



# **Climate Change, Air Pollution and Global Challenges: Chapter 12. Flux-Based Ozone Risk Assessment for Adult Beech and Spruce Forests (Developments in Environmental Science)**

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Rising tropospheric ozone (O<sub>3</sub>) concentrations pose a critical threat to forest ecosystems. A stomatal flux-based risk evaluation methodology at leaf level was established recently in the context of the Convention on Long-Range Transboundary Air Pollution. This study demonstrates improvement and validation of the stomatal flux–effect approach for European beech and Norway spruce with results from the 8-year free-air O<sub>3</sub> enrichment experiment at Kranzberg Forest (Germany). Based on the recommended O<sub>3</sub>/water vapour diffusivity ratio of 0.663, provisional corrected flux–effect functions for beech and spruce were deduced. Comparison of observed and modelled loss in annual growth under twice-ambient O<sub>3</sub> exposure relative to whole-stem productivity under ambient O<sub>3</sub> seems to confirm the Convention’s leaf-level stomatal flux approach and the associated response function for Norway spruce up to twice-ambient O<sub>3</sub> exposure. For European beech, it must be emphasized that the Convention’s methodology may underestimate the risk for loss in whole-stem productivity.

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