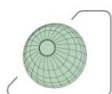


## Action COST ES1004

# European framework for online integrated air quality and meteorology modelling (EuMetChem)

ESSEM



COST countries: AT, BG, CH, DE, DK, EE, ES, FI, FR, GB, GR, HU, IL, IT, MT, NL, NO, PL, SE

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## Abstract

The COST Action is focusing on a new generation of online integrated Atmospheric Chemical Transport and Meteorology modelling systems using two-way interactions between different atmospheric processes including chemistry, clouds, radiation, boundary layer, emissions, meteorology and climate (Fig. 1). The Action intend to consider at least two application areas of integrated modelling: (i) improved numerical weather prediction (NWP) and chemical weather forecasting (CWF) with short-term feedbacks of aerosols and chemistry on meteorological variables, and (ii) two-way interactions between atmospheric pollution/composition and climate variability/change. The framework consists of four working groups namely: WG1: Strategy and framework for online integrated modelling; WG2: Interactions, parameterisations and feedback mechanisms; WG3: Chemical data assimilation in integrated models; and finally WG4: Evaluation, validation, and applications. Establishing such a European framework (involving also key American experts) will enable the EU to develop world class capabilities in integrated ACT/NWP-Climate modelling systems, including research, education and forecasting. More than 40 teams from 19 European COST countries, as well as ECMWF, JRC, WMO, US EPA, NOAA, etc. are already involved in the Action.

**The Action aims** towards a new generation of online models, based on integrated modelling of Atmospheric Chemical Transport (ACT) and Meteorology (Numerical Weather Prediction and Climate, NWP-CLIM) with two-way interactions between different atmospheric processes including chemistry (both gases and aerosol), clouds, radiation, boundary layer, emissions, meteorology and climate.

**The overall objective** is to set up a multi-disciplinary forum for online integrated air quality/meteorology modelling and to elaborate an European strategy for an integrated ACT/NWP-CLIM modelling capability/framework.

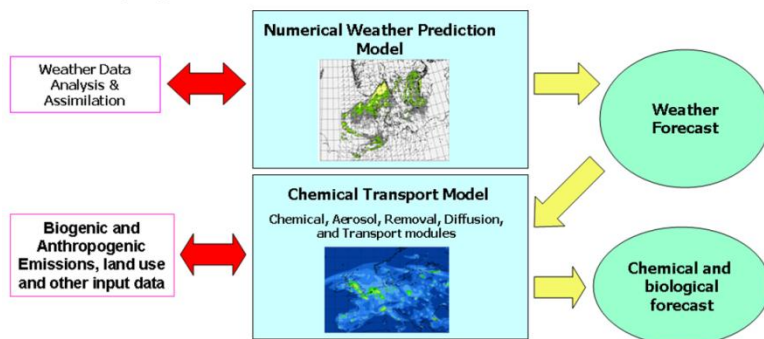
### Benefits for the Society

- Contribute to better forecasting of severe weather events and their consequences (forest fires, dust storms, flooding, volcano eruption, etc.)
- Contribute to the reduction of detrimental combined health effects,
- Contribute to better prediction of climate change and building climate change adaptation strategy,
- Cost-effective measures towards transport management and energy production,
- Improved management and protection of terrestrial, coastal, and marine ecosystems,
- Enhanced quality of life especially in urban areas,
- Decreased overlap and redundancy of national, regional or local activities and arrangements,
- Better possibilities to relate the air quality, meteo/climate factors with human health and impacts on ecosystems.

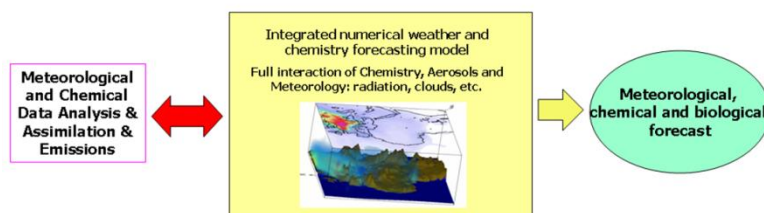
### Recent Events and Activities

- Special Session AS4.25 "Integrated physical and chemical weather modelling with two-way interactions" at the EGU General Assembly in Vienna, 6-7 April 2011
- Summer School on "Integrated Modelling of Meteorological and Chemical Transport Processes / Impact of Chemical Weather on NWP and Climate Modelling", Odessa, 2-9 July 2011
- Springer book on "Integrated Systems of Meso-Meteorological and Chemical Transport Models", Baklanov, A., A. Mahura, R. Sokhi (Eds), 2011.

### Off-line coupling:



### On-line coupling/integration:



**Figure 1: Schematic diagram of the off-line and on-line coupled NWP and ACT modelling approaches for CWF.**