

Task 21:3 Model Protocols and Uncertainty

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Effects of climate change on air pollution impacts
and response strategies for European ecosystems



T21.3 Modelling protocols reliability and uncertainty

- *Agreement on common modelling and uncertainty assessment protocols across C1-5*
- *Reports on uncertainty in model output (yrs 3 & 4)*
- Facilitation/collation role – joining up the dots [1.5 month!]
- Seven different ‘types’ of model
- Many links between component and workpackages
- Discussions started yesterday
- Need to formulate the way this work is carried out
- Close links to the rest of the workpackage

Models in ECLAIRE

Model type	Scale	Processes	Application	Used in ÉCLAIRE
Dynamic vegetation & trace gas emissions models (DGVMs)	Regional, Europe to globe, 2-D	Dynamic response of vegetation and soil to climate and CO ₂ drivers, in some cases also to N-deposition and ozone levels. May be applied to potential natural vegetation or include crop cover and processes	Dynamically varying biogenic emissions (e.g., NO _x , BVOC, fire). Response of vegetation and soil C- and N-pools and cycles, to changing climate, atmospheric composition and in some cases N or O ₃	CLM, LPJ-GUESS, JULES, ORCHIDEE
Soil process and trace gas emission models (DSVMs)	Point to Europe (2-D)	Soil C-N decomposition processes and nutrient chemistry. Relies on prescribed soil and vegetation properties, may be applied to natural or agricultural ecosystems	Response of soil C and N pools, trace gas emissions, nutrient levels to changes in emissions, climate, vegetation litter input or management	DNDC-MOBILE, DNDC-metamodel, FORSPACE, VSD-N ¹⁴ C, SUMO
Deposition / bi-directional exchange models	Point / 1-D column	Within-and above canopy exchange (O ₃ , VOC, NO _x , aerosol) and in-canopy chemistry	O ₃ stomata deposition-dose effects; N _r deposition; pollutant life-time	CanT, DO ₃ SE, various CTM sub-models
Regional Climate model (RCMs)	European	Calculates meteorology for future climate simulations, downscaling from large-scale GCM results to 50 km over Europe	Provides future climate meteorology for DVGM, DSVMs and CTMs, as well as future climate data	RCA
Chemistry transport model (CTMs)	Regional, Europe to globe, 3-D	Atmospheric reaction pathways, transport and deposition of natural and anthropogenic emissions, in some cases also in response to climate change	Variable O ₃ & other gases or aerosol,, wet/dry deposition of O ₃ , N and other compounds; PODY (phytotoxic ozone dose)	EMEP, EURAD, LOTOS, TM5, LMD ₂ -INCA-ORCHIDEE, MATCH
Biodiversity assessment model	Point (2-D)	Species composition response to changing soil properties (e.g., %C, %N, soil chemistry) or Ellenberg ecosystem indicators	Biodiversity indicators based on species prevalence	GBMOVE, MOVE
Integrated assessment model	Countries regions	Transfer coefficients, emission factors, optimisation targets, costs, etc	Optimised emissions and costs, translated into transfer matrix linked with CTM	GAINS

More detail...

- Modelling Protocols
 - Harmonizing input/output
 - Fit for purpose
 - Possibly technical and format issues
 - Storage and access needs?
 - Version storage – links with databases
- How do we achieve this?
 - First phase – defining the issues and tacking stock
 - Developing protocols [Meeting in spring – report month 9]
 - Using these protocols
 - User group – one per model type?
 - One key contact per model?
 - Look to previous projects, NEU, others – learn lessons and take on board good ideas

More detail...

- Uncertainty.....
 - Means different things to different people
 - ‘scientific uncertainty’, ‘policymakers uncertainty’
 - Within models
 - Between models - intercomparison, ensemble
 - Input uncertainty from our measurement WP’s
 - Output uncertainty – assessing and quantifying
 - Parameter uncertainty
 - Anything is possible with infinite resources.....
 - Pragmatic approach, identifying the key areas where a joined up approach is important – **useful information** – adds value to our work, credibility and important messages for stakeholders

Moving forward

- Modelling protocol and uncertainty working group
- One person per model type
- Key contact per model (?any commonality with other tasks?)
- Persons involved in previous model protocol work for NEU/their models elsewhere
- What harmonisation is needed between models in your work – that is not related to the scenarios?
- How do you consider output uncertainty in your models?
- Are you planning any intercomparison or ensemble work – if so, what? Which models are involved, who, key factors for comparison, etc?

Further questions...

- Do you have any storage or access requests, i.e. versioning, input/output for use in comparisons (links to 21.4)
- What 'policymaker' uncertainty are you trying to develop? What need is there for other types of uncertainty in your work?

Lends weight to the work but provides relevant signposts regarding the uncertainty to the stakeholders

Over to you!!!!