



## Multi-scale atmospheric composition modelling for the Balkan region

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### Overview

The present work describes the progress in developing of an integrated, multi-scale Balkan region oriented modeling system.

The main activities and achievements at this stage of the work are: Creating, enriching and updating the necessary physiographic, emission and meteorological data bases; Installation of the models for GRID application, model tuning and validation; Extensive numerical simulations on regional (Balkan Peninsula) and local (Bulgaria) scales.

### Objectives:

The present work describes the progress of an application developed by the Environmental VO of the 7FP project SEE-GRID eInfrastructure for regional eScience. The application aims at developing of an integrated, multi-scale Balkan region oriented modelling system, which would be able to:

- Study the atmospheric pollution transport and transformation processes (accounting also for heterogeneous chemistry and the importance of aerosols for air quality and climate) from urban to local to regional (Balkan) scales;
- Track and characterize the main pathways and processes that lead to atmospheric composition formation in different scales;
- Account for the biosphere-atmosphere exchange as a source and receptor of atmospheric chemical species;
- Provide high quality scientifically robust assessments of the air quality and its origin, thus facilitating formulation of pollution mitigation strategies at national and Balkan level.

The application is based on US EPA Models-3 system.

### Description of work:

The main activities and achievements at this still preparatory stage of the work are:

- 1.) Creating, enriching and updating the necessary physiographic, emission and meteorological data bases
- 2.) Installation of the models for GRID application, model tuning and validation, numerical experiments and interpretation of the results: The US EPA Models 3 system is installed; software for emission speciation and for introducing emission temporal profiles is created, a procedure for calculating biogenic VOC emissions by using the SMOKE abilities is developed; Model validation tests for episodes of very high PM10 concentrations over Germany in February and March of 2003.
- 3.) Extensive numerical simulations on regional (Balkan Peninsula) and local (Bulgaria) scales are performed aiming at:
  - better understanding and quantifying of the role of different processes and scales
  - evaluation of different sources (countries and/or SNAP categories) contribution to air pollution formation on local to regional scales

### Conclusions and Future Work:

The present work is an attempt to development of an integrated view of the atmospheric composition formation at different spatial and temporal scales.

It is also envisaged some studies to be carried out aiming at assessment of climate change impact on air pollution

levels in Bulgaria. A natural sequel of the present work will be the creation of Bulgarian national chemical weather forecasting and information system.