

Contents

SARNTHEIN, Michael, HAUG, Gerald H., BARD, Edouard, FISCHER, Hubertus, ILYINA, Tatiana, and SCHULZ, Michael: Introduction	11
Programme	13
 Extended Abstracts	
ADKINS, Jess: Radiocarbon (and Other) Constraints on the Transition from Glacial Maximum to the Holocene	21
ANDERSON, Robert F., ALLEN, Katherine A., YU, Jimin, and SACHS, Julian P.: Ocean Stratification, Carbon Storage, and Calcite Compensation throughout the Late Pleistocene Glacial Cycles	23
BARD, Edouard: Variations of Sea-Surface ^{14}C Reservoir Ages (SSRA) and their Paleoclimatic Implications: From a Chronometric Problem to a New Paleoceanographic Proxy	29
BIJMA, Jelle: Ocean Acidification – A Biogeological Perspective	35
BROOK, Ed, BAUSKA, Thomas, and MIX, Alan: Isotopic Constraints on Greenhouse Gas Variability during the Last Deglaciation from Blue Ice Archives	39
BROVKIN, Victor, and GANOPOLSKI, Andrey: The Role of the Terrestrial Biosphere in CLIMBER-2 Simulations of the Last 4 Glacial CO_2 Cycles	43
BURKE, Andrea, STEWART, Andrew L., ADKINS, Jess F., FERRARI, Raffaele, JANSEN, Malte F., THOMPSON, Andrew F., and ROBINSON, Laura F.: Radiocarbon Constraints on Southern Ocean Circulation	49
CIAIS, Philippe, ZHU, Dan, PENG, Shushi, WANG, Tao, KRINNER, Gerhard, ZIMOV, Sergei A., TAGLIABUE, Alessandro, CUNTZ, Matthias, BOPP, Laurent, and PRENTICE, Colin: An Attempt to Quantify Terrestrial Carbon Storage during the Last Glacial Maximum and the Implications for Deglaciation CO_2 Changes	55
FISCHER, Hubertus, SCHMITT, Jochen, SCHNEIDER, Robert, EGGLESTON, Sarah S., JOOS, Fortunat, BAUSKA, Thomas K., MARCOTT, Shaun A., BROOK, Edward J., KÖHLER, Peter, and CHAPPELLAZ, Jérôme: Latest Insights into Past Carbon Cycle Changes from CO_2 and $\delta^{13}\text{C}_{\text{atm}}$	59

FRIEDRICH, Tobias, and TIMMERMAN, Axel: Effects of Sea-Ice and Ocean-Circulation Changes on Deglacial Deep-Ocean Radiocarbon Trends	65
GALBRAITH, Eric D.: The Role of Air-Sea Disequilibrium in Ocean Carbon Storage and its Isotopic Composition	71
GANOPOLSKI, Andrey, and BROVKIN, Victor: The Last Four Glacial CO ₂ Cycles Simulated with the CLIMBER-2 Model	75
GROOTES, Pieter M., and SARNTHEIN, Michael: Oceanic Reservoir Ages, ¹⁴ C Concentrations, and Carbon Dynamics (also in the “Mystery Interval”)	81
GRUBER, Nicolas, CLEMENT, Dominic, FRÖLICHER, Thomas, HAUMANN, Alexander, and LANDSCHÜTZER, Peter: The Global Ocean Carbon Sink: Recent Trends and Variability	85
HAIN, Mathis P., SIGMAN, Daniel M., and HAUG, Gerald H.: Simulating Atmospheric Radiocarbon through Deglaciation	89
HAUG, Gerald H., STUDER, Anja, REN, Abby, SERNO, Sascha, JACCARD, Samuel L., MARTÍNEZ-GARCÍA, Alfredo, ANDERSON, Robert F., WINCKLER, Gisela, GERSONDE, Rainer, TIEDEMANN, Ralf, and SIGMAN, Daniel M.: The Polar Oceans during the Deglaciation	93
HEIMANN, Martin: Constraints on Global Climate-Carbon Cycle Feedbacks on Interannual to Glacial Cycle Timescales	97
HUANG, Enqing, SKINNER, Luke C., MULITZA, Stefan, PAUL, André, and SCHULZ, Michael: Radiocarbon Distribution and Radiocarbon-Based Circulation Age of the Atlantic Ocean during the Last Glacial Maximum	101
ILYINA, Tatiana: The Combined Effects of Changes in Ocean Chemistry, Biology, and Hydrodynamics on Alkalinity	107
JACCARD, Samuel L., and GALBRAITH, Eric D.: Deglacial Changes in Ocean (De)Oxygenation	111
JOOS, Fortunat, SPAHNI, Renato, STOCKER, Benjamin D., ROTH, Raphael, MENVIEL, Laurie, EGGLESTON, Sarah S., FISCHER, Hubertus, and SCHMITT, Jochen: Mechanisms and Multi-Tracer Fingerprints of Past Carbon Cycle Changes in the Bern3D-LPX Model	117
JOUZEL, Jean: Ice Core Records: Climate Reconstruction	123
KOHFELD, Karen E., and CHASE, Zanna: Using Paleo-Oceanographic Data Synthesis to Test Ideas about Changes in Atmospheric CO ₂ Concentrations during Glacial Inception	127
KÖHLER, Peter, VÖLKER, Christoph, KNORR, Gregor, and BARD, Edouard: High Latitude Impacts on Deglacial CO ₂ : Southern Ocean Westerly Winds and Northern Hemisphere Permafrost Thawing	135

LOHMANN, Gerrit, ZHANG, Xu, and KNORR, Gregor: Abrupt Climate Change Experiments: The Bølling/Allerød Transition	141
MARCOTT, Shaun A., BROOK, Edward J., BAUSKA, Thomas K., RHODES, Rachael H., and KALK, Michael: Abrupt Changes in the Global Carbon Cycle over the Past 70 ka	149
MARTÍNEZ-GARCÍA, Alfredo, SIGMAN, Daniel M., REN, Haojia, ANDERSON, Robert F., STRAUB, Marietta, HODELL, David A., JACCARD, Samuel L., EGLINTON, Timothy I., and HAUG, Gerald H.: Iron Fertilization of the Subantarctic Ocean during the Last Ice Age	151
MCCAVE, I. Nicholas: A Carbon Isotope Perspective on the Glacial Circulation of the Deep Southwest Pacific	155
MENVIEL, Laurie, SPENCE, Paul, GOLLEDGE, Nick, and ENGLAND, Matthew H.: Southern Ocean Overturning Role in Modulating High Southern Latitude Climate and Atmospheric CO ₂ on Millennial Timescales	159
MULITZA, Stefan, CHIESSI, Cristiano M., LIPPOLD, Jörg, LYNCH-STIEGLITZ, Jean, MACKENSEN, Andreas, PAUL, André, PRANGE, Matthias, RAMOS, Rodrigo Portilho, CRUZ, Anna Paula S., SCHEFUSS, Enno, SCHWENK, Tilmann, SCHULZ, Michael, TIEDEMANN, Ralf, VOIGT, Ines, WERNER, Martin, and ZHANG, Yancheng: Response of the Tropical Atlantic Ocean-Atmosphere System to Deglacial Changes in Atlantic Meridional Overturning	167
OSCHLIES, Andreas: Robustness and Uncertainties of Current Marine Carbon Cycle Models	171
PAILLARD, Didier: Glacial CO ₂ as a Key to the Glacial-Interglacial Problem	175
PAUL, André, KURAHASHI-NAKAMURA, Takasumi, MULITZA, Stefan, and SCHULZ, Michael: Model-Based Reconstruction of the Marine Carbon Cycle during the Last Glacial Maximum	183
RAE, James W. B., FOSTER, Gavin L., ROBINSON, Laura F., RIDGWELL, Andy, and ADKINS, Jess F.: Signals of CO ₂ Destratification from Boron Isotopes	187
RAYNAUD, Dominique, PARRENIN, Frederic, MARTINERIE, Patricia, CHAPPELLAZ, Jérôme, and LANDAIS, Amaelle: The Ice Core Record of CO ₂ – A Focus on the Climate/CO ₂ Phase Relationship during Deglacial Transitions	191
RIDGWELL, Andy: Are the Drabbest Proxies the ‘Best’? Patterns of Bulk CaCO ₃ and Glacial Carbon Storage	195
SARNTHEIN, Michael, GROOTES, Pieter M., SCHNEIDER, Birgit, and WALLMANN, Klaus: Benthic ¹⁴ C Ventilation Ages Record Changing Storage of Dissolved Inorganic Carbon in the Abyssal Ocean	197
SCHMITT, Jochen, EGGLESTON, Sarah S., JOOS, Fortunat, and FISCHER, Hubertus: Atmospheric δ ¹³ CO ₂ from Ice Cores: An Overloaded Parameter	201

SCHMITTNER, Andreas, and LUND, David C.: Was the Early Deglacial CO ₂ Rise Caused by a Reduction of the Atlantic Overturning Circulation?	207
SCHNEIDER, Birgit, and SARNTHEIN, Michael: What is Shaping the $\Delta^{14}\text{C}$ -DIC Relationship in the Deep Ocean?	211
SIGMAN, Daniel M.: Taking Stock of the Hypotheses for Polar Ocean Stratification and Carbon Dioxide Sequestration during the Last Ice Age	213
SKINNER, Luke C., FREEMAN, Emma, PRIMEAU, François, and SCRIVNER, Adam E.: On the Glacial Ocean Circulation and its Impact on the Global Radiocarbon and Carbon Cycles	217
THORNALLEY, David J. R.: Reconstructing Deglacial Circulation Changes in the Northern North Atlantic and Nordic Seas: $\Delta^{14}\text{C}$, $\delta^{13}\text{C}$, Temperature, and $\delta^{18}\text{O}_{\text{SW}}$ Evidence	223
TIEDEMANN, Ralf, RONGE, Thomas A., LAMY, Frank, KÖHLER, Peter, FRISCHE, Matthias, DE POL-HOLZ, Ricardo, PAHNKE, Katharina, ALLOWAY, Brent V., WACKER, Lukas, and SOUTON, John: New Constraints on the Glacial Extent of the Pacific Carbon Pool and its Deglacial Outgassing	229
TIMMERMANN, Axel, and FRIEDRICH, Tobias: Deglacial CO ₂ /Climate Feedbacks: Models, Myths, and Misconceptions	235
WALLMANN, Klaus: Effects of Eustatic Sea-Level Change on Atmospheric CO ₂ and Glacial Climate	241
WATSON, Andrew J., VALLIS, Geoffrey K., and NIKURASHIN, Maxim: Southern Ocean Overturning, Controlled by Wind or Buoyancy Flux? Understanding the Link between Antarctic Temperatures and Atmospheric CO ₂	247
YU, Jimin: Deep Atlantic Carbon Sequestration and Atmospheric CO ₂ Decline during the Last Glaciation	253

Poster

BALMER, Sven, and SARNTHEIN, Michael: Deglacial Surface-Water Reservoir Ages from Key Positions in the Subtropical and Tropical Atlantic	259
BEREITER, Bernhard, EGGLESTON, Sarah S., SCHMITT, Jochen, NEHRBASS-AHLES, Christoph, STOCKER, Thomas F., FISCHER, Hubertus, KIPFSTUHL, Sepp, and CHAPPELLAZ, Jérôme: Revision of the EPICA Dome C CO ₂ Record from 800 to 600 ka BP	261
CARTAPANIS, Olivier, BIANCHI, Daniele, and GALBRAITH, Eric: A Comprehensive Database for the Most Commonly Measured Paleoceanographic Proxies: Evaluating Global Organic Carbon Burial Variations over the Last Glacial Cycle	265

EGGLESTON, Sarah S., SCHMITT, Jochen, JOOS, Fortunat, and FISCHER, Hubertus: Comparison of [CO ₂] and δ ¹³ C _{atm} Measurements from Antarctic Ice Cores during Marine Isotope Stages 2 and 4	269
FERRER-GONZALEZ, Miriam, and ILYINA, Tatiana: Mitigation Potential, Risks, and Side-Effects of Ocean Alkalinity Enhancement	275
FREEMAN, Emma, and SKINNER, Luke C.: Radiocarbon Evidence of Ocean Circulation Change over the Last Deglaciation	279
GAO, Pan, ZHOU, Liping, XU, Xiaomei, and LIU, Kexin: Characterizing Deep Circulation in the Northeast South China Sea Using Dissolved Inorganic Radiocarbon	283
GRAHAM, Robert M., BOER, Agatha M. DE, KOHFELD, Karen E., and SCHLOSSER, Christian: What Caused Enhanced Export Production in the Sub-Antarctic Zone during Glacial Intervals?	291
HASENFRATZ, Adam P., MARTÍNEZ-GARCÍA, Alfredo, JACCARD, Samuel L., HODELL, David A., VANCE, Derek, BERNASCONI, Stefano, GREAVES, Mervyn, KLEIVEN, Helga (Kikki) F., and HAUG, Gerald H.: Paleoceanographic Evolution of the Atlantic Sector of the Antarctic Southern Ocean across the Mid-Pleistocene Transition	297
HEINZE, Mathias, and ILYINA, Tatiana: Effects of Changing Ocean Circulation on the Marine Carbon Cycle during the Paleocene-Eocene Thermal Maximum	301
KEUL, Nina, LANGER, Gerald, NOOIJER, Lennart DE, NEHRKE, Gernot, REICHART, Gert-Jan, BIJMA, Jelle, and SCHNEIDER, Ralph: New Carbonate System Proxies: Foraminiferal Culturing and Pteropod Potentials	305
KRANDICK, Annegret, PAUL, André, MARSHALL, Shawn J., and SCHULZ, Michael: Sensitivity of Open-Ocean Convection to Ice Sheet Melting: A Regional Modelling Approach	311
KUEHN, Hartmut, LEMBKE-JENE, Lester, GERSONDE, Rainer, ESPER, Oliver, LAMY, Frank, ARZ, Helge, KUHN, Gerhard, and TIEDEMANN, Ralf: Deglacial History of the Subarctic North Pacific Oxygen Minimum Zone – Implications for Ocean Dynamics	315
ÖDALEN, Malin, NYCANDER, Jonas, OLIVER, Kevin, NILSSON, Johan, and BRODEAU, Laurent: Maximum Drawdown of Atmospheric CO ₂ due to Biological Uptake in the Ocean	321
QIAN, Na, ZHOU, Liping, and GAO, Pan: New Data of DIC Radiocarbon in the Eastern Equatorial Indian Ocean	327
REPSCHLÄGER, Janne, WEINELT, Mara, ANDERSEN, Nils, GARBE-SCHÖNBERG, Dieter, and SCHNEIDER, Ralph: Northern Source for Deglacial and Holocene Deep Water Composition Changes in the Eastern North Atlantic Basin	331

VÖLPEL, Rike, PAUL, André, KRANDICK, Annegret, MULITZA, Stefan, and SCHULZ, Michael: Implementing Water Isotopes in the MIT Ocean General Circulation Model (MITgcm)	337
XU, Xu, SCHNEIDER, Birgit, and PARK, Wonsun: Simulating Holocene Variations of the Eastern Tropical South Pacific Oxygen Minimum Zone	341
ZAEHLE, Sönke, SINGARAYER, Joy S., and FRIEDLINGSTEIN, Pierre: Changes in the Terrestrial Carbon and Nitrogen Cycles since the Last Glacial Maximum	345