ANDY RIDGWELL

Born in 1969 in the deepest, darkest, dankest South-western corner of England (America's permanently moored aircraft carrier off the coast of Europe) it was not until 1987 before I escaped. But when I did it was only as far as East Anglia – an equally damp part of the country less than 300 km away. Here I took an undergraduate degree at Cambridge University in a subject that was officially and rather quaintly termed 'Natural Sciences'. Although my underlying interests lay in environmental and global change, I was fascinated by the thought of 'Unnatural Sciences'. The closest I found that I could get to this without a set of black candles and a chalk pentagram was mineral (solid state) physics. These unnatural pursuits continued for a year immediately following graduation when I worked as a Research Assistant/Technician in the Earth Science department. However, by the time I realized that what I truly wanted to do was climate/environmental research, my newly acquired qualifications in probing the structure of quartz at -200˚C with high performance FTIR transmission and reflectance spectrometry had left me stuck up the proverbial creek without any useful paddling implement.

The next few years were a mixture of industry contract work (developing analytical trace-metal instrumentation – a Zeeman-effect graphite furnace atomic absorption spectrometer to give you the full tedious details) and periods of non-employment. However, rather than follow tradition and lay about in bed all day while unemployed, I spent my time writing not-for-profit educational software and dabbling in basic climate modeling. During these free-lance research forays I assessed the effectiveness and climatic impact of different 'greenhouse gas' emissions scenarios and explored aspects of Earth system behavior and dynamics. However, because sitting in front of a computer all day every day is not always the utmost fun I started to engage in rather more 'hands-on' (environmental campaigning) activities. This quickly became something of a full-time occupation and between 1993 and 1996 I could be found making unofficial 'visits' to a certain now-discredited UK nuclear waste reprocessing facility, holding up road shipments of weapons-grade Plutonium (highlighting nuclear proliferation and terrorism threat issues), and 'recovering' the products of illegal logging (technically the stolen property of various indigenous peoples) from local department stores. The environmentally damaging and ineffective road building program of the Government of the day also attracted my attention, and I spent the best part of a year living in tree-houses built in the path of planned road schemes (climbing down when the local pub opened of course).

Eventually I became tired of successive residences being chopped down, and in the summer of 1996 I left behind an extremely comfy oak tree in rural Devon to pursue the long sort-after research career. I took an MSc in Environmental Science at Nottingham University (UK) and the next year applied to do a PhD at the University of East Anglia in Norwich (UK). There, I taught myself Fortran – the Ediacaran of programming languages (the Dodo would be too modern a species to make a truly suitable analogy), and embarked on a voyage of intensive and extensive computer modeling of the global carbon cycle with a view to answering the question; "why was the concentration of carbon dioxide in the atmosphere some 30% lower during late Quaternary glacial periods compared to interglacials?". Three years later and I was none-the-wiser. Well, not strictly true, but despite my best efforts the solution of the 'glacial CO_2 problem' remains unsolved to this day (and thus it still makes an excellent PhD topic). In any case, the journey is frequently as or more important than the destination, and I learned and discovered much about such things as the marine iron cycle and its relationship to atmospheric CO_2, what determines the accumulation rate and spatial distribution of bio-minerals such as calcite and opal in deep-sea sediments, and the role and potential importance of sea-level change in global carbon cycling.

Understanding of global biogeochemical cycling and computer modeling developed during my PhD stood me in good stead for the three Postdoctoral research contracts that followed. During the first two of these I further developed ideas regarding the inter-linkages between mineral dust, biological productivity in the ocean, CO_2, and climate. I also embarked on encapsulating key aspects of the atmosphere-ocean-sediment carbon cycle into an Earth system model – 'GENIE' ('Grid ENabled Integrated Earth system model' – www.genie.ac.uk). The opportunity of living in a much (*much*) sunnier climate then arose, and I crossed the Pond to take up a temporary position at the University of California at Riverside. Here I completely shifted research focus from micro-nutrient supply and sub-regional details of Quaternary carbon cycling to global-scale aspects of the ill-delineated and (even less well dated) late Precambrian Earth system. The cross-fertilization of time-scales and environmental processes bore fruit and I developed new hypotheses regarding the reasons for the extremity and observed geochemical aftermath of Neoproterozoic glaciation. I also gained a new perspective on the Phanerozoic evolution of the Earth system and the unique importance of certain elements of the modern carbon cycle.

And so to a Canada Research Chair in 'Global Process Modeling' at UBC, where I am developing and applying computer models of the interactions between land, air, and sea and the influence of living organisms to evaluate both past and future controls on atmospheric CO_2 and elucidate the role of feedbacks in the Earth system. At present, particular areas of interest to me concern the implications for global carbon cycling of changes in the rate, locus, and primary mineralogy of calcium carbonate precipitation and preservation, and the control of marine productivity and atmospheric CO_2 by the aeolian delivery of iron to the ocean surface. I will also be exploring wider issues of how conditions suitable for life on this planet have been apparently well regulated and maintained throughout much of Earth history, and what impacts evolutionary innovation and extinction have had on biogeochemical cycling, CO_2, and climate. In addition I will be further pursuing my interests in future climate and global change and the fate of fossil fuel CO_2.