

On February 12–15, 2001, more than 200 scientists, engineers, decision makers, and educators participated in a conference on the 'Future Directions in Air Quality Research: Ecological, Atmospheric, Regulatory/Policy, and Educational Issues.' Important perspectives are summarized from the keynote addresses of noted scientists and educators, as well as managers in government, industry, and public interest groups. Observations and recommendations are provided to stimulate further thought about how to increase opportunities to make greater use of scientific knowledge in air-quality decision making and to ensure that decisions are effective, economically viable, health and ecologically sound, and socially acceptable. Recommendations are given regarding ways in which communications between scientists and policy makers should be structured so as to make appropriate and effective use of scientists and the knowledge they can provide in policy-making fora.

03/02591 Hydrogeological and geochemical interactions of adjoining mercury and coal mine spoil heaps in the Morgao catchment (Mieres, NW Spain)

Loredo, J. *et al. Geological Society Special Publication*, 2002, 198, 327–336.

Asturias, NW Spain, has a long coal and metal mining tradition including mining for Hg, which was intermittently exploited from Roman times up to 1974. In the valley of the Morgao Stream, there is a spoil heap from the Los Rueldos Hg mine immediately uphill from another one from the Morgao coal washery, both situated <3 km away from the town of Mieres (30 000 inhabitants). At the Los Rueldos site, As is abundant in the form of As-rich pyrite. Total As concentrations in representative samples from the spoil heap were 4746–62 196 mg/kg. Readily leachable Pb and Zn are, respectively, present at average concentrations of 3680 and 45 mg/kg. Leachate from this spoil heap drains on to the El Batán coal spoil heap, together with acid drainage from old underground workings of the Los Rueldos Mine, which has very low pH (2.5), with ≤ 2900 mg SO_4^{2-} /L, and 5.3–8.3 mg As/L. The total flow of polluted water from the Los Rueldos site that flows into the Morgao Stream is estimated to average 3200 m³/year (corresponding to only 1% of the total flow from the Morgao drainage basin). Analysis of the Morgao Stream downstream of both spoil heaps clearly shows the results of the dilution effects, with the As content being lowered by >95%.

03/02592 Impacts of elevated atmospheric CO₂ on forest trees and forest ecosystems: knowledge gaps

Karnosky, D. F. *Environment International*, 2003, 29, (2–3), 161–169.

Atmospheric CO₂ is rising rapidly, and options for slowing the CO₂ rise are politically charged as they largely require reductions in industrial CO₂ emissions for most developed countries. As forests cover some 43% of the Earth's surface, account for some 70% of terrestrial net primary production (NPP), and are being bartered for carbon mitigation, it is critically important that we continue to reduce the uncertainties about the impacts of elevated atmospheric CO₂ on forest tree growth, productivity, and forest ecosystem function. In this paper, I review knowledge gaps and research needs on the effects of elevated atmospheric CO₂ on forest above- and below-ground growth and productivity, carbon sequestration, nutrient cycling, water relations, wood quality, phenology, community dynamics and biodiversity, antioxidants and stress tolerance, interactions with air pollutants, heterotrophic interactions, and ecosystem functioning. Finally, I discuss research needs regarding modeling of the impacts of elevated atmospheric CO₂ on forests. Even though there has been a tremendous amount of research done with elevated CO₂ and forest trees, it remains difficult to predict future forest growth and productivity under elevated atmospheric CO₂. Likewise, it is not easy to predict how forest ecosystem processes will respond to enriched CO₂. The more we study the impacts of increasing CO₂, the more we realize that tree and forest responses are yet largely uncertain due to differences in responsiveness by species, genotype, and functional group, and the complex interactions of elevated atmospheric CO₂ with soil fertility, drought, pests, and co-occurring atmospheric pollutants such as nitrogen deposition and O₃. Furthermore, it is impossible to predict ecosystem-level responses based on short-term studies of young trees grown without interacting stresses and in small spaces without the element of competition. Long-term studies using free-air CO₂ enrichment (FACE) technologies or forest stands around natural CO₂ vents are needed to increase the knowledge base on forest ecosystem responses to elevated atmospheric CO₂. In addition, new experimental protocols need to continue to be developed that will allow for mature trees to be examined in natural ecosystems. These studies should be closely linked to modeling efforts so that the inference capacity from these expensive and long-term studies can be maximized.

03/02593 Interaction between air pollution and meteorological parameters in Erzurum, Turkey

Oguz, E. *et al. International Journal of Environment and Pollution*, 2003, 19, (3), 292–300.

In recent years, the rapid increase in population density has caused increases in the consumption of fuel, and the outdoor air quality has deteriorated in the crowded urban areas of Turkey. Erzurum, a city in the eastern part of Turkey, is influenced by air pollutants, such as SO₂ and suspended particles. It is known that, in general, the air pollution concentrations have a close relationship with meteorological factors. In this study, the relationship between outdoor air quality data and meteorological factors, such as wind speed, rainfall, temperature, sunshine hours and relative humidity, is statistically analysed, using the code SPSS. According to the results obtained through multiple linear regression analysis, there are moderate levels of correlation between SO₂ and particle concentrations and meteorological factors in Erzurum.

03/02594 Local emissions trading in developing countries as a transitional strategy toward international greenhouse gas trading: a Beijing example

Solomon, B. D. and Ji, Q. *International Journal of Environment and Pollution*, 2002, 18, (6), 521–540.

As is the case in most developing countries, China relies on command-and-control regulation to control air pollution. While it has instituted a modest air pollution levy system in the past 20 years for emissions in excess of standards, the effect on emission levels has been minimal. This paper focuses on how to use emissions trading as a policy instrument to achieve cost-effective reductions in air pollution in Beijing. Emissions or allowance trading has been widely applied to air pollution control in the USA during the past 25 years. Three of the most recent programmes will be examined, which provide applicable experience for possible SO₂ and NO_x trading in the Beijing region. A trading strategy for Beijing will be proposed by comparing the economic and political institutional differences between the USA and China, which could eventually facilitate acceptance of an international greenhouse gas trading system.

03/02595 Location decisions of a polluting firm and the time consistency of environmental policy

Petrakis, E. and Xepapadeas, A. *Resource and Energy Economics*, 2003, 25, (2), 197–214.

This paper considers location decisions of a monopolist, who faces a tax on its emissions in the home country, under ex post that is, time consistent, and ex ante, that is precommitment, environmental policies. It is shown that the monopolist will relocate more often under ex post optimal emission taxes. A government which cannot commit to an ex ante emission tax and sets its tax ex post after abatement effort has been chosen, is unable to affect the monopolist's location decision, because it cannot commit to strategically reduce its tax level in the first stage. Domestic welfare is often higher under ex post emission taxes whenever the monopolist relocates under both policy regimes. Otherwise, welfare is higher under government commitment to an ex ante emission tax level. Thus, government commitment to a policy is not always welfare improving.

03/02596 Making global initiatives local realities: carbon mitigation projects in Chiapas, Mexico

Nelson, K. C. and de Jong, B. H. J. *Global Environmental Change*, 2003, 13, (1), 19–30.

Global, environmental initiatives create macro-level agreements, but the true test is how local communities respond. From 1995 to 2001, we investigated the evolution of *Fondo Bioclimático*, a carbon mitigation project, using interviews and document review. Even under tremendous uncertainty the project grew seven-fold. Its social structure shifted from a development emphasis to a brokering relationship, from shared to concentrated power, from social fund to carbon bank. Social selection of systems with fewer tree species and single ecosystems is a concern for biodiversity. The challenge is to remain critical, monitor, and support indigenous communities in their endeavor to implement clean development mechanism projects.

03/02597 Microbial degradation of pyridine using *Pseudomonas* sp. and isolation of plasmid responsible for degradation

Mohan, S. V. *et al. Waste Management*, 2003, 23, (2), 167–171.

Pseudomonas (P12) capable of degrading pyridine was isolated from the mixed population of the activated sludge unit which was being used for treating complex effluents, the strain was characterized. Aerobic degradation of pyridine was studied with the isolated strain and the growth parameters were evaluated. Pyridine degradation was further confirmed by chromatography (HPLC) analysis. The process parameters like biomass growth and dissolved oxygen consumption were monitored during pyridine degradation. In order to conform with the plasmid capability to degrade pyridine, the requisite plasmid was isolated and transferred to DH 5 α *Escherichia coli*. The subsequent biodegradation studies revealed the ability of the transformed plasmid capability to degrade the pyridine.