

EA-NCRAOA Box 1

A GUIDE TO

ENVIRONMENTAL FORECASTING

**AT THE NATIONAL CENTRE FOR RISK ANALYSIS AND
OPTIONS APPRAISAL**



EA - National centres



ENVIRONMENT AGENCY

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1 ENVIRONMENTAL FORECASTING

The National Centre for Risk Analysis and Options Appraisal aims to assess risks to the environment and provide guidance on their reduction so that society and industry bear a justifiable cost, and the Agency maximises its contribution to sustainable development. A key component of this process is determining the threats arising from a wide variety of environmental pressures, both natural and man made, existing and proposed. This involves forecasting how the environment will respond to these pressures over relevant spatial and temporal scales and across the complete range of environmental receptors. These forecasts can then be used to assess policy options, determine the effects of risk reduction strategies and guide operational activities.

2 THE ROLE OF THE NATIONAL CENTRE



The Centre develops appropriate forecasting tools and techniques in parallel with the criteria necessary for comparative assessment. Forecasts cover a very broad range of potential threats ranging from the local and immediate, such as the impact of pollution from an industrial plant on its surroundings, to the national and long-term consequences of major policy issues, such as road transport or energy.

An understanding of the current situation coupled with predictive models and assessment criteria form the basis of environmental forecasting. The Centre provides models which enable the Agency to project current trends and activities into the future to determine their impact on the environment. This provides proactive support to sustainable development. As many processes are imperfectly understood, uncertainties are large and attempting to minimise and understand the causes of these uncertainties is an important element of any forecast.

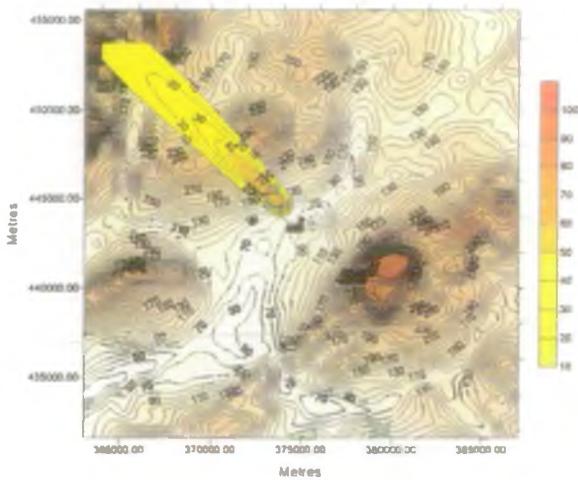
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4 FUTURE DEVELOPMENTS

At present, modelling approaches tend to treat each medium separately. However, the Agency is required to adopt a more holistic view of the environment. New media-specific models will be integrated to ensure the true environmental impact is assessed. In addition, the availability of data with improved spatial resolution will present a challenge for models to provide forecasts over finer spatial scales and with temporal resolution relevant to the environmental impacts, which can range from seconds to decades.

A further requirement will be the development of risk-based environmental assessment criteria, with the aim of ensuring that standards applied for each medium, be it air, water or soil, afford a comparable degree of environmental protection. In the past model output has usually been compared with chemical standards. In order to allow forecasts to be compared with a range of environmental viewpoints, such as biodiversity, it will be necessary to model the effects of activities on new endpoints.

In its work the Centre will take a proactive role in attempting to predict where detrimental effects may occur in future rather than solely forecasting future effects of existing problems.



Damage to Building due to Acid Deposition

5 CHECKLIST

The range of activities which the Centre may address is large and varied including the effects of climate change, the impact of activities on the future state of land quality and the environmental implications of integrated transport policies. Hence it will be necessary to focus on key policy and operational requirements.

A primary aim will be to ensure that a comprehensive suite of suitable models is available for operational and policy staff, together with support to allow them to be used in a consistent fashion. The Centre will not carry out routine modelling activities, for example the dispersion of pollutants released from a stack into the atmosphere. The Centre will, however, train Regional and Area staff in the use of models for such assessments.

	CENTRE ACTIVITY	CENTRE ADVISES
Modelling the transport of pollutants in a single medium		✓
Modelling complex transport, transformations and multimedia transfers	✓	
Analysis of the environmental impacts of policy initiatives	✓	
Using environmental forecasts in the development of LEAPS		✓
Screening future environmental hazards	✓	
Development and validation of environmental models	✓	
Development of risk-based environmental standards	✓	
Assessment of environmental impacts for individual plants, sites or discharges		✓

Contact:

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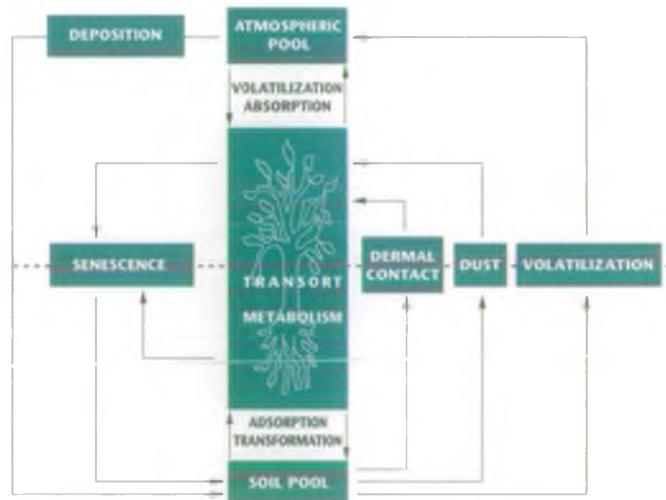
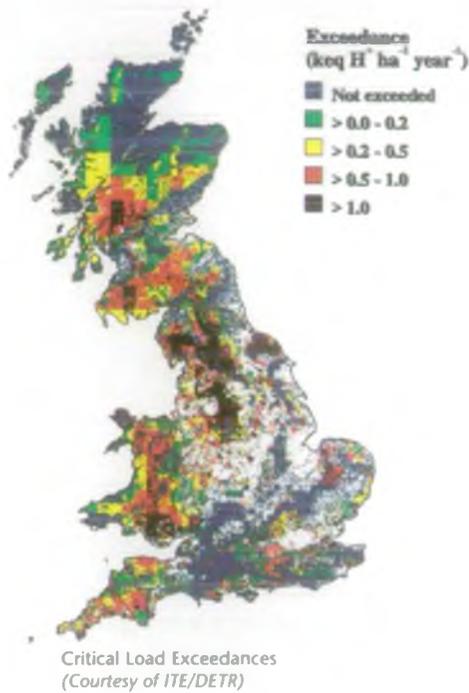
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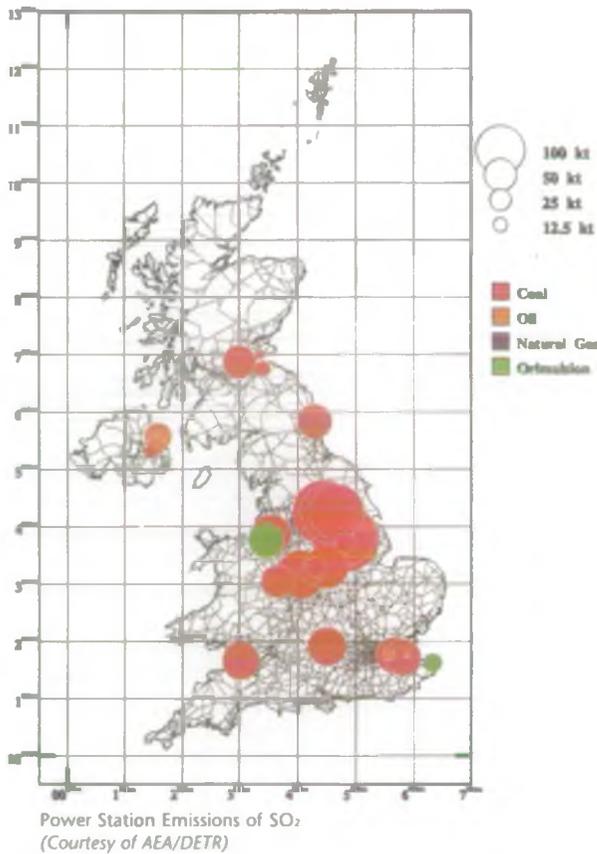
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3 MAIN TECHNIQUES

In parallel with convergence on acceptable existing models, the Centre will develop new and improved models in-house and through external research. The models will cover air, soil, and both water quality and quantity. In addition the Centre will link physicochemical and ecological models to enable the Agency to focus on the real impact of pressures on the environment. A key element in the Centre's work is to ensure that each model is fit for purpose. For example, models which provide a view of the national impact of a policy option will be very different from those used to assess the grounding of a plume.



Understanding pollution emission, transfer and transformation is only one aspect; a further step is forecasting effects on the environment and assessing what harm may be caused. For example, critical loadings of acidifying pollutants for soil ecosystems can be mapped. Forecasting the improvement from any policy option is then possible by overlaying current and future deposition fields.



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