

# **CURRICULUM VITAE**

## **Ralph Rayner**

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Ralph Rayner is Sector Director – Energy and Environment for BMT Limited.

In addition to this role Ralph is a Professorial Research Fellow at the London School of Economics Centre for Analysis of Time Series. He is also responsible for industry advocacy and outreach for the US Integrated Ocean Observing System at the US Consortium for Ocean Leadership as well as serving as a non executive director with a number of specialist ocean science and technology businesses.

Ralph has a BSc in Biology, an MSc in Underwater Science and Technology and a PhD in physical oceanography.

He is a Vice President of the Institute of Marine Engineering, Science and Technology, a member of the Council of the Society for Underwater Technology and an Executive Council member of the Association of Marine Scientific Industries. He chairs the Global Ocean Observing System Scientific Steering Committee and the Defra Ocean Processes Evidence Group.

He has authored numerous marine scientific papers and reports and is Editor-in-Chief of the Journal of Operational Oceanography.

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### **KEY SKILLS AND EXPERIENCE**

- Postgraduate research in physical oceanography, chemical oceanography, hydrodynamic modelling, water quality studies and sedimentology.
- Over twenty five years experience of the development of international environmental science and technology businesses.
- Broad professional background in applied environmental science and technology with worldwide experience of atmospheric, terrestrial, freshwater and marine environmental aspects of major engineering and infrastructure development projects.
- Experience across a wide range of business sectors including energy, transport, water, local government, national government and international organisations and agencies.
- Extensive management training and experience.
- Extensive financial and business training and experience.
- Work experience in Europe, the Middle East, Russia, South East Asia, China, Japan, India, the USA, South America, Australia, New Zealand and Africa.
- Strong IT and software development skills.
- Active professional involvement in the meteorological and oceanographic science community at an institutional and government level in the UK and overseas through participation in committees, working groups and peer review.
- Author of a range of publications and technical reports.
- Editorial experience with a number of specialist journals.
- Wide ranging experience of the organisation and management of scientific and technical conferences and workshops.

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### PROFESSIONAL RECORD

2011 – date: *BMT WBM Limited*

Non-Executive Director

2011 – date: *BMT ARGOSS Limited*

Non-Executive Director

2011 – date: *BMT Cordah Limited*

Non-Executive Director

2010 – date: *PML Applications Limited*

Non-Executive Director

2009 – date: *BMT Limited*

Sector Director – Energy and Environment

2010 – date: *National Oceanic and Atmospheric Administration*

US Integrated Ocean Observing System industry liaison

2008 – 2010: *United States Consortium for Ocean leadership*

US Integrated Ocean Observing System outreach and advocacy

2007 – date: *London School of Economics and Political Science Centre for Analysis of Time Series*

Professorial Research Fellow

2007-2008: *Ocean.US*

Deputy Director

2006 – date: *Reed Exhibitions Limited*

Chair, Marine Division.

2006 –2007: *Ocean.US/US National Oceanographic Partnership Program*

Consultant advising on strategic development of the US Sustained Integrated Ocean Observing System.

2006 – date: *BMT SMS Inc*

Non-Executive Director.

2006 – 2011: *GEMS International Limited*

Non-Executive Director.

2006 – date: *Sonardyne International Limited*

Non-Executive Director.

2006 – 2008: *Ocean Numerics Limited*

Director.

2005 – 2006: *UK Met Office*

Consultant advising on strategic development of the commercial business of the Met Office.

2005 – 2007: *European Environment Agency*

Supporting the EEA's involvement in GEO/GEOSS (Group on Earth Observations and Global Earth Observation System of Systems) and GMES (Global Monitoring for Environment and Security).

2002 – 2006: *Ocean Scientific International Limited*

Non-Executive Director.

2001 – 2006: *Ocean Numerics Limited*

Chairman.

2003 -2005: *Oceanor Holdings AS, Oceanographic Company of Norway AS*

Chairman.

1994 - 2005: *Fugro Global Environmental and Ocean Sciences Limited, Fugro Global Environmental and Ocean Sciences Private Limited, Fugro Global Environmental and Ocean Sciences Sediran Berhad, Fugro Global Environmental and Ocean Sciences Incorporated, Fugro Global Environmental and Ocean Sciences BV*

Managing Director responsible for the development of the worldwide oceanographic and meteorological businesses of the Fugro Group.

1991 - 1994: *Wimpey Environmental International Limited*

Director responsible for all natural environment related business including marine environmental sciences, contaminated land assessment and air quality studies.

1990 - 1994: *Wimpey Environmental Limited*

Director responsible for business development and direction of all water related business within the company; Director responsible for information technology; Responsible for general business development in SE Asia and the Middle East.

1982 - 1989: *Wimpol Limited*

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Divisional Manager, Marine Environmental Sciences Division.

1981 - 1982: *Wimpol Limited*

Senior Marine Scientist responsible for co-ordinating the development of data collection systems and analytical software. Responsible for project management of a wide range of scientific investigations.

1980 - 1981: *Wimpey Laboratories Limited*

Marine Environmental Scientist.

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## PUBLIC AND SCIENTIFIC APPOINTMENTS

- 2011 – date: Board member, Alliance for Coastal Technology
- 2010 – date: Chair of Plymouth Marine Laboratory Science Advisory Council
- 2009 – 2010: Member of Proudman Oceanographic Laboratory Science Council
- 2009 – date: Chair, Ocean Processes Evidence Group, Defra
- 2009 – date: Member of UK Intergovernmental Oceanographic Commission Advisory Group
- 2009 – date: Member of the Board of Trustees, Plymouth Marine laboratory
- 2008 – date: Member of UK Science Council
- 2008 – 2011: Chair, Global Ocean Observing System Scientific Steering Committee
- 2007 - 2011: Member of Board of Trustees, Institute of Marine Engineering, Science and Technology.
- 2007 - date: Member of Council, Society for Underwater Technology
- 2006 - 2009: Member IACMST Global Ocean Observing System Action Group
- 2006 - date: Vice President, Institute of Marine Engineering, Science and Technology
- 2006 - 2009: Chair, Marine Information Alliance
- 2005 - date: Science Advisory Group, Institute of Marine Engineering, Science and Technology.
- 2004 - date: Member of Executive Council, Association of Marine Scientific Industries
- 2003 - 2008: Executive Board and Work Package leader for development of user products, MERSEA (Marine Environment and Security for the European Area) EC FP6 Integrated Project
- 2002 - 2005: Executive Development Council, Natural History Museum
- 2002 - 2004: Chairman, Association of Marine Scientific Industries
- 2002 - 2004: Board of Trustees, Earth Centre Charitable Trust
- 2002 - 2004: International R&D Review Panel, Foundation for Science and Technology, Portugal
- 2002 - 2003: Peer Review Committee, Norwegian Research Council, Centres of Excellence programme
- 2002 - 2003: Conference Chair, Oceanology International 2002
- 2002 - 2003: Global Ocean Observing System Action Group Review Panel, Inter-Agency Committee for Marine Science and Technology
- 2000 - 2005: Chair, UK Marine Information Council
- 1999 - 2002: Chair, European Oceanographic Industry Association
- 2000 - 2005: Global Ocean Observing System Capacity Building Panel, Intergovernmental Oceanographic Commission of UNESCO
- 1999 - 2000: Comprehensive spending review advisory committee, UK Natural Environment Research Council
- 1999 - 2004: Advisory Board for the Global Ocean Observing System Services and Products Bulletin Intergovernmental Oceanographic Commission of UNESCO
- 1999 - 2001: Gulf of Guinea Large Marine Ecosystem Review Group, World Bank/United Nations Environment Programme
- 1999 - 2005: Global Ocean Observing System Scientific Steering Committee, Intergovernmental Oceanographic Commission of UNESCO
- 1999 - 2001: Coupled Ocean-Atmosphere Processes and European Climate Steering Committee, UK Natural Environment Research Council
- 1999 - 2000: Centre for Coastal and Marine Sciences Advisory Council, UK Natural Environment Research Council
- 1999 - 2005: Member of Council, Society for Underwater Technology
- 1998 - 1999: Cross-Cutting User Liaison Working Group, UK Natural Environment Research Council

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- 1997 - 2000: Proposal Review Committee/expert evaluator, European Commission DGXII, Marine Science and Technology (MAST) Programme/Framework V Infrastructure Proposals, European Commission Directorate General for Research
- 1997 - 2000: Chair, Marine Foresight Task Force on Managing Marine Resources and the Marine Environment, UK Department of Trade and Industry
- 1997 - 2003: Marine Foresight Panel, Foresight Programme, UK Department of Trade and Industry
- 1996 - 1997: Offshore Energy Panel, Foresight Programme, UK Department of Trade and Industry
- 1994 - 1996: Marine Science and Technology Board, UK Natural Environment Research Council
- 1994 - date: Publications Committee, Society for Underwater Technology.
- 1988 - 1991: Membership Secretary, Challenger Society for Marine Science Council
- 1986 - 1990: Member of Council, Society for Underwater Technology
- 1985 - 2000: Education and Training Committee, Society for Underwater Technology
- 1980 - 1985: Member of Council, Marine Conservation Society
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### OTHER PROFESSIONAL ACTIVITIES:

- 1994 - 2002: *UK Department of Trade and Industry*  
Participation in trade and technology evaluation missions.
- 1989 - 1993: *University College of North Wales*  
Visiting lecturer.
- 1987 - 1994: *Newcastle University*  
Visiting lecturer, MSc course in tropical coastal management.
- 1978 - 1980: *University of Manchester*  
Extra-mural courses on oceanography
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### ACADEMIC QUALIFICATIONS

#### 1978 - 1981: PhD, Oceanography, University of Salford

Winner of a Science Research Council special award for a student formulated research proposal for research into the relationship between water movement and water quality in mid Indian Ocean atolls.

PhD Research synopsis:

Research included measurement of the physical (tidal elevation, water movement and water column structure and meteorology), chemical (nutrient concentrations) and biological environment (primary productivity) of three mid Indian Ocean atoll systems with widely differing degrees of connectivity with the open ocean.

These data were used to support the development of mathematical (lagoon water exchange, temperature budgets and circulation) and physical models (wave pumped flows over shallow reef flats). Models and data were used to examine the effects of restricted water exchange on nutrient budgets and primary productivity.

Research was undertaken at the Institute of Oceanographic Sciences Proudman Oceanographic Laboratory, the Institute of Oceanographic Sciences Deacon Laboratory and the Gatty Marine Laboratory, University of St Andrews.

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### **1977 – 1978: MSc, Underwater Science and Technology, University of Salford**

Lecture courses in marine geology (with emphasis on geological exploration techniques), marine physics, offshore engineering, manned and unmanned underwater intervention, diving physiology, underwater power systems and marine corrosion.

Project work on the hydrogen economy and fuel cell technology.

Research dissertation on trace metal contamination of dredged sediments from the Mersey Estuary and the implications for dredge spoil disposal.

### **1974 – 1977: BSc (Joint honours botany and zoology), Biology, University of Salford**

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#### **PROFFESIONAL QUALIFICATIONS**

Fellow of the Explorers Club  
Fellow of the Royal Society for the encouragement of Arts, Manufactures and Commerce  
Fellow of the Institute of Marine Engineering, Science and Technology  
Fellow of the Royal Meteorological Society  
Fellow of the American Meteorological Society  
Fellow of the Royal Institution of Great Britain  
Fellow of the Society for Underwater Technology  
Fellow of the Insitute of Electrical and Electronic Engineers  
Member of the Institute of Directors  
Member of the British Institute of Management  
Chartered Marine Scientist  
Chartered Scientist  
Member of the Chartered Institute of Biology  
Member of the Chartered Institution of Water and Environmental Management  
Member of the American Association for the Advancement of Science  
Member of the Hydrographic Society  
Member of the Marine Technology Society  
Member of the Challenger Society for Marine Science  
Member of the Oceanography Society  
Member of the Association for Marine Remote Sensing

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#### **OTHER QUALIFICATIONS AND AWARDS**

Society for Underwater Technology Presidents Award, 2011  
Association of Marine Scientific Industries Business Person of the Year, 2011  
Institute of Directors Certificate in Company Direction  
UK Ministry Of Defence Award for Oceanography, 2009  
HSE Part IV qualified scientific diver  
Private Pilot's licence  
Full UK driving licence

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### SUPPLEMENTARY TRAINING

2009 - 2010: Certificate in Company Direction, Institute of Directors  
1998 - 1999: Exploring Mathematics, Open University  
1996: Young Node management course, Civil Service College  
1995: Executive Management Course, Henley Management College  
1991 - 1992: International Marketing, Open University Business School  
1990 - 1991: Finance and Accounting, Open University Business School  
1989 - 1990: The Effective Manager, Open University Business School  
1988 - 1990: Computer-based information Systems, Open University  
1997 - 1988: Geology, Open University  
1996 - 1997: Modelling with Mathematics, Open University  
1982 - 1983: The Digital Computer, Open University  
1981 - 1982: Interdisciplinary Statistics, Open University  
1981 - date: Various management, financial, accounting training courses

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### LANGUAGES

German, moderate spoken and written  
French, moderate spoken

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### OUTREACH AND EDUCATION ACTIVITIES

2009 – date: Organisation of a series of workshops around the United States to promote the benefits of the US Integrated Ocean Observing System  
2008 – 2009: Participation in educational expeditions to Greenland to brief on climate and energy issues  
2007 – date: Organisation of workshops and conferences on wide ranging topics in marine science and technology, including Arctic science and governance  
2005 – date: Annual Christmas lecture to Schools, National Maritime Museum and various other venues in the UK  
Contributions to various radio and television programmes  
Experience of newspaper, magazine, radio and TV interviews

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### INTERESTS

Running - regular participant in international marathon and half marathon events  
Climbing – experience of climbs in the Himalayas, the Alps, Greenland, Malaysia and the UK  
SCUBA diving/underwater photography – qualified SCUBA instructor with experience of diving throughout the world  
Hillwalking  
Caving  
Music – play piano and saxophone  
Flying – Paragliding and single engine aircraft  
Skiing  
General science and technology – avid reader of books and journals

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## EDITORIAL ACTIVITIES:

- 2007 – date: Editor in Chief – Journal of Operational Oceanography  
2003 – 2007: Member of Editorial Board – Journal of Marine Science and Environment.  
1998 – date: Member of Editorial Board – International Underwater Systems Design  
1997 – date: Member of Editorial Board – Journal of the Society for Underwater Technology
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## PUBLICATIONS AND INVITED LECTURES

- Rayner, R F (2011)  
Marine renewable energy. Science in Parliament, Volume 68, Number 1
- Rayner, R F (2010)  
The U S Integrated Ocean Observing System in a global context. Journal of the Marine Technology Society, Volume 44, No 6
- Church, J, Rayner, R F et al (2010)  
Sea-level rise and variability: Synthesis and outlook for the future. In 'Understanding sea-level rise and variability.' Editors J A Church, P L Woodworth, T Aarup and W S Wilson, Blackwell Publishing
- Rayner, R F and B MacKenzie (2010)  
A first order assessment of the impact of long-term trends in extreme sea levels on offshore structures and coastal refineries. In 'Understanding sea-level rise and variability.' Editors JA Church, P L Woodworth, T Aarup and W S Wilson, Blackwell Publishing
- Rayner, R F (2010)  
Incorporating climate change within asset management. In 'Asset management – whole life management of physical assets'. Editor, C Lloyd, London, Thomas Telford Press, ISBN 978-0-7277-3653-6
- Rayner, R F & Stephens, R V (2008)  
Offshore Industry Applications. Proceedings of the GODAE Final Symposium, Nice, November 2008
- Rayner, R F (2006)  
Climate change and the Arctic. Climate change and the marine environment conference, University of London, December 2006
- Rayner, R F (2006)  
The History, Science and Politics of the Indian Ocean Chagos Archipelago. Stanley Gray Memorial lecture, Institute of Marine Engineering, Science and Technology, November 2006
- Rayner, R F (2006)  
Assessing the impact of long term trends in extreme sea surface elevation on the design of offshore and coastal installations, Proceedings of the IOC workshop on sea level, Paris, July 2006
- Rayner, R F and Stephens, R V (2006)  
Performance metrics for ocean forecasts – testing how good ocean models really are. Proceedings of the World Maritime Technology Conference, London, March 2006
- Rayner, R F (2005)  
Practical mechanisms for improving the coordination of operational oceanography at a national and international level, Proceedings of the Oceans 2005 Conference, Washington, September 2005
- Rayner, R F (2005)  
Value of operational oceanography at the intergovernmental level (JCOMM) to industry, JCOMM Science Conference, Halifax Nova Scotia, September 2005
- Rayner, R F (2005)  
Climate change and the oceans, in The European environment – State and outlook 2005, European Environment Agency, Copenhagen, 2005, ISBN 92-9167-776-0



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- Rayner, R F (2005)  
Operational issues associated with practical ocean observing and forecasting systems, plenary presentation, Proceedings of the 4<sup>th</sup> EuroGOOS Conference, Brest, 6-9 June 2005
- Rayner, R F (2004)  
Practical benefits of operational oceanography, plenary presentation at 2<sup>nd</sup> symposium on the Global Ocean Data Assimilation Experiment, St Petersburg, Florida
- Rayner, R F (2004)  
Operational oceanography – from Maury to the present day and beyond, keynote presentation, Oceanology International Conference, March 2004
- Summerhayes C. P & Rayner, R F (2002)  
Operational oceanography, In Field, J G., Hempel, G., and Summerhayes C. P. (eds), Oceans 2020: Science for future needs, Island Press, Washington DC
- Rayner, R F (2001)  
Operational oceanography – A private sector perspective, Anton Bruun Memorial Lecture, Intergovernmental Oceanographic Commission General Assembly, Paris, 5 July 2001
- Rayner, R F (2001)  
The private sector use of ocean remote sensing – industrial requirements and commercial services, Guymet, T H et al, EuroGOOS Conference on Operational Observations from Space, EuroGOOS publication number 16
- Rayner, R F (2000)  
Creating wealth from basic data, National open forum on the value of marine data, Inter-Agency Committee on Marine Science and Technology, 14 July 2000
- Rayner, R F (2000)  
The Global Marine Information Business, Oceanology International 2000 distinguished lecture
- Rayner, R F et al (1999)  
The Greenwich Project – A Marine Information Strategy for the United Kingdom, Department of Trade and Industry, DTI/Pub 4071/10K/05/99/NP. URN 99/668
- Gallett, I N L, Rayner, R F et al (1998)  
The Oceanographic and Underwater Robotics Industries in Asia: A Report on an International Technology Service Mission to Korea and Japan, Society for Underwater Technology, ISBN 0 906940 34 6
- Rayner, R F, Flynn, J E & Smirren J V (1994)  
The use of Ocean Surface Current Radar in Singapore coastal waters, Proceedings of the Ninth Congress of the Asian and Pacific Division of the International Association for Hydraulic Research, Singapore 24-26 August 1994
- Rayner, R F & Teo, C H (1993)  
Environmental Data Requirement and Data Acquisition for Marine Resource Development, Commonwealth Association of Surveying and Land Economy International Symposium on Resource Management. Kuala Lumpur, February 1993
- Rayner, R F (1992)  
Field Studies and the Analysis of Data, in Coastal Estuarial and Harbour Engineers Reference Book, (Ed Price, W.A) Spon, London 1992
- Rayner, R F (1992)  
Field Surveys, Scottish Hydraulics Study Group Seminar on Coastal and Estuarine Pollution, Glasgow, April 1992
- Rayner, R F (1992)  
Developments in the Measurement of Estuarine Hydrodynamic Features, International Association for Hydraulic Research meeting on Hydraulic Measurement in Rivers and Estuaries, Institution of Civil Engineers, January 1992
- Rayner, R F & Arundel J (1992)  
New Approaches to Effluent Treatment, Industrial Waste Water Treatment Conference, Esher, March 1992
- Rayner, R F (1992)  
Modelling Water Quality - Field Data Requirements, Proceedings of the Institution of Civil Engineers (Water, Maritime and Energy) 96, Sept pp201-203

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- Rayner, R F (1991)  
Measurement and Assessment of the Marine Environment, Surveying at Sea Seminar, Royal Institution of Chartered Surveyors, September 1991
- Rayner, R F (1991)  
Geographical Information Systems for the Marine Environment, Proceedings of the Association for Geographic Information Conference, Birmingham, November 1991
- Hannam, M D and Rayner, R F (1991)  
Understanding the Environmental Effects of Waste Water Disposal, British Association for the Advancement of Science Conference, Plymouth, 1991
- Rayner, R F, Tidman, M and FitzGerald, A (1991)  
Monitoring of Pollutant Fluxes in Point Source Inputs to Rivers and Coastal Waters, Proceedings of the Institution of Water and Environmental Management Conference on Water and the Environment, Birmingham, April 1991
- O'Connor, B, Nicholson, J, and Rayner, R F (1990)  
Estuary Geometry as a function of tidal range, Proceedings of the Coastal Engineering Conference, Delft, July 1990
- Rayner R F (1990)  
Undersea Technology, Wayland Publishers Limited
- Rayner, R F (1989)  
Post Construction Monitoring of the Performance of Sea Outfalls, Proceedings of Seminar on Long Sea Outfalls. Institution of Civil Engineers, March 1989
- Rayner, R F & Pagett, R M (1989)  
Monitoring Water Quality in the Marine Environment - Present Methods and Some Likely Future Improvements, in advances in Water Modelling and Measurement (Ed M H Palmer). BHRA (Information Services)
- Rayner, R F, Elliott, R C A & Pagett, R M (1988)  
Site Investigation for Outfall Design, Construction and Monitoring, Water Research Centre Report Reference ER315E, August 1988
- Elliott, R C A, Pagett R M & Rayner R F (1988)  
Environmental Studies for Outfall Design, Construction and Monitoring, Institution of Water and Environmental Management Symposium - Aspects of Sea Outfalls. Exeter, January, 1988
- Rayner, R F (1987)  
Current Profiling - an Industry View, Society for Underwater Technology Meeting, Institution of Mechanical Engineers, London, March, 1987
- Rayner, R F (1987)  
Review of Recent Developments in Tide Gauges, Hydrographic Society Seminar on Tidal Measurement and Data Acquisition. Royal Institution of Chartered Surveyors, April, 1987
- Rayner, R F (1986)  
Wave Measurement, Hydrographic Society Seminar on Environmental Monitoring, Norwich, 1986
- Rayner, R F (1986)  
Commercial Applied Oceanography in the United Kingdom, UK Oceanography Conference, University of Southampton, October 1986
- Rayner, R F (1986)  
Oceanology: An Exciting Future? Proceedings of the Port Engineering Seminar, Rai Congress Centre, Amsterdam, October, 1986
- Rayner, R F & Archer, S A (1985)  
Evaluation and Calibration of Oceanographic Instruments - The Users View, Advances in Underwater Technology and Offshore Engineering, Volume 4, Proceedings of the International Conference on Ocean Data, Society for Underwater Technology, London, 1985, Published by Graham & Trotman Ltd
- Rayner, R F & Powell, R P (1984)  
Marine Environmental Surveys for Desalination Plant and Power Station Development, Proceedings of the International Maritime Engineering Conference, Bahrain, 1984
- Rayner, R F (1984)  
The Role of SCUBA Techniques in an Oceanographic Survey of Two Mid Indian Ocean Coral Atolls, Memorial University of Newfoundland Occasional Papers in Biology, 1984, 9, pp 76-86

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Rayner, R F & Drew, E A (1984)

Nutrient Concentrations and Primary Productivity at the Peros Banhos and Salomon Atolls in the Chagos Archipelago, Estuarine, Coastal and Shelf Science, 1984, 18, pp 121-132

Pugh, D T & Rayner, R F (1981)

The Tidal Regimes of Three Indian Ocean Atolls and some Ecological Implications, Estuarine, Coastal and Shelf Sciences, 1981, 13, pp 389-407

Rayner, R F (1980)

Circulation of the Salomon Atoll Lagoon, Chagos Archipelago, Proceedings of the Sixth International Symposium of the World Underwater Federation (CMAS), September 1980

Rayner, R F (1980)

A Report on an Oceanographic Survey of Two Atolls in the Chagos Archipelago, Lecture presented at the Royal Geographical Society, London, June 1980

Rayner, R F (1979)

The tidal Regime of Some Indian Ocean Atolls, Paper presented at the Coral Reefs - Problems and Prospects meeting, Cambridge University, October 1979

Rayner et al (1981 - date).

Input to, or authorship of, in excess of two hundred client confidential technical and scientific reports