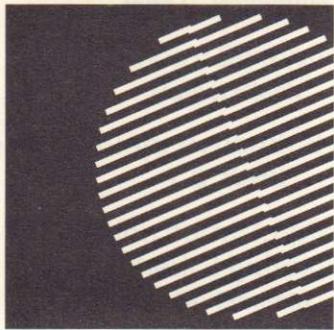
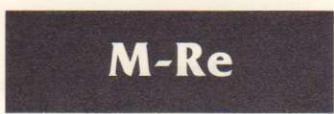


CONTENTS

**ENCYCLOPEDIA OF
EARTH
SYSTEM
SCIENCE** 
VOLUME 3 

M-Re

William A. Nierenberg, Editor-in-Chief

Scripps Institution of Oceanography
University of California, San Diego



Academic Press, Inc.

Harcourt Brace Jovanovich, Publishers

San Diego New York Boston London Sydney Tokyo Toronto



CONTENTS

Guide to Using the Encyclopedia ix

Magma Chamber Dynamics	1
<i>Greg A. Valentine</i>	
Magmatic Processes in Sills	19
<i>Bruce D. Marsh</i>	
Magmatic Sulfide Deposits	31
<i>Anthony J. Naldrett</i>	
Magnetic Stratigraphy	59
<i>J. E. T. Channell</i>	
Magnetohydrodynamics	65
<i>E. H. Levy</i>	
Magnetospheric Currents	75
<i>T. A. Potemra</i>	
Mantle	85
<i>M. Madon</i>	
Mantle Metasomatism	101
<i>Martin Adrian Menzies</i>	
Marine Mineral Resources	113
<i>Michael J. Cruickshank</i>	
Marine Pollution	125
<i>Martin R. Preston</i>	
Marine Snow in Oceanic Cycling	139
<i>A. L. Alldredge</i>	
Mediterranean Salt Lenses	149
<i>Barry Ruddick and Dave Hebert</i>	
Messinian Salinity Crisis	161
<i>Richard H. Benson</i>	
Metal Deposits in Relation to Plate Tectonics	169
<i>F. J. Sawkins</i>	

Metamorphic Petrology 177

John C. Palmquist

Meteorology, Synoptic 185

Rainer Bleck

Methane, Biogeochemical Cycle 197

J. B. Yavitt

Methylchloroform: Implications for Atmospheric Hydroxyl 209

D. M. Cunnold

Micrometeorology 219

S. Pal Arya

Microplates 231

David F. Naar

Mid-Latitude Convective Systems 239

R. A. Maddox

Mountains, Effect on Airflow and Precipitation 251

Joseph B. Klemp

Natural Detonations 263

M. B. Boslough

Natural Resource Exploration, Soil Gas and Vapor Methods 271

Ronald W. Klusman

Nitrification 287

R. J. Haynes

Nitrogen Cycle of the Sea 295

B. B. Ward

Nitrogen in Soil 307

K. C. Cameron

NMR Spectroscopy in the Earth Sciences	319	Organic Matter Decomposition in the Marine Environment	493
Ian Farnan		Jack J. Middelburg	
Nuclear Testing and Seismology	333	Orogenic Belts	501
T. Lay		Nicholas Rast	
Nuclear Waste Disposal	353	Oxygen, Biogeochemical Cycle	515
Douglas G. Brookins		Lee R. Kump	
Ocean Circulation	367	Ozone, Absorption and Emission of Radiation	525
Donald B. Olson		Joan E. Rosenfield	
Ocean Eddies and Global Climate	383	Paleobotany	531
Greg Holloway		C. J. Cleal	
Ocean Production Export: Hydrodynamics and Ecosystems	393	Paleoclimatic Effects of Continental Collision and Glaciation	543
L. Legendre and J. Le Fèvre		Patricia H. Kelley and Anne Raymond	
Oceanic Chlorophyll	403	Paleolimnology	551
E. L. Venrick		John P. Smol and John R. Glew	
Oceanic Crust	415	Paleomagnetism	565
James S. McClain		John Wm. Geissman	
Oceanic Gabbros, Magnetic Properties	427	Phosphorus, Biogeochemistry	579
Janet E. Parise		Thurman L. Grove	
Oceanic Islands, Atolls, and Seamounts	435	Photogrammetry	589
C. D. Woodroffe		N. E. Tolbert	
Oceanic Sunlight and the Origin of Life	445	Photosynthetic Carbon Metabolism and Atmospheric CO ₂	601
D. C. Mauzerall		Paola Malanotte Rizzoli	
Oil Shale	455	Planetary Waves in the Ocean and Atmosphere	609
T. F. Yen		Steven C. Cohen	
Optical Mineralogy	467	Plate Tectonics, Crustal Deformation and Earthquakes	617
Mickey E. Gunter			
Ore Formation	481		
D. A. Polya			

Polar Aurora	629	Radon in the Geological Environment	705
Syun-Ichi Akasofu		G. M. Reimer and Allan B. Tanner	
Polar Motion and Earth Rotation	641	Rare Earth Elements	713
Clark R. Wilson		James K. Meen	
Polar Regions, Influence on Climate Variability and Change	647	Remote Sensing of Earth Resources from Air and Space	723
Ellsworth F. LeDrew		Michael J. Duggin	
Polar Stratospheric Clouds	661	Remote Sensing of the Upper Atmosphere, Instrumentation and Observational Techniques	737
D. W. Fahey and S. R. Kawa		Supriya Chakrabarti	
Powder Diffraction Techniques	673	Remote Sensing of the Upper Atmosphere, Phenomenology	751
Deane K. Smith		Supriya Chakrabarti	