

Preface

J'ai voulu expliquer l'océanographie que j'aime
(Jean-François Minster, La Machine-océan)

“Ocean research is a lot like climbing a new route to the top of a mountain. Every time you go out to sea there’s something new. I enjoy that aspect of both – the unpredictability of the mountains and the bottom of the sea. Besides, neither place is very crowded”, said geologist and oceanographer Charles Davis Hollister once. I can fully endorse this statement. Climbing up a mountain or being out at sea is indeed a great feeling and the striking parallelism between both experiences is amazing. Climbing up a carbonate mound is tough but once you reach the top it is an indescribable moment of delight. Trying to look into a mound is even more difficult but the secrets that such carbonate structures hide are unbelievable and more than worth digging into this matter. I could never have experienced all these moments if I have not had a strong rope, various anchor points, and a stable platform to lead and help me during my search for the secrets behind these strange carbonate structures occurring in the deep blue. Thanks a lot to all the people who were just walking along my way, never giving up in supporting me and always giving me a pat on the back or whispering some encouragement.

In the first place, I would like to mention my supervisor and coach Prof. Dr. Jean-Pierre Henriët. His triggering enthusiasm proved infectious. Without his perseverance, carbonate mound research was not as far as it is nowadays. He prepared the way for many young scientists and involved them in the world of carbonate mound research. His support and encouragement during my research were great. Having discussions with him was sometimes intense but always more than instructive. He gave me a lot of possibilities to discover the world of carbonate mounds in all its aspects from the Arctics to Morocco, and from scientific meetings and workshops over research campaigns to classrooms.

During the last four years, I had the possibility to explore literally the whole carbonate mound world and community. I would like to acknowledge all the people who offered me a home-feeling all over the world, who supported me during hours of measurement time, and who helped in building up the extensive data set presented in this study. It has to be mentioned that this study is the result of teamwork and as

each cog has its important function in a machine, each person involved in mound research has his or her important role in unveiling the secrets of carbonate mounds.

Prof. Dr. Joseph Hus is thanked for the possibility to use the palaeomagnetic measurement infrastructure at the Geophysical Centre of the Royal Meteorological Institute in Dourbes and for his excellent support during the measurements. Dr. Veerle Cnudde introduced me in the world of computer tomographic scanning and had the patience to learn me the details of image analysis. The analytical and geochemical expertise present at the Department of Earth and Environmental Sciences at the K.U. Leuven (currently my home lab) and Prof. Dr. Rudy Swennen's profound knowledge in complex carbonate systems paved the way to start unravelling diagenetic processes in mound systems. Dr. Dierk Hebbeln offered me several times the possibility to use the excellent infrastructures available at the University Bremen (from cutting and freezing samples to extensive XRF scanning). Thanks to Prof. Dr. Tjeerd Van Weering, the XRF CORTEX scanner installed at the Netherlands Institute for Sea Research (NIOZ) could be used. Rineke Gieles helped me intensively during my stay on the Dutch island Texel, from providing nice meals to excellent support during the XRF measurements. Dr. Norbert Frank and Dr. Dominique Blamart showed me the way to the legendary caves (officially named as 'carothèque') of Gif-sur-Yvette. During the academic year 2004–2005, Erlangen University became a kind of second home place. Thanks a lot, Prof. Dr. A. Freiwald, to host me so many times at your institute specialized in carbonate research, to show me the way towards the CT-scan facilities of Siemens, and to teach me to enjoy real German barbecues. At the end of my PhD and especially last year, I got the opportunity to join a professional team of carbonate sedimentologists at the research centre CSTJF (Centre Scientifique et Technique Jean Feger) of TOTAL S.A. in Pau, France. I would like to acknowledge the whole carbonate team of TOTAL S.A. for all the stimulating discussions on reservoir-related carbonate aspects, enlarging my view on the carbonate world and triggering my enthusiasm to understand the complex relationship between diagenesis and petrophysics.

The whole scientific team and the IODP and Transocean crews aboard the R/V JOIDES Resolution on IODP Expedition Leg 307 are acknowledged. The data collected during this expedition form the key data set of this work. It was a fantastic experience to participate as palaeomagnetist in one of the biggest drilling programmes in science. In particular, Yuji Fuwa, Klayton Curtis, Margaret Hastedt and Trevor Williams are thanked for their palaeomagnetic help aboard the R/V JOIDES Resolution. Besides IODP Expedition Leg 307, a whole range of scientific expeditions was taking place during the last years with as main topic the study of carbonate mounds and cold-water coral reefs. Thanks to mound-networking, I had the possibility to participate in a lot of these expeditions. In this way, I would like to thank all the people who gave me these possibilities to broaden my horizons, and especially the scientific shipboard parties of the Géosciences 123 cruise aboard the R/V Marion Dufresne in September 2001, the Polarstern ARK/XIX3a cruise in June 2003, the GAP (SO 175) cruise aboard the R/V Sonne in December 2003, the M61/3 campaign aboard the R/V Meteor in June 2004, the Poseidon 325 expedition in July 2005 and the series of expeditions aboard the R/V Belgica in 2003, 2004, 2005, and 2006.

My port of registry during my PhD was RCMG, and I would like to thank all the inhabitants of RCMG for the nice time spend together. Deevit introduced me to the Porcupine Seabight and all kind of drift stories. Davy, my office mate during the last years, and Lieven, my previous office mate, created always a nice working atmosphere in the office and endured my endless phone calls or discussions. Peter helped me through all kind of problems at the interface between science and engineering, from swell-filtering seismic data sets over time series analysis to multibeam problems. Our “project” and “support” manager, Marc Faure, was an expert in solving (A)SAP problems, sorting out financial chaos and administrative problems and this always with a big smile. The engineers, Koen and Jeroen, were always there to sort practical things out, from sending boxes and arranging vans to the technical developments of the new ROV GENESIS. Wim solved each computer problem. The North-Sea women (Vera, Els, Kristien, and Isabelle) and former North-Sea man (Samuel) gave me useful advice concerning box coring, grain size analysis and sediment dynamics. Pieter liked intensive discussions and was supporting new ideas concerning carbonate mounds. Tist noticed each new scientific outcome and provided me with some nice references. Hans helped me with the magnetic measurements in Dourbes and his nice West-Flemish sounds will be remembered. Thanks also to Annelies, Heleen and Mieke, who did parts of their MSc work in the neighbourhood of the carbonate mounds and are nowadays still involved in ocean research. I also would like to thank all the other RCMG colleagues and the palaeo-neighbours for the nice moments and chats around the kitchen table and the great cake-and-party-hours.

While roaming around the world, I got introduced to the international “carbonate mound-clan” for young scientists, which is still growing and expanding each year. Thanks a lot Boris, Andres, Tim, Veerle, Ben, Juergen, Max, Claudia, Morten, Henk, Kai, Furu, Stephanie, Andy, Matthias, Alina, Agostina, Lydia, Stephan, Sascha, Cees, Markus, Hans, Mieke, Rory, Jaceck, Nina, Laura, Lies, and the whole bunch. I could always phone or mail you with new questions or discussion topics. Without you, mound research was not what it is nowadays! Especially, a more than “big” thank you for my “sister-soul” Veerle. She was standing behind me since the start of my work at RCMG as undergraduate until the end, was always there for nice discussions or just a chat and made it to read carefully through this PhD work by giving helpful and constructive comments. And last but not least, Andres, you started to play a major role in my life from the defense of my PhD on. More than thanks a lot to read again carefully with all your patience and eye for detail through these written pages.

Each globetrotter has its roots and I never forgot my “home-place” wherever I was crossing around. Family and friends, you can not survive without! Always there were friends to play some music, go for a climb or a mountain bike trip, have a nice chat or sit together around a party game. My two sisters, Katrien and Marjan, gave me the right “pep-talk” on the right moments. Also, Bart and recently Stan were always there. My parents and grand-parents provided a safe and cozy home-place where I was welcome at each time of the day or night. Whenever or wherever I was in troubles, they saved me from the crisis situation by arranging everything, from airport-shuttle-services to food-supply. Thanks mum, for all your presence and the

survival food packages! Thanks dad, for having tried to understand what I was doing during the last years and for giving me your positive and constructive criticism from a professional teacher's viewpoint. Godfather and granddad pepe, I appreciated it enormously that you were more than interested in my research work and that I could always come to see you for a serious talk: *gratias ago vos!* This book is dedicated to you.

Finally, I would like to emphasize that this work is far away from being complete. There are still a lot of questions left and many points can be discussed. However, I would be most delighted if the present volume stimulates further discussions and opens some new perspectives in the wide field of carbonate mound research.

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The Mound Challenger Code

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