

## ITC CONFERENCE GRANT SCIENTIFIC REPORT

This report is submitted for approval by the grantee to the MC Chair.

**Action number: CA16202**

**Conference title: FAIRMODE technical meeting and TFIAM workshop**

**Conference start and end date: 26/06/2018 to 29/06/2018**

**Conference attendance start and end date: 26/06/2018 to 29/06/2018**

**Grantee name: Jonilda Kushta**

### ACTIVITIES DURING YOUR ATTENDANCE AT THIS CONFERENCE:

On 26 till 29 June, I attended the Forum for Air Quality Modelling in Europe (FAIRMODE) Technical meeting 2018, and the workshop on local measures to improve air quality and health organized in the framework of the activities of the Task force on Integrated Assessment Modelling (TFIAM) of the Convention on Long Range Transboundary Air Pollution. I attended the sessions regarding the Work Group on Assessment (benchmarking model evaluation methodology for air quality assessment and forecasting).

I participated in the discussions related to assessment activities mostly focused on the methodology to benchmark model performances in forecasting mode, model quality objective guidance and e-reporting. In this context, several quality objectives are presented for models to satisfy in order to be considered accurate for reporting and regulatory applications.

I presented the case of Cyprus where the contribution of natural sources and specifically mineral dust is an important issue. Desert dust affects not only air quality over the region posing continuous health stress to inhabitants of affected countries, but, in the case of Cyprus contributes to threshold exceedances as set by the EU Air Quality Directive. I stressed out the need for accurate modelling as a tool to quantify this contribution. It demonstrated that mineral dust modelling poses several challenges and the assessment of modelling results needs to follow a well-defined analysis structure.

The benchmarking methodology – intended to be officially used by member states in the future - is now extended to forecasting applications, apart from air quality assessment. I highlighted some shortcomings of the methodology in cases such as the country of Cyprus where episodic increase in fine and coarse particulate matter (due to dust storms) might compromise the interpretation of the results of the evaluation. I proposed and discussed with other participants on the possibility to separate natural sources from the evaluation procedure or use separate model configurations (since air quality modelling and dust assessment require different features).

### IMPACT ON YOUR RESEARCH AND FUTURE COLLABORATIONS (if applicable)

Including airborne dust aerosols in the FAIRMODE assessment procedure to assess the performance regarding both anthropogenic and mineral dust particulate matter highlighted the need for more accurate modeling. We will be focusing on a number of dust storms that initiate and move due to phenomena of local scale or convective activity. For this we will be using high-resolution model configurations over source areas. Moreover, the modelling of the dust levels in receptor areas calls for high-resolution configuration of the model in the populated region that it affects, in order to capture local scale circulation patterns due to

topography. Computationally, this is a challenging task and needs more elaboration. It must not be understated that modelling of dust should be included in online models to account for feedbacks and links between aerosols (dust) and meteorological processes (radiation, cloud, precipitation) that in turn will affect both the aerosols themselves (due to alterations in the wind and deposition patterns) as well as other pollutant levels (i.e. ozone due to changes in the photolysis rates). Therefore, my research in dust will encompass important components both from the scientific and regulatory point of view.

During the discussion on my work I was invited to forthcoming events that will focus on the identification and assessment of dust for policy applications, which I intend to take part in. I also identified possible cooperation with representatives from other countries affected by dust to investigate the threshold exceedances during dust episodes that were not well represented by the models, as shown by the benchmarking methodology developed in the framework of FAIRMODE, and whether these missed alarms come from the model configuration and spatial resolution over the dust originating area.

I am also now to looking into the use of satellite data by the Copernicus programme which provides fire data with a two-day lag period for forecasting. Similar information on dust, or the intention to move towards this direction from ECMWF, would be a great benefit for the modelling community.

Finally, a joint manuscript on the benchmarking methodology for model evaluation is going to be submitted soon from the Cyprus Institute, with leading author myself, within which an elaboration on the importance and challenges of modelling, forecasting and evaluation of dust will be included, with co-author Philip Thunis who leads the FAIRMODE. I am grateful to the InDUST action for its support and will acknowledge in this publication.