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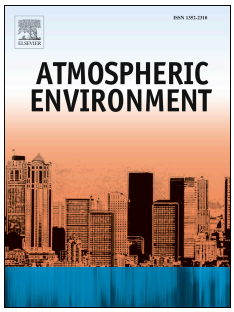

New directions: Future approaches to the standardized assessment of airborne pollutants affecting environmental quality

Sascha Nehr, Isabelle Franzen-Reuter, Catharina Kucejko

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New Directions: Future approaches to the standardized assessment of airborne pollutants affecting environmental quality

Sascha Nehr [a,*], Isabelle Franzen-Reuter [b], Catharina Kucejko [a]

[a] Verein Deutscher Ingenieure e.V., Kommission Reinhaltung der Luft, Düsseldorf, Germany

[b] Fachhochschule Münster, Fachbereich Energie – Gebäude – Umwelt, Steinfurt, Germany

[*] Corresponding author at: Verein Deutscher Ingenieure e.V., VDI-Platz 1, 40468 Düsseldorf, Germany. E-Mail address: nehr@vdi.de (S. Nehr).

1. Introduction

Man-made activities have caused unexampled changes of our environment during the last two centuries. Due to emissions of a vast number of pollutants the composition of the Earth's atmosphere is continuously changing, and the consequences for humans and for ecosystems are only partly understood at present. Once released to the atmosphere, the emitted substances undergo physical and chemical degradation. Many of the substances detected in ambient air are toxic or carcinogenic and might cause respiratory and cardiovascular diseases. Furthermore, air pollutants are influencing acidification, eutrophication, global warming, and biodiversity. Therefore soil quality, water quality, air quality, ecosystem exposure to pollutant deposition, biodiversity, and climate change are coupled problems. [1]-[4]

Ambient air quality standards are used to report the frequency with which pollutant concentrations exceed harmful levels. This concept is a tool for future enforcement of laws. However, approving ambient air quality standards requires more than adopting a set of limit values for airborne pollutants. It is mandatory to link the standards with measurement methods, sampling site locations and frequency of sampling, quality control measures, and statistical data analysis. This article reports the current status of approaches to the standardized assessment of airborne pollutants affecting environmental quality and identifies priority areas for future standardization activities in this field.

2. Current status of internationally standardized environmental quality assessment

The traditional environment protection approach is related to the endangered media soil, water and air. Methods for the standardized assessment of environmental quality make use of biological and/or physico-chemical monitoring of the different environmental media. In 1971 standardization agencies all over the world started to face environmental issues by establishing dedicated committees on "Air Quality", "Water Quality", and later "Soil Quality" within the International Organization for Standardization (ISO). The objectives of standardization related to air quality characterization are focused on emission testing, workplace atmospheres, ambient air, indoor air, and in particular on measurement methods for air pollutants as well as meteorological parameters. [5] The standardized assessment of water quality resorts to the chemical methods including the investigation of sum-parameters and single analytes as well as the biological methods including toxicity and biodegradability. [6] Standardization in the field of soil quality resorts to the measurement of potential contaminants, the description of methods for cleaning polluted soils, and the guidance for human and ecotoxicological risk assessment. Moreover, guidance for the description of soil degradation related to local and diffuse contamination, erosion, loss of organic matter, acidification, risk of landslides, loss of biodiversity, salinization, desertification, sealing, and compaction is also specified by international standards. [7]

To date, the media-related environment protection approach is complemented by the causal approach and the vital approach. On the one hand, the substance-specific causal approach assures