

## CURRICULUM VITAE: MICHAEL KEVIN GAGAN

### Personal Details

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### Academic Qualifications

1980 BA with Honours; Department of Geological Sciences, University of California, Santa Barbara, California, USA  
1990 PhD; Department of Geology, James Cook University, Townsville, Qld., Australia.

### Professional Experience

1979-80 Research Assistant, Seismotectonic Prognostications, University of California, Santa Barbara, California, USA.  
1981-83 Exploration Geologist, Aquitaine Australia Minerals Pty Ltd, North Sydney, NSW.  
1984-87 PhD Candidate, Department of Geology, James Cook University, Townsville, Qld.  
1988-91 Lecturer; Faculty of Resource Science and Management, University of New England, Northern Rivers, Lismore, NSW.  
1992-98 Research Fellow; Environmental Geochemistry Group, Research School of Earth Sciences, The Australian National University, Canberra, ACT.  
1998- Fellow; Earth Environment, Research School of Earth Sciences, The Australian National University, Canberra, ACT.

### Research Interests

The use of isotopic and elemental tracers to address fundamental problems in palaeoclimatology, palaeoceanography, environmental geochemistry, and global change research. Specifically, the development of high temporal resolution proxy climate records for improved understanding of changes in climatic and oceanic processes during the late Quaternary, particularly in the southern hemisphere and the tropics.

### Academic Awards and Distinctions

1979, 80 Dean's List for High Scholastic Achievement; University of California, Santa Barbara.  
1980 BA confirmed with Honours; University of California, Santa Barbara.  
1984-87 Marine Science and Technologies Postgraduate Research Scholarship.  
1985, 87 Geology Department Staff Award for Excellence in Research Presentation, James Cook University.  
1996 Keynote address: *The Great Barrier Reef: Science, Use, and Management*, Townsville, Qld.  
1997 Keynote address: The joint IAMAS-IAPSO Symposium: *Earth-Ocean-Atmosphere: Forces for Change*, Melbourne.  
1998 Plenary address: The International Geosphere-Biosphere Program Past Global Changes Open Science Meeting: *Past Global Changes and their Significance for the Future*, London, UK.  
2001 Keynote address: The International Geosphere-Biosphere Program Meeting: *Austral-Asian Pole Equator-Pole (PEPII) Synthesis*, National University of Singapore.  
2003 Alan Cox Visiting Professor, Department of Geological and Environmental Sciences, Stanford University, USA.  
2005 Keynote address: The AGU Chapman Conference: *Tropical-Extratropical Teleconnections: A Long-Term Perspective*, University of Hawaii, USA.

### Professional Service

1995 Invited co-organiser (with R. Dunbar, USA.; J. Cole, USA; J. Recy, France) for the International Geosphere-Biosphere Program initiative and meeting: *Annual Records of Tropical Systems*.  
1996- Invited member of the Past Global Changes (PAGES) – Climate Variability and Predictability (CLIVAR) Joint Working Group of the International Geosphere-Biosphere Program (IGBP) and World Climate Research Program (WCRP).

- 1997- Invited member of the Ocean Drilling Program Shallow Water Systems Program Planning Group.
- 2001- Invited member of International Geological Correlation Program (IGCP) Project 464: *Continental Shelves during the Last Glacial Cycle*.
- 2001 Invited co-organiser (with T. Correge, New Caledonia.; S. Tudhope; R. Dunbar, USA) for the International Geosphere-Biosphere Program meeting: *Annual Records of Tropical Systems*.
- 2004- Invited Research Associate for the *Oceania Marine Reservoir Dating Project*.
- 2005- Invited Partner Researcher for a report commissioned by the Australian Greenhouse Office: *The key ways that palaeo-science can constrain uncertainties about climate change and its potential impacts in Australia*.
- 1992- Professional societies: Member of the American Geophysical Union, Australian Quaternary Association, Australian Coral Reef Society, ANU Centre for Archaeological Research.
- 1993- Journal articles: Reviews for *Nature*, *Science*, *Geochimica et Cosmochimica Acta*, *Earth and Planetary Science Letters*, *Journal of Geophysical Research*, *Geophysical Research Letters*, *Paleoceanography*, *Quaternary Science Reviews*, *Climate Dynamics*, *Geochemistry-Geophysics-Geosystems*, *Marine Chemistry*, *Geochemical Journal*, *Paleoclimatology-Paleogeography-Paleoecology*, *Limnology and Oceanography*, *Coral Reefs*, *Marine Geology*, *Journal of Paleolimnology*, *Sedimentary Geology*, *Australian Journal of Marine and Freshwater Research*.
- 1995- Research grant proposals: Reviews for the the Australian Research Council (ARC), US National Science Foundation (NSF); the US National Oceanic and Atmospheric Administration (NOAA); the UK Natural Environment Research Council (NERC), and European Science Foundation (ESF).

### Invited Lectures

- 1993 International Geosphere-Biosphere Program Past Global Changes Workshop: *Paleomonsoons in Africa and surrounding oceans: the last 200,000 years*, Mombasa, Kenya.
- 1994 International Geological Correlation Program Project 349 Meeting: *Desert Margins and Palaeomonsoons: The last 20 ka BP*, Xian, China.
- 1994 UNESCO-International Union of Geological Sciences Meeting: *3rd Climates of the Past Meeting*, Denpasar, Indonesia.
- 1995 UNESCO-International Union of Geological Sciences Meeting: *4th Climates of the Past Meeting*, Lanzarote, Canary Islands.
- 1995 American Geophysical Union Fall Meeting Special Symposium: *Tropical Ocean-Atmosphere Interactions: Past and Present*, San Francisco, USA.
- 1996 The national conference *The Great Barrier Reef: Science, Use, and Management*, James Cook University, Townsville, Qld., Australia (Keynote Address).
- 1996 International Geosphere-Biosphere Program (PAGES) and World Climate Research Program (CLIVAR) Workshop: *Climate Variability and Predictability*, Villefranche-sur-mer, France.
- 1996 Co-organiser of International Geosphere-Biosphere Program Past Global Changes Workshop: *Annual Records of Tropical Systems*, Hawaii, USA.
- 1997 *The International Symposium on Quaternary Environmental Change in Asia and the Western Pacific Region*, University of Tokyo, Tokyo, Japan.
- 1997 The joint International Association for Meteorology and Atmospheric Sciences / International Association for the Physical Sciences of the Oceans Symposium: *Earth-Ocean-Atmosphere: Forces for Change*, Melbourne, Vic., Australia (Keynote Address).
- 1997 The International Center for Theoretical Physics workshop: *Warm Climates in the Tropics*, Trieste, Italy (paper presented by T. Correge).
- 1998 The International Geosphere-Biosphere Program Past Global Changes Open Science Meeting: *Past Global Changes and their Significance for the Future*, London, UK (Plenary Address).
- 1998 The FERCO International Conference: *Climate and Culture at 3,000 B.C.*, University of Maine, USA.

- 1999 The International Geosphere-Biosphere Program Past Global Changes / World Climate Research Program Climate Variability and Predictability Workshop: *Climate Variations of the Last 300 to 1,000 Years*, Venice, Italy.
- 2000 The Ocean Drilling Program Shallow Water Systems Workshop: *Submerged Coral Drilling*, St. Petersburg, Florida, USA.
- 2001 The International Geosphere-Biosphere Program Past Global Changes Workshop: *Annual Records of Tropical Systems*, Noumea, New Caledonia.
- 2001 The International Geosphere-Biosphere Program Meeting: *Austral-Asian Pole-Equator-Pole (PEPII) Synthesis*, National University of Singapore. (Keynote Address).
- 2002 The Goldschmidt 2002 Conference special session: *Ocean Paleotemperatures*, Davos, Switzerland.
- 2002 The U.S. National Oceanic and Atmospheric Administration Program Conference: *The Hadley Circulation: Present, Past, and Future*, University of Hawaii, USA.
- 2005 The AGU Chapman Conference: *Tropical-Extratropical Teleconnections: A Long-Term Perspective*, University of Hawaii, USA. (Keynote Address).
- 2005 The national conference *Reconstructing Past Climates for Future Prediction: Integrating High-resolution Palaeo Data for Meaningful Prediction in the Australasian Region*, The Australian Academy of Science, Canberra, Australia.

## Research Supervision

### *Research Fellows / Post-doctoral Fellows*

- 1997-98 Dr A. Suzuki, now at National Institute of Advanced Industrial Science and Technology, Japan.
- 2000-02 Dr T. Watanabe, now at Grad. School of Environ. Earth Science, Hokkaido University, Japan.
- 2003-05 Dr G. Dunbar, now at Department of Earth Sciences, Victoria University of Wellington, NZ.
- 2006- Dr L. Ayliffe, RSES, ANU.

### *PhD Students*

#### *Chair of PhD supervision panel or co-supervisor*

- 1997-03 E. Hendy, Australian Postgraduate Research Scholar, principal supervisor.  
RSES Robert Hill Memorial Prize winner: *Coral Reconstructions of Decadal-to-Centennial Climate Variability in the Great Barrier Reef since 1565 AD*.  
Now at Lamont-Doherty Earth Observatory, Columbia University, USA.
- 1997-03 A. Müller, International Postgraduate Research Scholar, co-supervisor w / B. Opdyke (DEMS).  
*Deep-Sea Sediment Core and Coral Reconstructions of the Late Quaternary Paleooceanography of the Eastern Indian Ocean*.  
Now at the Department of Earth Sciences, The University of Queensland.
- 1998-03 H. McGregor, Australian Postgraduate Research Scholar, committee chair.  
*Coral Records of Climate Variability in the West Pacific Warm Pool*.  
Now at the Research Center for Ocean Margins, University of Bremen, Germany.
- 2000-04 N. Abram, John Conrad Jaeger Scholar, committee chair.  
RSES Robert Hill Memorial Prize winner: *Multi-proxy Coral Reconstruction of Holocene Climate and Reef Growth in the Eastern Indian Ocean*.  
Now at the British Antarctic Survey, Cambridge, United Kingdom.
- 2002- D. Qu, ANU Postgraduate Research Scholar, committee chair.  
*Late Quaternary Climate in the Indo-Pacific Warm Pool Reconstructed from the Raised Coral Reefs of Sumba, Indonesia*.
- 2003- R. Berdin, ANU Postgraduate Research Scholar, committee chair.  
*Reconstructing Holocene Climate Variability from Corals in the Philippines, Northern West Pacific Warm Pool*.
- 2006- E. St Pierre, ARC / UQ Postgraduate Research Scholar, external co-supervisor with J.-x. Zhao

and S. Golding, The University of Queensland.

2006- M. Griffiths, ARC Postgraduate Research Scholar, external co-supervisor with R. Drysdale, University of Newcastle.

*Advisor on PhD supervision panel*

1996-99 T. Barrows, Australian Postgraduate Research Scholar, Environmental Processes, RSES.  
 1997-01 J. Marshall, Australian Postgraduate Research Scholar, Earth Environment, RSES.  
 2001-05 R. Fraser, Australian Postgraduate Research Scholar, Earth Environment, RSES.  
 2001-05 H. Bostok, Australian Postgraduate Research Scholar, DEMS.  
 2002- M. Spooner, Australian Postgraduate Research Scholar, DEMS.  
 2002-06 B. Ayling, Australian Postgraduate Research Scholar, Earth Environment, RSES.  
 2003- S. Burgess, Australian Postgraduate Research Scholar, Earth Environment, RSES.  
 2004- S. Barker, Australian Postgraduate Research Scholar, Earth Materials, RSES.

*Honours Students*

2002-03 K. Lilly, Honours Scholar, supervisor.  
 First Class Honours: *Extreme El Niño Events Recorded in Great Barrier Reef Corals*.  
 Now at Research School of Earth Sciences, ANU.  
 2004 C. Southby, Honours Scholar, supervisor.  
 First Class Honours: *Late Holocene El Niño Variations Recorded in Fossil Corals from Papua New Guinea*.  
 Now at Geoscience Australia, Canberra, ACT.

*School Visitors (advisor for academics / PhD students using RSES Stable Isotope Laboratory)*

1996 W. Hantoro et al., R & D Center for Geotechnology, Indonesian Institute of Sciences.  
 1996-97 A. Steven, Dept. of Biological Sciences, James Cook University, with B. Willis, D. Barnes.  
 1997-98 G. Dunbar, School of Earth Sciences, James Cook University, with R. Carter.  
 1998 W. Yim, Department of Earth Sciences, The University of Hong Kong.  
 1998-00 G. Yan, School of Ecology and Environment, Deakin University, with G. Shi.  
 1999-01 J. True, Dept. of Biological Sciences, James Cook University, with B. Willis.  
 2000 W. Hantoro et al., R & D Center for Geotechnology, Indonesian Institute of Sciences.  
 2000-02 C. Ihlenfeld, Dept. of Earth Sciences, La Trobe University, with R. Maas.  
 2001-02 S. Clarke, School of Geosciences, University of Wollongong, with C. Murray-Wallace.  
 2001-02 M. Elliot, Lamont Doherty Earth Observatory, Columbia University, USA.  
 2002 M. Beech, School of Geosciences, University of Wollongong, with C. Woodroffe.  
 2002 R. Johnston, School of Geogr. and Environ. Science, Monash University, with P. Kershaw.  
 2003 M. Inoue, Graduate School of Science, Tohoku University, Japan, with A. Suzuki.  
 2003 A. Moy, Inst. of Antarctic and Southern Ocean Studies, U. Tasmania, with W. Howard.  
 2003-04 J. McDonald, School of Environmental and Life Sciences, U. Newcastle, with R. Drysdale.  
 2003-04 P. Montagna, Dept. of Mineralogy and Petrology, University of Padova, with C. Mazzoli.  
 2003-04 C. Rowe, School of Geogr. and Environ. Science, Monash University, with P. Kershaw.  
 2004 T. Correge, Institute of Research and Development, France.  
 2004 K. Durand, School of Environmental and Life Sciences, U. Newcastle, with R. Drysdale.  
 2004 Y. Feng, ACQUIRE, The University of Queensland, with J.-x. Zhao.  
 2004 T. Williamson, School of Earth Sciences, James Cook University, with R. Henderson.  
 2004-05 B. Murphy, Faculty of Science, Charles Darwin University, with D. Bowman.

- 2004-05 K. Westaway, School of Earth and Environmental Sciences, U. Wollongong, with B. Roberts.  
 2005 I. Taylor, Department of Earth Sciences, The University of Queensland, with A. Muller.  
 2005-06 G. Miller, Department of Geological Sciences, University of Colorado, USA.  
 2006 L. Hansen, Department of Earth Sciences, The University of Queensland, with A. Muller.  
 2006 E. Hodge, Australian Nuclear Science and Technology Organisation, with D. Fink.

## Publications

### Book contributions

- Gagan, M.K., Ayliffe, L.K., Anker, S., Hopley, D., McCulloch, M.T., Isdale, P.J., Chappell, J., Hantoro, W.S. and M.J. Head (1997). Coral reconstructions of surface-ocean temperature, precipitation and evaporation. *In* E. Matsumoto (ed.), *Coral Climatology by Annual Bands*, p. 36-41.
- Beck, J.W., Gagan, M.K., Tudhope, A.W., Recy, J., Taylor, F.W., Edwards, R.L. and G. Cabioch (1997). Abrupt changes in early Holocene sea surface temperatures from coral Sr/Ca, U/Ca and  $\delta^{18}\text{O}$  thermometry. *In* E. Matsumoto (ed.), *Coral Climatology by Annual Bands*, p. 42-49.
- Gagan, M.K. and J. Chappell (2000). Massive corals: grand archives of ENSO. *In* R.H. Grove and J. Chappell (eds.), *El Niño: History and Crisis*, The White Horse Press, United Kingdom, pp. 35-50.
- Gagan, M.K. and L.G. Thompson (2004). Evolution of the Indo-Pacific Warm Pool and Hadley-Walker circulations since the last deglaciation. *In* H.F. Diaz and R.S. Bradley (eds.), *The Hadley Circulation: Present, Past and Future*, Kluwer Academic Publishers, pp. 289-312.
- Suzuki, A., Gagan, M.K., Kan, H., Edward, A., Siringan, F.P., Yoneda, M. and H. Kawahata (in press). Coral records of the 1990s in the tropical northwest Pacific: ENSO, mass coral bleaching, and global warming. *In* H. Kawahata (ed.), *Global Climate Change and Response of the Carbon Cycle in the Equatorial Pacific, Indian Ocean, and Adjacent Landmasses*, Elsevier Oceanography Series, pp. 217-244.
- Anderson, A., Gagan, M.K. and J. Shulmeister (in press). Mid-Holocene cultural dynamics and climatic change in the western Pacific. *In* D.H. Sandweiss and K.A. Maasch (eds.), *Climate Change and Cultural Dynamics: A Global Perspective on Holocene Transitions*, Academic Press.
- Gagan, M.K. (in press). Paleo-El Niño-Southern Oscillation (ENSO) records. *In* R. Fairbridge and M. Rampino (eds.), *Encyclopedia of Paleoclimatology and Ancient Environments*, Kluwer Academic Publishers.

### Refereed journal articles

- Gagan, M.K., Sandstrom, M.W. and A.R. Chivas (1987). Restricted terrestrial carbon input to the continental shelf during Cyclone Winifred: implications for terrestrial runoff to the Great Barrier Reef Province. *Coral Reefs*, 6, 113-119.
- Gagan, M.K., Johnson, D.P. and R.M. Carter (1988). The Cyclone Winifred storm bed, central Great Barrier Reef shelf, Australia. *Journal of Sedimentary Petrology*, 58, 845-856.
- Gagan, M.K., Chivas, A.R. and A.L. Herczeg (1990). Shelf-wide erosion, deposition, and suspended sediment transport during Cyclone Winifred, central Great Barrier Reef shelf, Australia. *Journal of Sedimentary Petrology*, 60, 456-470.
- Gagan, M.K., Chivas, A.R. and P.J. Isdale (1994). High-resolution isotopic records from corals using ocean temperature and mass-spawning chronometers. *Earth and Planetary Science Letters*, 121, 549-558.  
 Paper highlighted in *Earth and Planetary Science Express*, February, 1994.
- Gagan, M.K., Johnson, D.P. and G.M. Crowley (1994). Sea level control of stacked late Quaternary coastal sequences, central Great Barrier Reef. *Sedimentology*, 41, 329-351.
- McCulloch, M.T., Gagan, M.K., Mortimer, G.E., Chivas, A.R. and P.J. Isdale (1994). A high-resolution Sr/Ca and  $\delta^{18}\text{O}$  coral record from the Great Barrier Reef, Australia, and the 1982-1983 El Niño. *Geochimica et Cosmochimica Acta*, 58, 2747-2754.

- Bird, M.I., Summons, R.E., Gagan, M.K., Roksandic, L., Dowling, L., Head, J., Fifield, L.K., Cresswell, R.G. and D.P. Johnson (1995). Terrestrial vegetation change inferred from *n*-alkane  $\delta^{13}\text{C}$  analysis in the marine environment. *Geochimica et Cosmochimica Acta*, 59, 2853-2858.
- Crowley, G.M. and M.K. Gagan (1995). Holocene evolution of coastal wetlands in wet tropical northeastern Australia. *The Holocene*, 5, 385-399.
- Gagan, M.K. and A.R. Chivas (1995). Oxygen isotopes in western Australian coral reveal Pinatubo aerosol-induced cooling in the Western Pacific Warm Pool. *Geophysical Research Letters*, 22, 1069-1072.
- Larcombe, P., Carter, R.M., Dye, J., Gagan, M.K. and D.P. Johnson (1995). The nature of postglacial sea-level change, central Great Barrier Reef, Australia. *Marine Geology*, 127, 1-44.
- Gagan, M.K., Chivas, A.R. and P.J. Isdale (1996). Timing coral-based climatic histories with  $^{13}\text{C}$  enrichments driven by synchronized spawning. *Geology*, 24, 1009-1012.
- Gagan, M.K., Ayliffe, L.K., Hopley, D., Cali, J.A., Mortimer, G.E., Chappell, J., McCulloch, M.T. and M.J. Head (1998). Temperature and surface-ocean water balance of the mid-Holocene tropical western Pacific. *Science*, 279: 1014-1018.  
Paper highlighted in *Science's Compass*: Beck, J.W. (1998). Warmer and wetter 6000 years ago? *Science*, 279, 1003-1004.
- Johnson, B.J., Miller, G.H., Fogel, M.L., Magee, J.W., Gagan, M.K. and A.R. Chivas (1999). 65,000 years of vegetation change in central Australia and the Australian summer monsoon. *Science*, 284: 1150-1152.
- Woodroffe, C.D. and M.K. Gagan (2000). Coral microatolls from the central Pacific record late Holocene El Niño. *Geophysical Research Letters*, 27: 1511-1514.
- Gagan, M.K., Ayliffe, L.K., Beck, J.W., Cole, J.E., Druffel, E.R.M., Dunbar, R.B. and D.P. Schrag (2000). New views of tropical paleoclimates from corals. *Quaternary Science Reviews*, 19: 45-64.
- Suzuki, A., Gagan, M.K., De Deckker, P., Omura, A., Yukino, I. and H. Kawahata (2001). Last Interglacial coral record of enhanced insolation seasonality and seawater  $^{18}\text{O}$  enrichment in the Ryukyu Islands, northwest Pacific. *Geophysical Research Letters*, 28: 3685-3688.
- Müller, A., Gagan, M.K. and M.T. McCulloch (2001). Early marine diagenesis in corals and geochemical consequences for paleoceanographic reconstructions. *Geophysical Research Letters*, 28: 4471-4474.
- Hendy, E.J., Gagan, M.K., Alibert, C., McCulloch, M.T., Lough, J.M. and P.J. Isdale (2002). Abrupt shift in tropical sea surface salinity at end of Little Ice Age. *Science*, 295:1511-1514.
- Kawahata, H., Nishimura, A. and M.K. Gagan (2002). Seasonal change in foraminiferal production in the western equatorial Pacific: evidence from sediment trap experiments. *Deep-Sea Research*, 49: 2783-2800.
- Gagan, M.K., Ayliffe, L.K., Opdyke, B.N., Hopley, D., Scott-Gagan, H. and J. Cowley (2002). Coral oxygen isotope evidence for recent groundwater fluxes to the Australian Great Barrier Reef. *Geophysical Research Letters*, 29(20), 1982, doi:10.1029/2002GL015336.
- Hendy, E.J., Gagan, M.K. and J.M. Lough (2003). Chronological control of coral records using luminescent lines and evidence for non-stationary ENSO teleconnections in northeast Australia. *The Holocene*, 13(2): 187-199.
- Watanabe, T., Gagan, M.K., Corregge, T., Scott-Gagan, H., Cowley, J. and W.S. Hantoro (2003). Oxygen isotope systematics in *Diploastrea heliopora*: New coral archive of tropical paleoclimate. *Geochimica et Cosmochimica Acta*, 67(7): 1349-1358.
- Woodroffe, C.D., Beech, M. and M.K. Gagan (2003). Mid-late Holocene El Niño variability in the equatorial Pacific from coral microatolls. *Geophysical Research Letters*, 30(7), 1358, doi:10.1029/2002GL015868.
- McGregor, H.V. and M.K. Gagan (2003). Diagenesis and geochemistry of *Porites* corals from Papua New Guinea: implications for paleoclimate reconstruction. *Geochimica et Cosmochimica Acta*, 67(12): 2147-2156.

- Ihlenfeld, C., Norman, M.D., Gagan, M.K., Drysdale, R.N., Maas, R. and J. Webb (2003). Climatic significance of seasonal trace element and stable isotope variations in a modern freshwater tufa. *Geochimica et Cosmochimica Acta*, 67(13): 2341-2357.
- Abram, N.J., Gagan, M.K., McCulloch, M.T., Chappell, J. and W.S. Hantoro (2003). Coral reef death during the 1997 Indian Ocean dipole linked to Indonesian wildfires. *Science*, 301(5635): 952-955.
- Hendy, E. J., Lough, J.M. and M.K. Gagan (2003). Historical mortality in massive *Porites* from the central Great Barrier Reef, Australia: evidence for past environmental stress? *Coral Reefs*, 22(3): 207-215.
- Zhao, J.-x., Wang, Y.-j., Collerson, K.D. and M.K. Gagan (2003). Speleothem U-series dating of semi-synchronous climate oscillations during the last deglaciation. *Earth and Planetary Science Letters*, 216(1-2): 155-161.
- Suzuki, A., Gagan, M.K., Fabricius, K., Isdale, P.J., Yukino, I. and H. Kawahata (2003). Skeletal isotope microprofiles of growth perturbations in *Porites* corals during the 1997-1998 mass bleaching event. *Coral Reefs*, 22(4), 357-369, doi:10.1007/s00338-003-0323-4.
- Abram, N.J., Gagan, M.K., McCulloch, M.T., Chappell, J. and W.S. Hantoro (2004). Response to comment on "Coral reef death during the 1997 Indian Ocean dipole linked to Indonesian wildfires". *Science*, 303(5662): Feb. 27, 2004.
- Abram, N.J., Gagan, M.K., McCulloch, M.T., Chappell, J. and W.S. Hantoro (2004). The sudden death of a coral reef - Response. *Science*, 303(5662): 1293-1294.
- Müller, A., Gagan, M.K. and J.M. Lough (2004). Effect of early marine diagenesis on coral reconstructions of surface-ocean  $^{13}\text{C}/^{12}\text{C}$  and carbonate saturation state. *Global Biogeochemical Cycles*, 18(1), GB1033, doi:10.1029/2003GB002112.
- Gagan, M.K., Hendy, E.J., Haberle, S.G. and W.S. Hantoro (2004). Post-glacial evolution of the Indo-Pacific Warm Pool and El Niño-Southern Oscillation. *Quaternary International*, 118-119: 127-143.
- Correge, T., Gagan, M.K., Beck, J.W., Burr, G.S., Cabioch, G. and F. Le Cornec (2004). Interdecadal variation in the extent of South Pacific tropical waters during the Younger Dryas event. *Nature*, 428: 927-929.
- Wu, J., Gagan, M.K., Jiang, X., Xia, W. and S. Wang (2004). Sedimentary geochemical evidence for recent eutrophication of Lake Chenghai, Yunnan, China. *Journal of Paleolimnology*, 32: 85-94.
- Grumet, N.S., Abram, N.J., Beck, J.W., Dunbar, R.B., Gagan, M.K., Guilderson, T.P., Hantoro, W.S. and B.W. Suwargadi (2004). Coral radiocarbon records of Indian Ocean water mass mixing and wind-induced upwelling along the coast of Sumatra, Indonesia. *Journal of Geophysical Research*, 109, C05003, doi:10.1029/2003JC002087.
- McGregor, H.V. and M.K. Gagan (2004). Western Pacific coral  $\delta^{18}\text{O}$  records of anomalous Holocene variability in the El Niño-Southern Oscillation. *Geophysical Research Letters*, 31, L11204, doi:10.1029/2004GL019972.
- Bostock, H.C., Opdyke, B.N., Gagan, M.K. and L.K. Fifield (2004). Carbon isotope evidence for changes in Antarctic Intermediate Water circulation and ocean ventilation in the southwest Pacific during the last deglaciation. *Paleoceanography*, 19, PA4013, doi:10.1029/2004PA001047.
- Ayliffe, L.K., Bird, M.I., Gagan, M.K., Isdale, P.J., Scott-Gagan, H., Parker, B., Griffin, D., Nongkas, M. and M.T. McCulloch (2004). Geochemistry of coral from Papua New Guinea as a proxy for ENSO ocean-atmosphere interactions in the Pacific Warm Pool. *Continental Shelf Research*, 24: 2343-2356.
- Treble, P.C., Chappell, J., Gagan, M.K., McKeegan, K.D. and T.M. Harrison (2005). *In situ* measurement of seasonal  $\delta^{18}\text{O}$  variations and analysis of isotopic trends in a precisely dated speleothem from southwest Australia. *Earth and Planetary Science Letters*, 233: 17-32.
- Miller, G.H., Fogel, M.L., Magee, J.W., Gagan, M.K., Clarke, S.J. and B.J. Johnson (2005). Ecosystem collapse in Pleistocene Australia and a human role in megafaunal extinction. *Science*, 309: 287-290.
- Paper highlighted in *Science Perspectives*: Johnson, C.N. (2005). The remaking of Australia's ecology.

- Science*, 309: 255-256.
- Johnson, B.J., Miller, G.H., Magee, J.W., Gagan, M.K., Fogel, M.L. and P.D. Quay (2005). Carbon isotope evidence for abrupt grassland loss coincident with European settlement of Lake Eyre, South Australia. *The Holocene*, 15(6): 888-896.
- Sun, D., Gagan, M.K., Cheng, H., Scott-Gagan, H., Dykoski, C.A., Edwards, R.L. and R. Su (2005). Seasonal and interannual variability of the mid-Holocene East Asian monsoon in coral  $\delta^{18}\text{O}$  records from the South China Sea. *Earth and Planetary Science Letters*, 237: 69-84.
- Pelejero, C., Calvo, E., McCulloch, M.T., Marshall, J.M., Gagan, M.K., Lough, J.M. and B.N. Opdyke (2005). Preindustrial to modern interdecadal variability in coral reef pH. *Science*, 309: 2204-2207.
- Anderson, A., Chappell, J., Gagan, M.K. and R. Grove (2006). Prehistoric maritime migration in the Pacific islands: an hypothesis of ENSO forcing. *The Holocene*, 16(1): 1-6.
- Bostock, H.C., Opdyke, B.N., Gagan, M.K., Kiss, A.E. and L.K. Fifield (2006). Glacial/interglacial changes in the East Australian current. *Climate Dynamics*, 26(6): 645-659.
- Wu, J.L., Lin, L., Gagan, M.K., Schleser, G.H. and S.M. Wang (2006). Organic matter stable isotope ( $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ) response to historical eutrophication of Lake Taihu, China. *Hydrobiologia*, 563: 19-29.
- Ayling, B., McCulloch, M.T., Gagan, M.K., Stirling, C.H., Andersen, M.B. and S.G. Blake (2006). Sr/Ca and  $\delta^{18}\text{O}$  seasonality in a *Porites* coral from the MIS 9 (339-303 ka) interglacial. *Earth and Planetary Science Letters*, 248(1-2): 462-475.
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- Conference proceedings*
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Müller, A., McGregor, H.V., Gagan, M.K. and J.M. Lough (2006). The effects of early marine aragonite, Mg-calcite and vadose-zone calcite diagenesis on reconstructions of coral calcification rate and the oceanic Suess effect. *Proceedings of the 10<sup>th</sup> International Coral Reef Symposium*, Okinawa, Japan, p. 607-614.

#### *Non-refereed publications*

Gagan, M.K., Ayliffe, L.K., Anker, S., Hopley, D., McCulloch, M.T., Isdale, P.J., Chappell, J. and M.J. Head (1997). Great Barrier Reef 'Climatic Optimum' at 5,800 yBP. In F. Oldfield (ed.), *International Geosphere-Biosphere Program (PAGES) Newsletter*, 5(1), 15-16.

McGregor, H.V. and M.K. Gagan (1999). New research into coralline palaeoclimate records from the Western Pacific Warm Pool, Papua New Guinea. *Quaternary Australasia*, 16: 14-17.

McGregor, H.V. and M.K. Gagan (1999). Tropical climate variability and the role of the Western Pacific Warm Pool: A review paper. *Quaternary Australasia*, 16: 24-27.

Cane, M.R., Clement, A.C., Gagan, M.K., Ayliffe, L.K. and A.W. Tudhope (2000). ENSO through the Holocene as depicted in corals and a model simulation. In J. Gould and A. Villwock (eds.), *International Geosphere-Biosphere Program (PAGES) Newsletter*, 8(1): 3-7.

Kawahata, H., Nishimura, A. and M.K. Gagan (2002). Planktonic foraminifera in the equatorial Pacific: Lunar reproduction and its effect on the global carbonate flux. *Chikyu Monthly*, 24(6): 388-393 (Chikyu in Japanese = Earth).

Harle, K., Etheridge, D., Whetton, P., Jones, R., Hennessy, K., Goodwin, I., Brooke, B., van Ommen, T., Barbetti, M., Barrows, T., Chappell, J., De Deckker, P., Fink, D., Gagan, M., Haberle, S., Heijnis, H., Henderson-Sellers, A., Hesse, P., Hope, G., Kershaw, P. and N. Nicholls (2005). Building a future on knowledge from the past: what palaeo-science can reveal about climate change and its potential impacts in Australia. *Report for the Australian Greenhouse Office*, 46 p.

#### *ISI-listed abstracts*

Gagan, M.K., Ayliffe, L.K., Scott-Gagan, H., Hantoro, W.S. and M.T. McCulloch (2002). Coral reconstruction of abrupt tropical cooling 8,000 years ago. *Geochimica et Cosmochimica Acta*, 66(15A): A255-A255 Suppl. 1.

Ihlenfeld, C., Maas, R., Gagan, M.K., Norman, M.D. and G.M. Henderson (2002). Seasonal trace element and isotope variations in freshwater tufas: potentials and limitations for climate reconstruction. *Geochimica et Cosmochimica Acta*, 66(15A): A352-A352 Suppl. 1.

McGregor, H.V., Gagan, M.K., McCulloch, M.T. and J. Chappell (2002). Abrupt shift in mid-Holocene climate in the Western Pacific Warm Pool. *Geochimica et Cosmochimica Acta*, 66(15A): A501-A501 Suppl. 1.

Muller, A. and M.K. Gagan (2002). Geochemical expression of early marine diagenesis in corals: implications for paleoceanographic reconstructions. *Geochimica et Cosmochimica Acta*, 66(15A): A531-A531 Suppl. 1.

Muller, A., Gagan, M.K. and J.M. Lough (2004). Validity of coral reconstructions of surface-ocean C-13/C-12 and carbonate saturation state. *Geochimica et Cosmochimica Acta*, 68(11): A475-A475 Suppl. S.

#### *PhD thesis*

Gagan, M.K. (1990). *Terrigenous sedimentation and the geologic impact of Cyclone Winifred, Innisfail area, central Great Barrier Reef Province*. PhD Thesis, James Cook University, 124 pp. + 2 vols.

### ***Citation information***

In September 2006, a search of the *ISI Web of Science* showed that two of my first-author papers have exceeded the top 1.0% threshold set for listing by the *ISI* as a *Highly Cited Paper* in geosciences during the census period 1996-2006. Another paper, with one of my PhD students as first author, is also listed as a *Highly Cited Paper*.

- Gagan et al., *Science*, 1998, 123 citations.
- Gagan et al., *Quaternary Science Reviews*, 2000, 82 citations.
- Hendy et al., *Science*, 2002, 47 citations.

### ***Invited popular science articles***

Popular articles for my first-author work and that of my PhD students :

- 1987            Research reveals important truth about Reef nutrients. *ANU Reporter*, 18(3), p. 3.
- 1993            Coral reefs give insight into El Niño effect. *ANU Reporter*, 24(9), p. 1.
- 1993            Coral shavings make climatic history. *Earth Sciences at ANU*, May issue, p. 3
- 1993            Corals unlock El Niño. *National Graduate*, Summer issue, p. 26-28.
- 1997            Weathered coral. *New Scientist*, 155(2089), p. 55.
- 1998            Coral samples support theory of previous global warming. *ANU Reporter*, 29, p. 3.
- 2002            Shaking core beliefs. *ANU Reporter*, 33(2), p. 1; Coral study exposes holes in global climate theories. *ANU Reporter*, 33(2), p. 7.
- 2002            Deciphering the coral code. *Time*, April 29 issue, p. 16.
- 2002            Global climate history challenged. *Australasian Science*, May issue.
- 2002            ‘Wonky holes’ blamed for coral death. *New Scientist*, 176(2369), p. 5.
- 2003            Invisible threat to the Great Barrier Reef. *ANU Reporter*, 34(2), p. 8-9.
- 2006            The coral seer. Feature article in the *ANU Reporter* (in press).

### ***Media appearances and coverage***

Media appearances and coverage for my first-author work and that of my PhD students (that I am aware of) includes:

- 1993-           Numerous newspapers (e.g., *The Australian*, *Sydney Morning Herald*, *Courier Mail*, *Canberra Times*, overseas newspapers) and radio shows (e.g., *ABC Radio Science Show*, etc.).
- 1994            ABC Television Science Special: *50 Million Years Under the Sea*. Available on video.
- 2006            Coverage by *Catalyst*, the ABC Television science show. Available on DVD.

### ***External Funding***

- 1994-96        Department of Environment, Sport, and Territories National Greenhouse Advisory Committee Research Grant (led by J. Chappell). \$500,000.
- 1996            Australian Institute of Nuclear Sciences & Engineering (AINSE) Grant: *Reconstructing ENSO and Indian Ocean SST dynamics using Indonesian corals*. Chief Investigator: M. Gagan. \$8,100.
- 1996            ANU Major Equipment Grant: *Laser-ablation stable-isotope-ratio micro-analysis system (LASIRMAS)*. Co-investigators: M. Palin, R. Loucks, I. Campbell, M. Bird, M. Gagan. \$250,000.
- 1998            ARC Small Grant: *F concentration in corals, forams, and cave calcite deposits as a palaeoenvironmental recorder*. Associate Investigator with B. Opdyke, L. Ayliffe. \$15,000.
- 2000            ARC IREX Grant: *Impact of extreme disturbance events on coral reef and rainforest communities: linking palaeoecological records to ecological processes*. Co-Investigators: S. Haberle, J. Pandolfi (Smithsonian Institution, USA), M. Gagan. \$9,000.

- 2000 ARC Small Grant: *Variation in the intensity and frequency of central Pacific El Niño during the last 3,000 years*. Associate Investigator with C. Woodroffe. \$6,000.
- 2001 ARC Small Grant: *Spatial and temporal variability of the seasonal cycle in recent and palaeo climates in the tropical and subtropical western Pacific*. Co-Investigators: J. Lindesay, K. Johnson, M. Gagan. \$7,000.
- 2001 ANU Major Equipment Grant: *Stable-isotope microanalytical facility for palaeoclimate systems and global change research*. Chief Investigator with external funding contributions from P. De Deckker, B. Opdyke (Geology Dept., ANU), T. Correge, L. Ortlieb (IRD, New Caledonia), I. Goodwin, R. Drysdale (U. Newcastle), R. Henderson, P. Hearty (James Cook University). \$149,000 + \$33,000 in external funding.
- 2003-2005 ARC Discovery Grant DP0342017: *Quantifying the El Niño-Indian Ocean Dipole system using high-resolution coral palaeoclimate archives*. Co-investigators: M. Gagan (CI), W. Hantoro (PI), J. Lough (PI), G. Meyers (PI) and Research Associate G. Dunbar. \$300,000.
- 2003-2005 ARC Discovery Grant DP0342788: *Stable isotopes in marsupials: reconstruction of environmental change in Australia*. Co-investigators: R. Grün (CI), D. Bowman (CI), M. Gagan (CI), R. Wells (CI). \$210,000.
- 2005 ARC LIEF Grant LE0560868: *SHRIMP SI – Microscale stable-isotope analysis in the Earth Sciences*. Chief investigators: T. Ireland, M. Harrison, A. Kennedy, P. Kinny, V. Bennett, I. Williams, A. Nutman, M. Gagan, R. Grun, I. Campbell, P. Vasconcelos, K. Knesel, S. Golding, B. Jones, P. Carr, C. Fergusson, J. Hellstrom, G. Davidson, R. Large. \$552,000.
- 2005 Australian Institute of Nuclear Sciences & Engineering (AINSE) Grant AINGRA05059: *Climate between the tropics and the poles: coral AMS C-14 record of abrupt tropical cooling 8,000 years ago*. Chief Investigator: M. Gagan. \$14,000.
- 2005 National Geographic Society Grant 7889-05: *Aepyornis extinction and environmental change in Madagascar: assessing human impacts through precise dating and paleoenvironmental proxies preserved in eggshells*. Co-investigators: G. Miller, J-L. Schwenninger, M. Gagan. US\$25,000.
- 2005-2007 US NSF Grant: *Collaborative Research: Identifying the footprints of human colonization on Australian ecosystems and climate*. Associate Investigator with G. Miller, M. Fogel. US\$354,000.
- 2006-2008 ARC Discovery Grant DP0663274: *Monsoon extremes, environmental shifts, and catastrophic volcanic eruptions: Quantifying impacts on the early human history of southern Australasia*. Co-investigators: M. Gagan (CI), J.-x. Zhao (CI), R. Drysdale (CI), W. Hantoro (PI), G. Schmidt (PI). \$445,000.
- 2006-2010 ARC Discovery Grant DP0663227: *The Indian Ocean Dipole, Australasian drought, and the great-earthquake cycle: Long-term perspectives for improved prediction*. Co-investigators: M. Gagan (CI), W. Hantoro (PI), D. Natawidjaja (PI), J. Lough (PI), G. Meyers (PI), Z. Liu (PI), K. Sieh (PI) and Research Associate L. Ayliffe. \$1,016,000.
- 1998- The RSES Stable Isotope Laboratory has attracted >\$250,000 for collaborative and contract work.

### Staff Supervision and Administration

- 1981-83 Elf Aquitaine Australia Minerals Pty Ltd / St Joe Bonaparte Pty Ltd: Supervised staff involved in exploration mapping, diamond-drill coring, geochemical assay analysis, and reporting of findings from exploration of Devonian-Carboniferous carbonate-hosted Pb-Zn-Ag deposits in the Western Australian half of the onshore Bonaparte Gulf Basin, northwestern Australia.
- 1988-91 UNENR: Developed lectures, laboratory practicals, fieldtrips, and examinations for 8 courses involving >1,100 undergraduate students. Academic responsibility for course delivery included extensive administration and supervision of 3 tutors, 4 demonstrators, and 1 laboratory manager.
- 1998- RSES, ANU: Supervision and administration of research, development, and analytical services for RSES Stable Isotope Laboratory. Academic responsibility includes supervision of two Senior Technical Officers, one Technical Officer, and casual technical staff, as required.

- 2004- Member of RSES Robert Hill Memorial Prize selection committee.
- 2005 Member of ANU Marine Science Initiative selection committee for Fellow / Senior Fellow in Marine Geochemistry and Research Fellow / Senior Fellow in Marine Carbon Cycle.
- 2005- Member of RSES Mervyn and Katalin Paterson Fellowship selection committee.
- 2005-06 Co-chair of the RSES Liaison Committee for the search for Director.

### Teaching Experience (UNENR)

- 1988 Hydrology and Climatology; 110 first-year students; developed, taught, and examined course.
- 1988 Resource Assessment Techniques; 110 first-year students; taught surveying block.
- 1988 Coastal Engineering; 26 third-year students; developed, taught, and examined course.
- 1988-91 Physical Geology; 190 first-year students; developed, taught, and examined course.
- 1989 Exploration Geology; 25 second-year students; taught base-metal exploration block.
- 1989-90 Coastal Geomorphology; 85 second-year students; developed, taught, and examined course.
- 1989-90 Oceanography and Meteorology; 80 second-year students; taught shelf circulation block..
- 1991 Marine and Coastal Geology; 28 third-year students; developed, taught, and examined course.
- 1988-91 Supervision of 13 third-year integrated projects.

### Research Expeditions

- 1994 Leader of coral collecting expedition to Nusa Barung Island, southeast Java, Indonesia (9 – 14 September, 1994).
- 1994 Leader of underwater coral drilling at Ningaloo Reef and the Muiron Islands, Western Australia (2 – 15 November, 1994). The expedition involved 6 participants from the RSES (2), Australian Institute of Marine Science (2), and crew of the vessel *Makaira II* (2).
- 1995 Leader of raised-reef coral drilling at the Laundi Terraces, Sumba, Indonesia (13 October – 19 November, 1995). The expedition involved 3 participants from RSES (1) and the Indonesian Institute of Sciences (2).
- 1998 Chief Scientist for Projcct TROPICS (Tropical River Ocean Processes in Coastal Settings) Cruise Leg 6B to the Sepik River, Schoeten-Ninigo Islands area, northern Papua New Guinea (26 May – 6 June, 1998). The cruise involved 12 participants from RSES (2), AIMS (1), and JCU (2) aboard the Australian Institute of Marine Science RV *Lady Basten* (7 crew) and was followed by raised-reef coral drilling (7 – 25 June, 1998).
- 1998 Leader of underwater and raised-reef coral drilling of the Laundi Terraces, Sumba, Indonesia (17 October – 27 November, 1998). The expedition involved 10 participants from RSES (4), the Indonesian Institute of Science (3), and Kupang Dive Pty Ltd (3).
- 1999 Leader of first raised-reef coral drilling in the Mentawai Islands, southwest Sumatra, Indonesia (20 June – 3 August, 1999). The expedition involved 11 participants from RSES (1), Caltech (3), and the Indonesian Institute of Science (3) aboard the Bung Hatta University research vessel (4 crew).
- 1999 Leader of first underwater and raised-reef coral drilling in Alor, Indonesia (11 August – 23 September, 1999). Seven staff from RSES (3), the Indonesian Institute of Science (1), and Kupang Dive Pty Ltd (3) participated in the coral drilling.
- 2000 Participant in summit ice core drilling expedition to Mt Kilimanjaro, Tanzania, with L. Thompson and team from Ohio State University (4 – 15 February, 2000).
- 2001 Leader of first underwater and raised-reef coral drilling in the Mentawai Islands, southwest Sumatra, Indonesia (20 May – 9 July, 2001). The expedition involved 13 personnel from RSES (3), Geoscience Australia (1), Caltech (2), the Indonesian Institute of Science (3) and aboard the Padang Dive Pty Ltd vessel (4 crew).

- 2003 Leader of raised-reef coral drilling on the islands of Sumba and Alor, Indonesia (3 August – 29 September, 2003). Four staff from RSES (3) and the Indonesian Institute of Science (1) participated in the coral drilling.
- 2004 Leader of first underwater and raised-reef coral drilling on the islands of Semau and Bohol, Philippines (15 March – 18 April, 2004). Eight staff from RSES (2), University of the Philippines (4), Indonesian Institute of Science (1), and the National Institute of Advanced Industrial Science and Technology, Japan (1) participated in the coral drilling.
- 2006 Co-leader (w / K. Sieh, Caltech) of first underwater and raised-reef drilling of corals on Simeulue and Nias, northwest Sumatra, Indonesia, impacted by the Boxing Day 2004 and Easter Monday 2005 earthquakes (21 May – 30 June, 2006). The expedition involved 30 participants from RSES (1), Caltech (6), Central Washington University (1), Kyoto University (1), and the Indonesian Institute of Science (6) aboard two research vessels (15 crew).
- 2006 Leader of first *in situ* speleothem drilling near Liang Bua, western Flores, Indonesia (23 July – 26 August, 2006). Seven staff from RSES (2), University of Newcastle (1), BHP Billiton (1), the Canberra Speleological Society (1), and the Indonesian Institute of Science (2) participated in the speleothem drilling.