

SNAPSHOT

China's dust bowl



BENOIT AQUIN

In the Wuwei Oasis, a small agricultural enclave in northern China that supports around 300,000 people, water levels are so low that the region is now merging with nearby deserts. This image is part of a series on the Chinese 'dust bowl' by photographer Benoit Aquin, who last month took home the first Prix Pictet, a major new award for photographs that depict sustainability issues.

China is one of many countries worldwide affected by worsening desertification. Formerly a 'silent crisis' localized in regions home to 75 per cent of the world's poor, the spread of deserts is caused largely by bad land use practice. But, according to one senior UN environmental official, it has recently been pegged as a global problem because of its connection to climate change.

Speaking ahead of the UN Convention to Combat Desertification (UNCCD) conference held 3 to 14 November in Istanbul, where experts met to thrash out details of a ten-year strategy to address the issue, UNCCD Executive Secretary Luc Gnacadja said "The nexus between land degradation and climate change is clear".

"If we want to tackle climate change challenges, we must look to the untapped potential of the soil to sequester carbon," added Gnacadja. For now, signs suggest that lands are losing that potential: a UN report released in July found that between 1981 and 2003 an additional 24 per cent of the world's land became degraded and less productive, while just 16 per cent of land became more fertile.

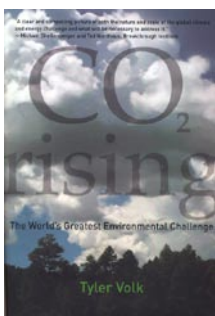
To stop its spreading sands, which cover 18 per cent of the country, the Chinese government recently set aside a fifth of its grasslands for restoration, and herding communities have been relocated en masse. The harsh measures may succeed in recovering land and carbon stores — if they are not overwhelmed by droughts yet to come.

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Anna Barnett

Fossil carbon's fate



CO₂ RISING: THE WORLD'S GREATEST ENVIRONMENTAL CHALLENGE

By Tyler Volk

MIT Press: 2008. 264pp. US\$22.95/£14.95

A clever use of fable brings surprising clarity to the story of climate change.

Parables are often better at conveying understanding than hammer-blow facts. The story of Noah's ark teaches us not to hurt the planet. Jonah tells us that if we deny our duty we'll be swallowed. Tyler Volk's *CO₂ Rising* is a finely crafted

introduction to the greenhouse problem, taking as its protagonist a little carbon atom called Dave.

Like Prometheus, Dave habitually spends millions of years bound in a limestone cliff. But occasionally he

escapes, most recently to travel variously into a glass of beer, through the rear end of an Irish earthworm, inside the brain of a giant Galapagos tortoise and as part of an air parcel to Mauna Loa where he is measured by climatologist

Charles David Keeling, to be recorded on the infamous 'Keeling curve', which documents the twenty-first century rise in atmospheric CO₂.

Dave has relatives: Coaleen, Oilivier and Methaniel in the fossil fuel family, and Icille. Coaleen heads for a strangler Fig tree in Australia, Methaniel is taken up by a plant in the Arctic tundra, and Oilivier, who becomes a bicarbonate ion in the ocean, is followed by cheerful Dave, who finds himself diving to a sea bed carbon burial site. Really cool Icille gets trapped in an ice bubble.

It's a simple but effective conceit, once the reader recovers from the terrible puns. Volk uses the journeys of his atoms to trace the breathing of the Earth and the marvellous complexities of the global carbon cycle, wheels within wheels, days to millennia to aeons. The book traces carbon from Earth's interior to surface, mantle to crust to ocean to air and back again through life. The brief glory days in the air become seasons in plants and long years in oceans, then millions of years in stone.

The technical exposition is sure-footed. The early chapters of the book follow carbon's paths round the biosphere, the atmosphere and ocean system. Then fossil-fuel carbon is introduced and the global atmospheric increase is well-explained, with a good discussion of the concept of the airborne fraction. Next, the historical record in ice cores is considered, through the adventures of Icille. The later chapters of the book switch from natural science to socio-economic issues. How tightly linked are CO₂ emissions with wealth and energy? Must they march in step? How high will CO₂ emissions go? What will happen ultimately? Dave exits the atmosphere in the year 135782, into the shell of a coccolithophore and hence back to sleep in the rock.

The science in the book is accurate and footnoted in an appendix. Although the discussion is wide-ranging, covering biology to geology via atmospheric physics and chemistry, it is reliable. In the later part of the book the opinions are well-founded. Some might be disputed, but they are soundly argued. The vexed question of whether to engineer the climate is thoughtfully discussed. Too often, so-called 'green' policies are adopted as a result of lobby group pressure, celebrity opinion and media frenzy. The results, at best, are billions of wasted money; at worst, voter backlash makes it harder for more sensible changes to be made. By putting good, well-explained science into the minds of both voters and decision-makers, Volk's

book could help greatly in bringing wisdom to the task of making policy.

But is there hope? Or are we doomed to a repeat of the Paleocene-Eocene Thermal Maximum, tens of thousands of years of heat and mass extinction? In 2008, climate optimism is scarcer than oil. The United States, Canada, Russia and Australia have been in denial. China, India and South Africa don't deny but burn anyway and vanish under coal-smog. Europe says sweet words but does nothing. Since 2001, many countries that lecture Washington have had a much poorer record of emissions control than Bush's America. Since the start of the economic crisis, it has become fashionable to bewail the looming recession as the final nail in Kyoto's coffin: no one now will switch from cheap oil and risk putting people out of jobs.

Volk is not prescriptive and judiciously leaves the future open. But perhaps there are indeed powerful grounds for optimism. The need for security of supply is becoming as important in the public mind as the demand for cheap energy. More generally, 'peak' oil is becoming reality, 'peak' gas may be as close as a decade away, and there may even be a near-future crisis in coal supply. Perhaps Mother Nature has set aside only enough accessible fossil fuels to push CO₂ to 450 parts per million or so — bad enough, but at least not near the extremes in some scenario models. Most of all, we have new leadership in America. Is it too much to hope for audacity?

Fables, like political cartoons, are powerful. Orwell's *Animal Farm* was the stake through the heart of Stalin's Marxism. Tyler Volk's simple tales in *CO₂ Rising* are not at that level, but they are clearer and more easily read than the prose of most scientific writing, even in good scientific journalism. That clarity brings understanding. Despite — or perhaps because of — its dreadful puns and apparent simplicity, this is a book that can persuade, can educate, and can change policy. If there is one book on climate change that President-elect Barack Obama should read, it might well be Tyler Volk's *CO₂ Rising*. Its clear, simple exposition of atmospheric chemistry is so well-written that it might even convince past-presidents.

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