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 #COSTinDust

inDust

COST Action CA16202

overview

FAIRMODE plenary meeting

International Network to Encourage the Use of Monitoring and Forecasting Dust Products

Indust

COST Action CA16202



Our goals

- To **establish a network** involving research institutions, service providers and potential end users of information on airborne dust → dust users-oriented services
- To **coordinate** and **harmonise** the process of transferring dust observations and predictions to users (including researchers and stakeholders)
- To **assist** the diverse socio-economic sectors affected by the presence of high concentrations of airborne mineral dust.

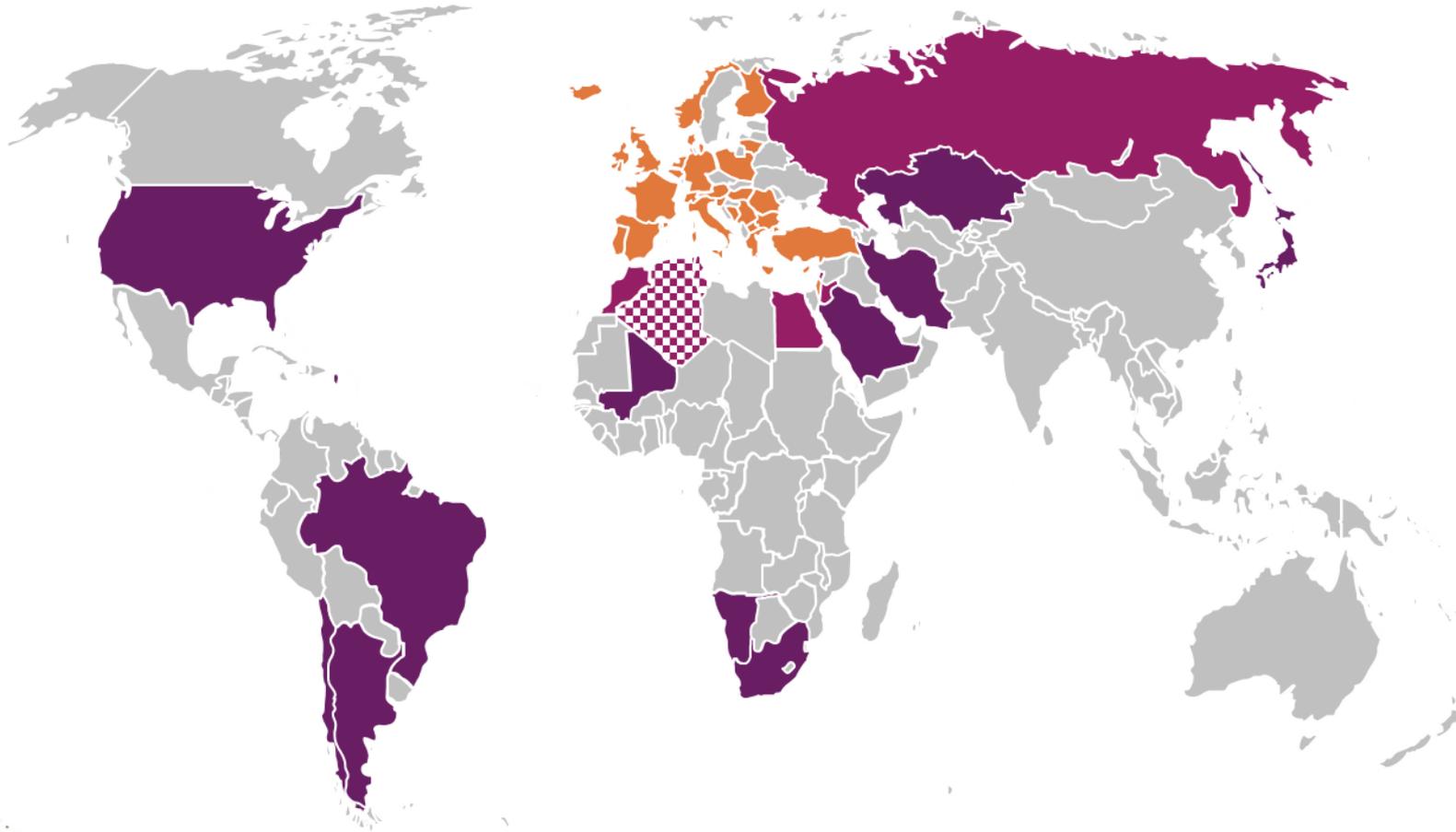


How?

- Identify scientific and technical **gaps in “dust” research**
- Coordinate and harmonise the process to get **user-oriented products**.
- **Build capacity** through the high-level teaching of users to promote the use of the delivered dust products.
- **Train staff** to properly use the available observational and forecast products to design and implement preparedness and mitigation measures.
- **Enhance the cooperation** with institutions from near-neighbouring and international partner countries in Northern Africa and the Middle East.



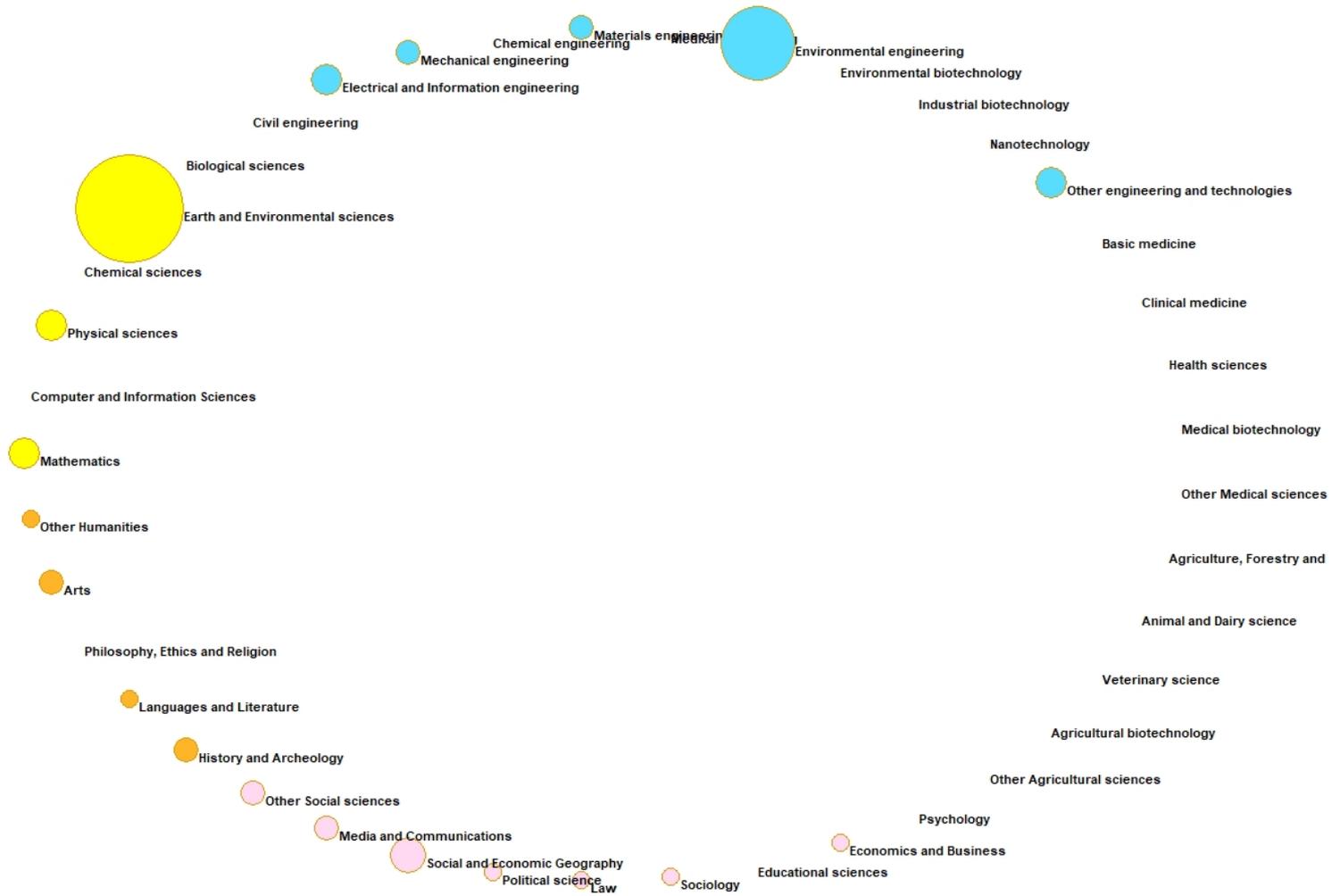
inDust Countries



- COST countries (29 countries)
- Near-Neighbour Countries (Egypt, Jordan, Lebanon, Morocco, Tunisia and Russia)
- International Partner Countries
- International Organisations (WMO, ECMWF, WHO)

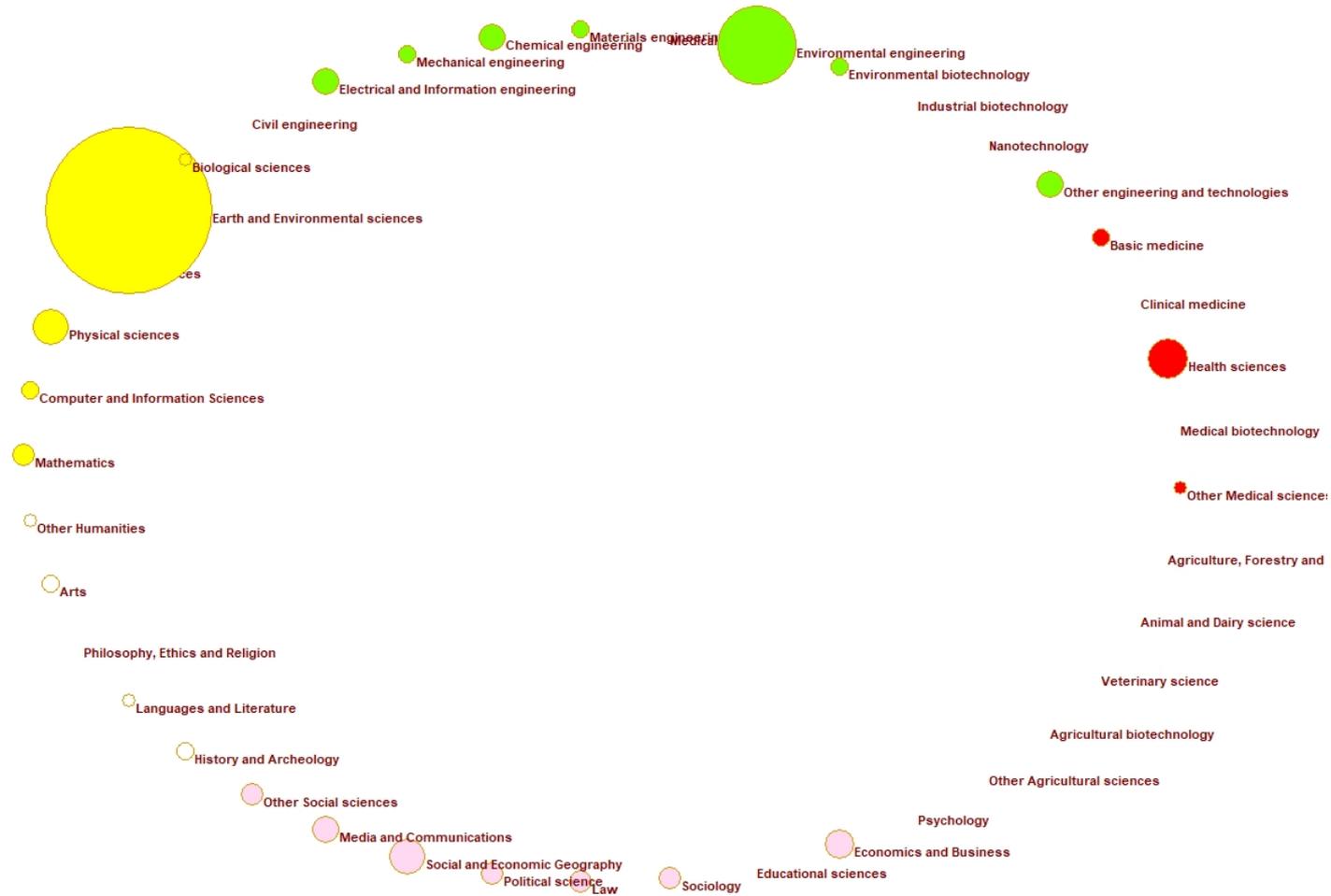


Disciplines - November 2017





Disciplines - October 2019



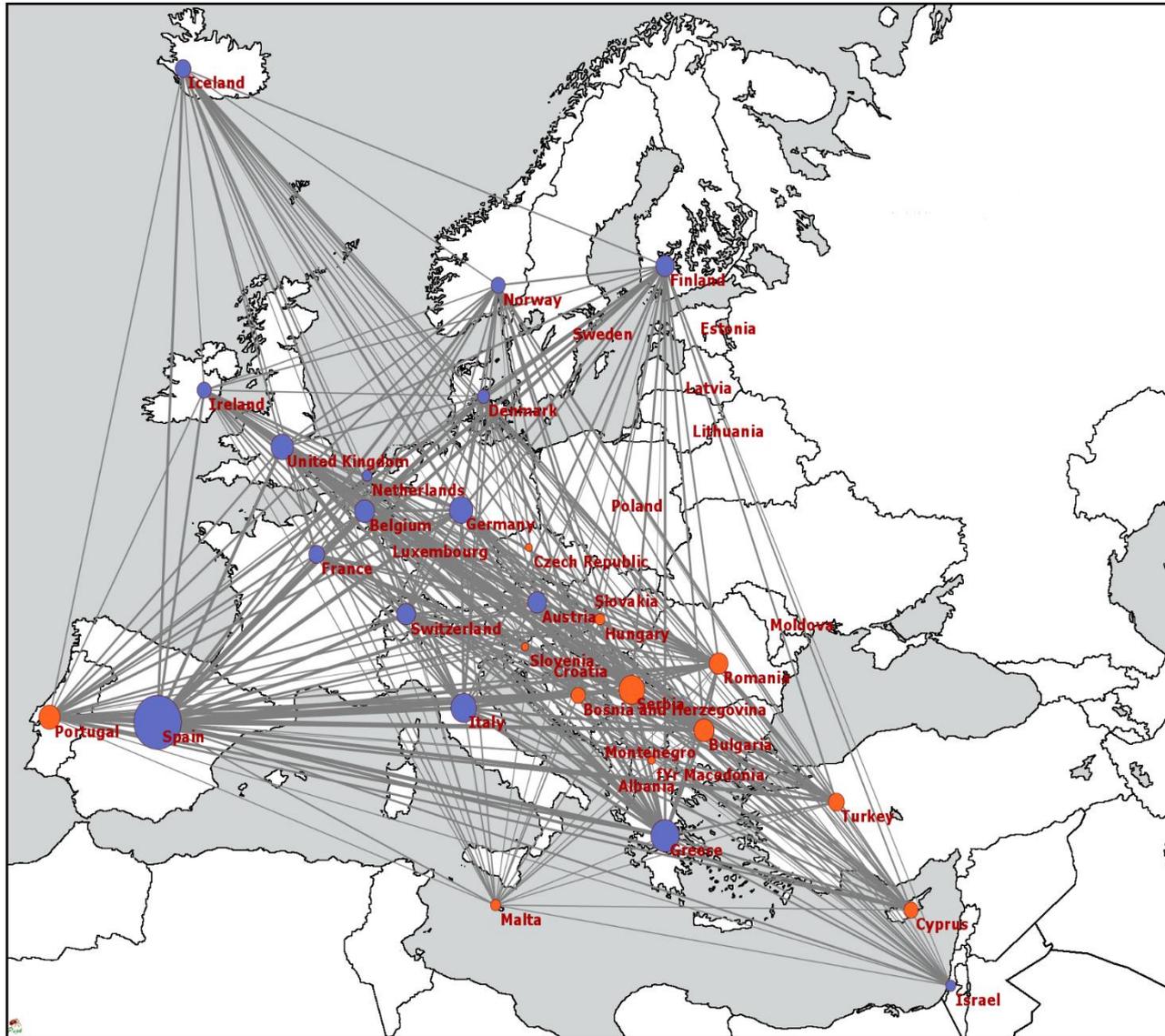


Movements - November 2017





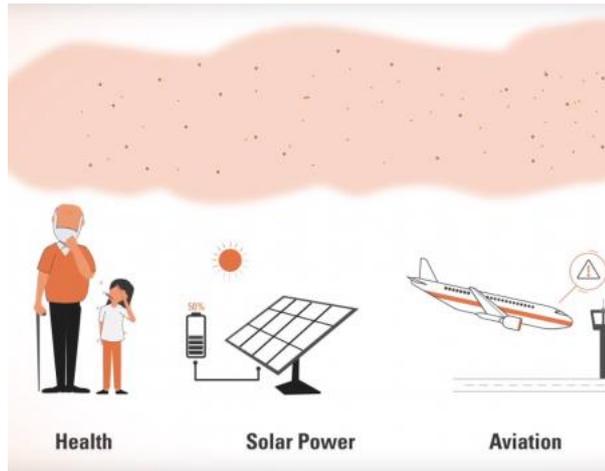
Movements - October 2019





Dissemination materials

Video



Leaflet

DUST IMPACTS

When winds are strong, large amounts of sand and dust are lifted from bare, dry soils into the atmosphere. Mineral dust particles are transported downwind, affecting regions hundreds to thousands of kilometers away. These particles affect climate, weather, atmospheric chemistry and ecosystems.

In addition to the climate effects of dust particles, sand and dust storms (SDS) represent a serious hazard with multi-sectoral effects at local, regional and global scales.

In countries with or near desert dust sources, SDS severely compromise human health, transport and agriculture. Intense dust outbreaks can force the closing of roads and airports due to poor visibility, deteriorate infrastructure and strongly affect commercial solar energy production. In distant regions, dust also affects solar energy production, by reducing solar irradiance, transportation and health. Conversely, it can also have positive effects as nutrients contained in the transported desert dust (iron and phosphorus) favour the fertilisation of marine and continental ecosystems, possibly affecting agriculture and fisheries.

ABOUT inDust

The overall objective of inDust is to establish a network linking research institutions, service providers and potential end users of information on airborne dust. Its purpose is to coordinate and harmonise the process of transferring dust observation and prediction data to users as well as to assist the diverse socio-economic sectors affected by the presence of high concentrations of airborne mineral dust.

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inDust is an international network that connects desert dust experts with stakeholders in socio-economic sectors affected by airborne mineral dust.

JOIN THE NETWORK

inDust

INTERNATIONAL NETWORK TO ENCOURAGE THE USE OF MONITORING AND FORECASTING DUST PRODUCTS

This leaflet is based upon work from COST Action inDust CA16102, supported by COST (European Cooperation in Science and Technology). The Grant holder of inDust is the Barcelona Supercomputing Center (BSC), whose long-term dust research program is associated with the AGA Research Fund.

COST is a funding agency for research and innovation networks. COST Actions help connect researchers nationwide across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts research, careers and innovation.

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cost European Cooperation in Science and Technology

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Deserts
Weather, climate and ecosystems
Agriculture and ground transportation
Solar energy

Health and air quality
Agriculture

Oceans
Weather, climate and ecosystems
Agriculture
Solar energy

Land
Atmosphere and land use
Health and air quality
Agriculture

Deserts
Dust storms are extreme and intense, low-level jet-like storms caused by strong winds resulting in a "wall of dust" that occurs daily regularly in border desert regions.

Deserts
Future events affect infrastructure by blocking and reducing irradiance, hindering agricultural, energy and economic development.

Deserts
Dust combined with the increasing solar irradiance will lead to a net increase in solar energy production.

Deserts
Volcanic reactions can cause ashfalls, disrupt ground transport services and cause traffic accidents.

Deserts
Iron and phosphorus in mineral dust favour fertilisation of marine and carbonate ecosystems.

Deserts
Dust deposition on ice and snow surfaces of Earth (the cryosphere) can reduce the amount of sunlight reflected (albedo), affecting climate.

Deserts
Dust deposition on solar panels reduces their efficiency.

Deserts
Dust can cause mechanical damages in planes during flight.

Deserts
Dust introduced during remote sensing measurements from satellites.

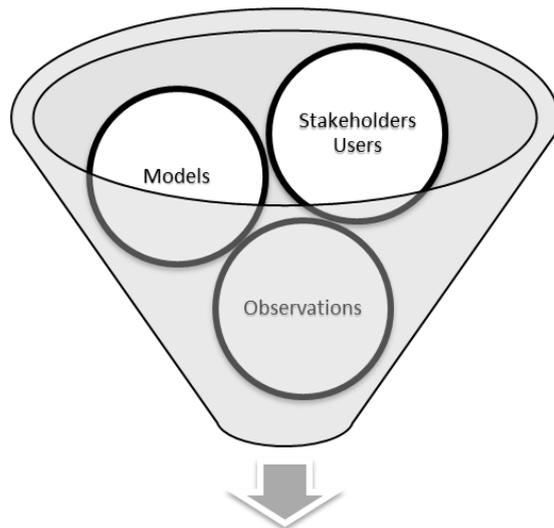
Deserts
Sand and dust storms have negative impacts on agriculture, reducing crop yields by affecting seedlings, causing loss of plant tissue, reducing photosynthetic activity and increasing soil erosion.

Deserts
Exposure to moderate levels of particulate matter (PM) can cause respiratory and cardiovascular diseases.

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How...concept and WGs



Dust-related Services



WG1 Dust observations

WG2 Dust modelling and forecast

WG3 Assessment of user and societal benefits

WG4 Transfer of dust products to user-oriented application and service value

1st “Users workshop on Air Quality”

Rome, March 2019

Discuss **methodologies currently** available to quantitatively report on contributions of this natural source to ambient PM levels in Europe, in compliance with the **EU Air Quality Directive** (2008/50/CE).

March 12, 2019

Dust contribution to Air Quality PM Levels

- | | |
|---------------|---|
| 09:00 - 09:15 | The EC-Guidelines to estimate the dust contribution to PM10
Andres Alastuey, CSIC-IDAEA, Barcelona, Spain |
| 09:15 - 09:30 | Dust contribution in Spain from EC-Guidelines application
Andres Alastuey, CSIC-IDAEA, Barcelona, Spain |
| 09:30 - 09:45 | Dust contribution in the Canary Islands
Emilio Cuevas, AEMET, Tenerife, Spain |
| 09:45 - 10:00 | Dust contribution in Portugal from EC-Guidelines application
Joana Monjardino, New Univ. Lisbon, Portugal |
| 10:15 - 10:30 | Dust contribution in Italy from EC-Guidelines application
Alessandro Di Menno di Bucchianico, ISPRA, Italy |
| 10:30 - 10:45 | Dust contribution in Italy from the DIAPASON approach
Francesca Barnaba, ISAC-CNR, Rome, Italy |

Coffee Break

- | | |
|---------------|---|
| 11:05 - 11:20 | The control of dust fraction in the Bulgarian Network of Air Quality
Milena Parvanova, Exec. Environ. Agency, Bulgaria |
| 11:20 - 11:35 | Dust events in Cyprus
Chrysanthos Savvides, Min. Lab. Wel. & S.I., Cyprus |
| 11:35 - 11:50 | Dust contribution in Turkey
Irde Gurtepe, Min. Environ. & Urbaniz., Turkey |
| 11:50 - 12:05 | Dust contribution in Jordan
Tareq Hussein, Univ. of Jordan, Jordan |

Round Table

- | | |
|---------------|---|
| 12:05 - 13:05 | Experiences and needs from Stakeholders |
| 13:05 - 13:30 | Wrap up and Closure |



Applications in Air Quality

LEGISLATION

2008/50/EC

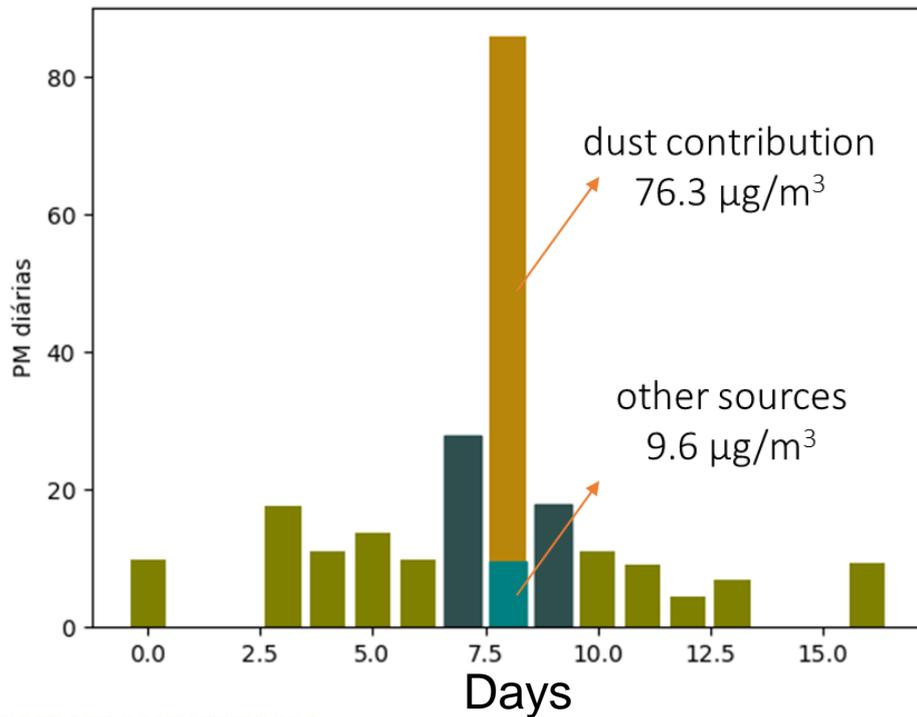
“Contributions from natural sources can be assessed but cannot be controlled. Therefore, **where natural contributions to pollutants in ambient air can be determined with sufficient certainty, and where exceedances are due in whole or in part to these natural contributions, these may, under the conditions laid down in this Directive, be subtracted when assessing compliance with air quality limit values.** “

‘contributions from natural sources’ shall mean emissions of pollutants not caused directly or indirectly by human activities, including natural events such as volcanic eruptions, seismic activities, geothermal activities, wild-land fires, highwind events, sea sprays or the atmospheric re-suspension **or transport of natural particles from dry regions;**



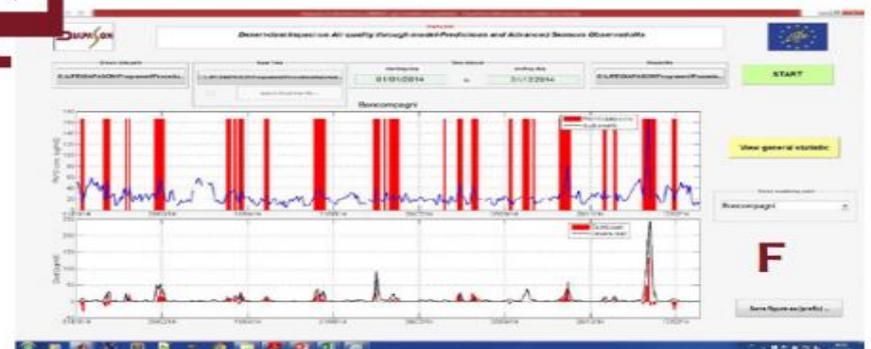
Methodologies to assess dust contribution to PM levels – legislation discount

P40 methodology (most used)



Alternative/new ones

DIAPASON software to implement the EC-Methodology



Software to implement the DIAPASON-revised Methodology



Workshop outcomes

Some heterogeneities/difficulties in its application have been found:

- current EC **Guidelines provide few specific indications** (too much freedom in application)
- **selection of rural background** reference stations required by the EC Guidelines is critical in some EU countries
- **role of the re-suspension** during desert dust events is still unclear
- **need to separate the contribution of biomass-burning** from the desert dust one that can sometimes be found in the same transport event (particularly critical for some Southern countries)
- **lack of desert dust alert systems** at regional/national and/or EU scale

2nd “Users workshop on Air Quality”

Malta, February 2019

Take note of this feedback and best practices **to design desert dust early warning system prototypes**

(to be later proposed and tested over the European region).



13:30	14:00	Registration - Opening
14:00	14:30	Welcome and introduction of this meeting (C. Galdies, S. Basart, F. Barnaba and A. Monteiro)
14:30	16:00	Overview of desert dust impact on Air Quality and Stakeholders needs in Member States (~10 minutes per country) Spain Andres Alastuey, IDAEA-CSIC, Barcelona Portugal Alexandra Monteiro, UA & APA, Aveiro Italy Francesca Barnaba, ISAC-CNR, Rome France Frederik Meleux, INERIS, Verneuil En Halatte Malta Michael Nolle, Amb. Q.&W. Env.& Res. Aut., Marsa Cyprus Chrysant. Savvides, Min. Lab. Well. Soc. Ins., Nicosia Turkey Gülen Gullu, Hacettepe University, Ankara Greece Chris Giannaros, NOA, Athens
16:00	16:20	Coffee Break
16:20	17:00	Revision of examples and best practices for natural hazards Early Warning Systems: Overview of ongoing systems (S. Basart) and earthquake prediction (F. Ozkaynak)
17:00	18:30	Round table: Draft document with user needs synthesis and priorities
18:00		Networking dinner - Radisson Blue Resort
19:00	10:30	Small Groups practical exercise: Best strategy for a desert dust Air quality Early Warning Systems
10:30	10:50	Coffee Break
10:50	12:45	Round table: Draft document with design of an Early Warning System NOTE: to be submitted to Stakeholders for evaluation and suggestions
12:45	13:00	Wrap up and closure



Workshop outcomes

One main outcome

to ask to WHO about hourly PM10 values instead daily.
It is complicated to launch an alert based on daily average,
because you are not sure about the contribution of the
maximum hourly peak at the end of the day.



Link FAIRMODE / InDUST

- WG2 & WG4: air quality modelling and dust services
- Dust modelling tools can be particularly important for:
 - forecast services (aviation, air quality, health, ...)
 - role of the re-suspension
 - supporting legislation (subtracting dust contribution)
 - source apportionment (to separate the contribution of biomass-burning from the desert dust one that can sometimes be found in the same transport event...)

Suggestion: organisation of a side event during the FAIRMODE technical meeting in October.

Crete | February 2018

