Project Number 282910

ÉCLAIRE

Effects of Climate Change on Air Pollution Impacts and Response Strategies for European Ecosystems

Seventh Framework Programme

Theme: Environment

RIVM deliverable report of 2012 contrbutions to ECLAIRE WP19 and WP16 in general and Deliverables D16.1 and D19.1 in particular.

Due date of deliverable: **31/10-2012** Actual submission date: 18/09-2012

Start Date of Project: **01/10/2011** Duration: **48 months**

Organisation name of lead contractor for this deliverable :
RIVM

Project co-funded by the European Commission within the Seventh Framework Programme		
Dissemination Level		
PU	Public	☒
PP	Restricted to other programme participants (including the Commission Services)	☐
RE	Restricted to a group specified by the consortium (including the Commission Services)	☐
CO	Confidential, only for members of the consortium (including the Commission Services)	☐

1. Executive Summary

WP19 includes the implementation in the GAINS-model (in the code) or in the GAINS-system of novel critical thresholds and operational indicators for the assessment – including robustness analyses - of adverse effects. Contributions to a number of deliverables including D19.1 and D16.1

Key achievements in 2012 include:

Task 19.1 and 16.1, MS86: In the GAINS-model a new database of critical loads (D16.1) has been implemented in 2012. This new database includes most recent county contributions, while the resolution of critical loads now enables assessments on a 5x5 km2 grid providing an improved focus on Natura 2000 areas.

Task 19.3 and 16.1 : Regarding the GAINS-system two advances have been realized. The first is the implementation on a European scale (Hettelingh et al., in prep) of nitrogen-dose-response functions which have been developed on the basis of Gradient studies (Stevens, et al. 2010). The second involves the implementation of limits to assess impacts of ozon (First results under D16.5) In collaboration with Alterra (beneficiary 4) , acquired/established a tree species data base covering Europe (excl. RU) on a 0.01 by 0.001 degree grid. This database has been used to compute exceedances of POD, using POD1 computations from met.no, exploring different critical limits, obtained from the ICP Vegetation (CEH Bangor), and their consequences for 4 different tree species. This work is meant to guide further developments in this field: (a) review of critical limits; (b) extension of POD calculation for specific species (now only coniferous and deciduous PODs are available).

Task 19.4 : An assessment was performed by RIVM-CCE in collaboration with IIASA (beneficiary 5) under the Convention on Long-range Transboundary Air pollution (and presented to its bodies) of the recently (May 2012) negotiated revision of the Protocol to abate acidification, eutrophication and ground-level ozone. Results including preliminary robustness analysis based on currently available indicators will be published in the CCE Status report 2012 (D19.1 Posch et al., in prep.)

Task 19.5 : The 28th meeting of the Task Force on Modelling and Mapping and the 22nd CCE workshop were held back to back at the National Centre for Emissions Management of the Environmental Protection Institute (Warsaw, Poland, 16-19 April 2012). The meetings were held under the auspices of the Convention and EC-programmes including ECLAIRE (MS82). The meeting was attended by 48 delegates from the following 23 countries: Austria, Azerbaijan, Bulgaria, Canada, Croatia, Czech Republic, Denmark, France, Germany, Ireland, Italy, Norway, P,R, China, Poland, Republic of Moldova, Russia, Slovenia, Sweden, Switzerland, The Netherlands, Ukraine, United Kingdom, United States, The bureau of the Working Group on Effects (WGE), the ICP Vegetation, the ICP Waters, the ICP Forests, the ICP Integrated Monitoring, the Coordination Centre for Effects (CCE), NEBEI and the UNECE secretariat were also represented. In ECLAIRE perspective, the meeting included the review of research progress on nitrogen (N) induced change of plant species biodiversity and their applications at local or regional scales (D16.1) and the review progress regarding methods and objectives for valuing air pollution effects (in conjunction with Task 20.4).

Results have also been presented to the 41st Task force on Integrated Assessment Modelling (Bilthoven, 7-9 May 2012) and Working Group on Effects (Geneva, 19-21 September 2012)

Objectives:

D 16.1 'Indicators for geo-chemical and biological endpoints'

D 19.1 'Progress report on the implementation of new effect indicators and critical thresholds in the GAINS modelling system'

2. Activities:

In the GAINS-model a new database of critical loads (D16.1) has been implemented in 2012. This new database includes most recent county contributions, while the resolution of critical loads now enables assessments on a 5x5 km2 grid providing an improved focus on Natura 2000 areas

Regarding the GAINS-system two advances have been realized. The first is the implementation on a European scale (Hettelingh et al., in prep) of nitrogen-dose-response functions which have been developed on the basis of Gradient studies (Stevens, et al. 2010). The second involves the implementation of limits to assess impacts of ozon (First results under D16.5) In collaboration with Alterra (beneficiary 4) , acquired/established a tree species data base covering Europe (excl. RU) on a 0.01 by 0.001 degree grid. This database has been used to compute exceedances of POD, using POD1 computations from met.no, exploring different critical limits, obtained from the ICP Vegetation (CEH Bangor), and their consequences for 4 different tree species. This work is meant to guide further developments in this field: (a) review of critical limits; (b) extension of POD calculation for specific species (now only coniferous and deciduous PODs are available).

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3. Results:

The activities have resulted in an updated set of critical loads in the GAINS-model and improved critical limits in the GAINS-system. Curently available results have been disseminated in various policy gremia under the Convention on Long-range Transboundary Air Pollution.

4. Milestones achieved:

MS67: Indicators for geo-chemical and biological endpoints identified
MS70: Preliminary initiatzation of MS82
MS86: First presentation of progress to the Working Group on Effects meeting (Geneva, 20-21 September 2012) and to the 22nd CCE workshop under the Convention on Long-range Transboundary Air Pollution. (2012) held under the auspices of UN and EC programmes, now also including ECLAIRE

5. Deviations and reasons:

WP16 (discussion and decision at kick off workshop, Brescia, 2011):
Issue: Developing novel thresholds for N
Decision: The group felt that differential critical loads (as opposed to critical levels) for reduced and oxidised N were not well supported by the evidence, because the different forms are rapidly cycled within the terrestrial ecosystem and thus usually indistinguishable in terms of impacts. Work on novel thresholds for N should therefore focus on deriving new biodiversity-oriented critical loads for N based on species models (EU-MOVE and GB-MOVE)
Action: collaborate on methods for setting critical thresholds using species models and linking these to biogeochemical models to define critical loads. Another issue that needs attention is the fact that a critical level for NH3 is not yet included in GAINS, nor a response function between NH3 and occurrence of lichens/higher plants. This would be valuable and requires an S-R matrix for NH3. Wim to interact with Mark Sutton to get the NH3 response function

6. Publications:

- WGE (2012) "impact assessment: effects indicators as tools to evaluate air pollution abatement policies" ECE/EB.AIR/WG.1/2012/13 (UNECE-Convention on Long-range Transboundar Air Pollution (CLRTAP)) (Q1,
- CCE (2012) Report by the Coordination Centre for Effects and the Task Force of the International Cooperative Programme on the Modelling and Mapping of Critical Levels and Loads and Air Pollution Effects, Risks and Trends ECE/EB.AIR/WG.1/2012/10 (UNECE-CLRTAP)
- Hettelingh, J-P, Stevens C.J., Posch M, Bobbink R, de Vries W (*in prep*), Assessing the impacts of nitrogen deposition on indicator values of plant species in Europe in: de Vries W and hettelingh J-P (eds.) Critical loads for nitrogen, acidity and metals for terrestrial and aquatic ecosystems

7. Meetings:

- Workshop of the Network of Experts on Benefits and Economic Instruments entitled "Further quantification of the effects of air pollutants on ecosystems" (St. Petersburg, 29 February 2012
- 28th meeting of the Task Force on Modelling and Mapping and the 22nd CCE workshop (Warsaw, Poland, 16-19 April 2012)
- Task Force on Integrated Assessment modelling (Bilthoven, 7-9 may 2012)
- 21st session of the Working Group on Effects (Geneva, 20-21 September 2012)

8. List of Documents/Annexes: