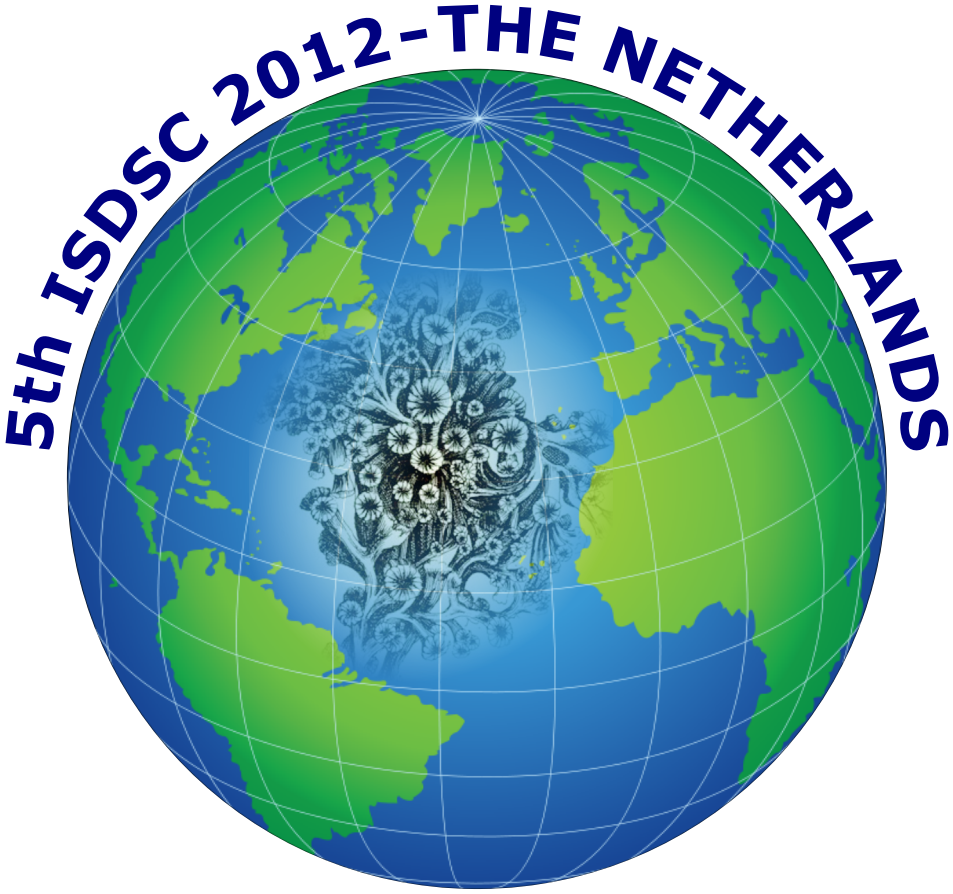

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