

Summary

- The Tyndall Centre is an international brand and interdisciplinary research entity with global reach and visibility. This year we made major contributions to the IPCC 4th Assessment, the UN Human Development Report, the OECD Vulnerable Port Cities report and received worldwide interest at the UN meeting in Bali
- The impact of the Centre on new knowledge, policy debates and wider society continues to grow. Our engagement with UK national, regional and local governments and decision-makers is evidence that the Tyndall Centre is the only UK organisation working to bring together the otherwise disparate cultures of climate science and climate policy research
- Tyndall's contribution to academia is significant. Eighty three journal papers were published last year by the Tyndall Centre, in addition to 28 book chapters, 10 Working Papers and 41 other publications such as topical Briefing Notes and reports for external organizations.
- The Centre has proved itself to be resilient and productive regardless of funding uncertainties and change. Additional funding since 2006 is £8.5m. Of particular significance is Tyndall's leadership of the EU project ADAM – a consortium of 26 organisations involving over 100 researchers from across Europe
- A recent Research Councils' report similarly concludes that Tyndall's economic and policy impact punches above weight. Tyndall received 5% of NERC's budget for Research and Collaborative Centres but was responsible for 17% of its total mentions in Parliament, while scientific publications are on a par with other research for its level of funding.

Science highlights for 2007-2008 include:

Evaluating emissions policy

From Kevin Anderson and Alice Bows of the Energy Programme at Tyndall Manchester came a demonstration that the emissions reduction of the groundbreaking UK Climate Bill is more likely to contribute to a world that is 4-5^oC warmer rather than the 2^oC target of the EU. Their emissions pathway out to the year 2050 demonstrates that the UK would have to reduce its emissions by 90% by 2050 even for a 30% chance of not exceeding the 2^oC target.

Tao Wang and Jim Watson at Tyndall Sussex revealed that 23% of China's carbon dioxide emissions are due to the manufacture of goods for export to the already industrialized nations – the equivalent of double the UK's emissions for an entire year. The global implication of the UN focus on emissions reductions within national borders was highlighted by the recent G8 and industrialising countries stalemate on agreeing emission reductions.

Anderson, K. and Bows, A. 2007. A response to the Draft Climate Change Bill's carbon reduction targets: Tyndall Centre Briefing Note 17 www.tyndall.ac.uk/publications/briefing_notes

Wang T. and Watson J. 2007. Who owns China's carbon emissions? Tyndall Centre Briefing Note 23 www.tyndall.ac.uk/publications/briefing_notes

Identifying flood risk

A global assessment led by Robert Nicholls and colleagues of the Coasts Programme at Tyndall Southampton has quantified the increasing flood exposure in 135 port cities through the 21st century, while the UK summer floods of 2007 resulted in Robert Nicholls, Jim Hall and Andrew Watkinson being asked to revisit the Foresight appraisal of Future Flooding for the Pitt Review. More locally, the Tyndall Coastal Simulator has quantified what has been argued qualitatively: that sediments washed away from eroding cliffs protect neighbouring low lying lands from flooding. Specifically, the Simulator has shown that the protection of Norfolk's cliffs from erosion is increasing the flood risk of neighbouring low-lying lands by starving their beaches of sediment. The increase in flood risk increases with sea level rise and the costs are an order of magnitude greater than the erosion risk.

Nicholls, R., S. Hanson, C. Herweijer, N. Patmore, S. Hallegatte, J. Corfee-Morlot, J. Chateau, and R. Muir-Wood. 2007. Ranking port cities with high exposure and vulnerability to climate extremes: Exposure estimates. OECD Environment Working Paper 1, 2007. Paris, France: OECD

Dawson R., Dickson M, Nicholls R., Hall J.W., Walkden M, Stansby P, Mokrech M, Richards J, Zhou J., Milligan J, Jordan A, Pearson S, 2007. Integrated analysis of risks of coastal flooding and cliff erosion under scenarios of long term change: Tyndall Centre Working Paper 110. www.tyndall.ac.uk/publications/working_papers

Helping cities reduce their emissions

Metropolitan areas and cities are signing up for the services of Tyndall Manchester's online system of calculating greenhouse gases and scenarios for their reduction across a region's economic sectors. The user-led Greenhouse Gas Regional Inventory Protocol (GRIP) has now been completed for Stockholm, Veneto, Bologna and Glasgow and the Clyde Valley. GRIP work for London is a small part of a wider integrated city-scale assessment for London of climate impacts and emissions over the 21st Century. It will enable urban policy-makers, planners, water engineers and other stakeholders to compare alternative adaptation and mitigation strategies to consider how cities can grow while at the same time reducing emissions and vulnerability to climate change.

Dawson R., 2007 Re-engineering cities: a framework for adaptation to global change. *Phil Trans Royal Soc A/365* (1861). p3085-3098

Dawson R., Hall J, Barr S, Batty M., Bristow A, Carney S, Evans E.P., Kohler J., Tight M, Walsh C, Ford A. 2007. A blueprint for the integrated assessment of climate change in cities: Tyndall Centre Working Paper 104 www.tyndall.ac.uk/publications/working_papers

Climate prediction and attribution

Considerable progress has been made by members of Tyndall Oxford in responding to policy demands for improved information at local and regional levels on climate impacts, attribution and uncertainty. This includes the analysis of uncertainty and attribution of observed temperature changes at global and regional scales together with the attribution of UK floods, European heatwaves and disease. Complementary research at Tyndall UEA in the Adaptation Programme on climate change decision-making with the water utilities, however, concludes that public and private efforts to adapt should focus on preparing for a wide range of climate change futures. It concludes the need for more precise information on future climate is not a reason for delaying decision making on adaptation.

Lopez A, Tebaldi, C., New M., Stainforth, D., Allen M., 2007 Two approaches to quantifying uncertainty in global temperature changes. *Journal of Climate/19*, p4785-4796

Stainforth, D., Allen M., Tredger LA., (2007) Confidence, uncertainty and decision-support relevance in climate predictions *Phil. Trans. R. Soc. A* 2007 365, 2145–2161

Dessai S, Hulme M, 2007 Assessing the robustness of adaptation decisions to climate change uncertainties: A case study on water resources management in the East of England. *Global Environmental Change/17*, p59-72

Evaluating North-South policy

The UN climate scheme for investment in sustainable development projects in the South is effective in achieving cost-effective emissions reductions but has fallen short of contributing to sustainable development and has an uneven distribution of projects with only 4% going to Africa. The assessment is part of the work of the International Development programme and poses five alternative options to increase the benefits to sustainable development and Africa.

Boyd E., Hultman N E., Roberts T., Corbera E., Ebeling J., Liverman D, Brown K, Tippmann R., Cole J., Mann P, Kaiser M., Robbins M, 2007. The Clean Development Mechanism: An assessment of current practice and future approaches for policy: Tyndall Centre Working Paper 114 www.tyndall.ac.uk/publications/working_papers

Knowledge exchange

The Centre's knowledge exchange continues to set the benchmark for stakeholder interaction. We held a range of focused stakeholder events for those involved in our Research Programmes, including a Coasts demonstration in Norwich of the coastal simulator, a Cities meeting with the Greater London Authority, Energy workshops with the aviation industry and a workshop on future energy scenarios for China in Beijing. Notable events of the year included the international Adaptation 2008 Symposium Living with Climate Change held in London, from which a book is in preparation. The Tyndall Centre Forum was this year a review of the evidence for the impacts of offsetting on international development projects. The ability of our research to motivate society is witnessed by the hundreds of environmental protesters at the Heathrow Climate Camp who publicised a Tyndall research report to broadcasters and press photographers.

Minns A. 2007. Is carbon offsetting a legitimate response to mitigating climate change? Tyndall Centre Briefing Note 21 www.tyndall.ac.uk/publications/briefing_notes

We were very impressed by the scope and depth of the work undertaken... Overall we would want to emphasise that we consider that Tyndall is doing a good job and should be proud of it.

John Gummer MP, Chair of the Advisory Board Review, January 2008