Analysis of aerosols, air pollution and their sources in the Eastern Mediterranean

EMME-CARE Autumn School, 2022

EMME-CARE
EASTERN MEDITERRANEAN MIDDLE EAST – CLIMATE & ATMOSPHERE RESEARCH CENTRE

Edu 4 ClimAte

INAR
Institute for Atmospheric and Earth System Research

The Cyprus Institute

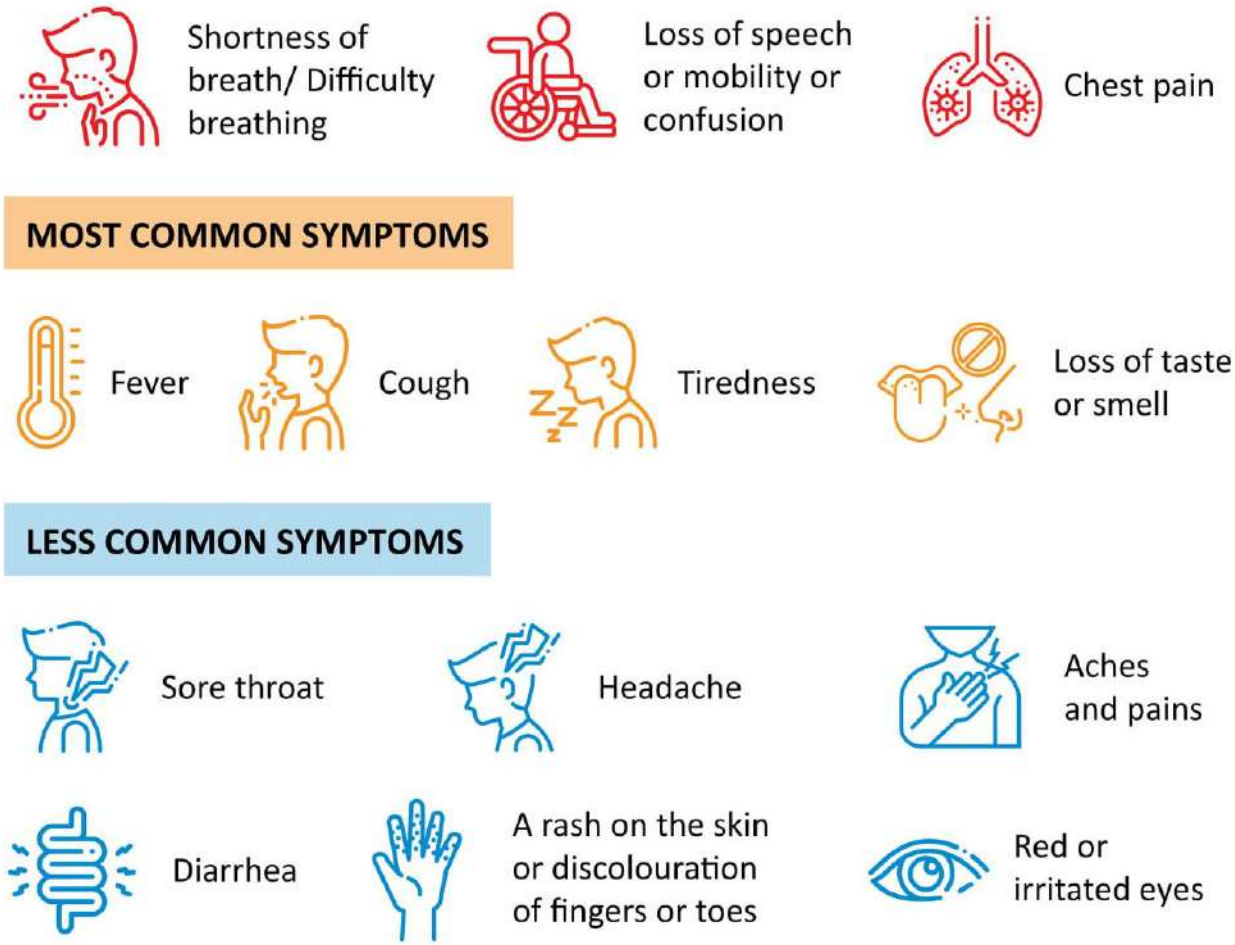
Occupational Health and Safety (OHS) Basic Induction

Natascia Manderioli

Rev. 11 July 2022

COVID basic rules

OHS – Basic



COVID symptoms

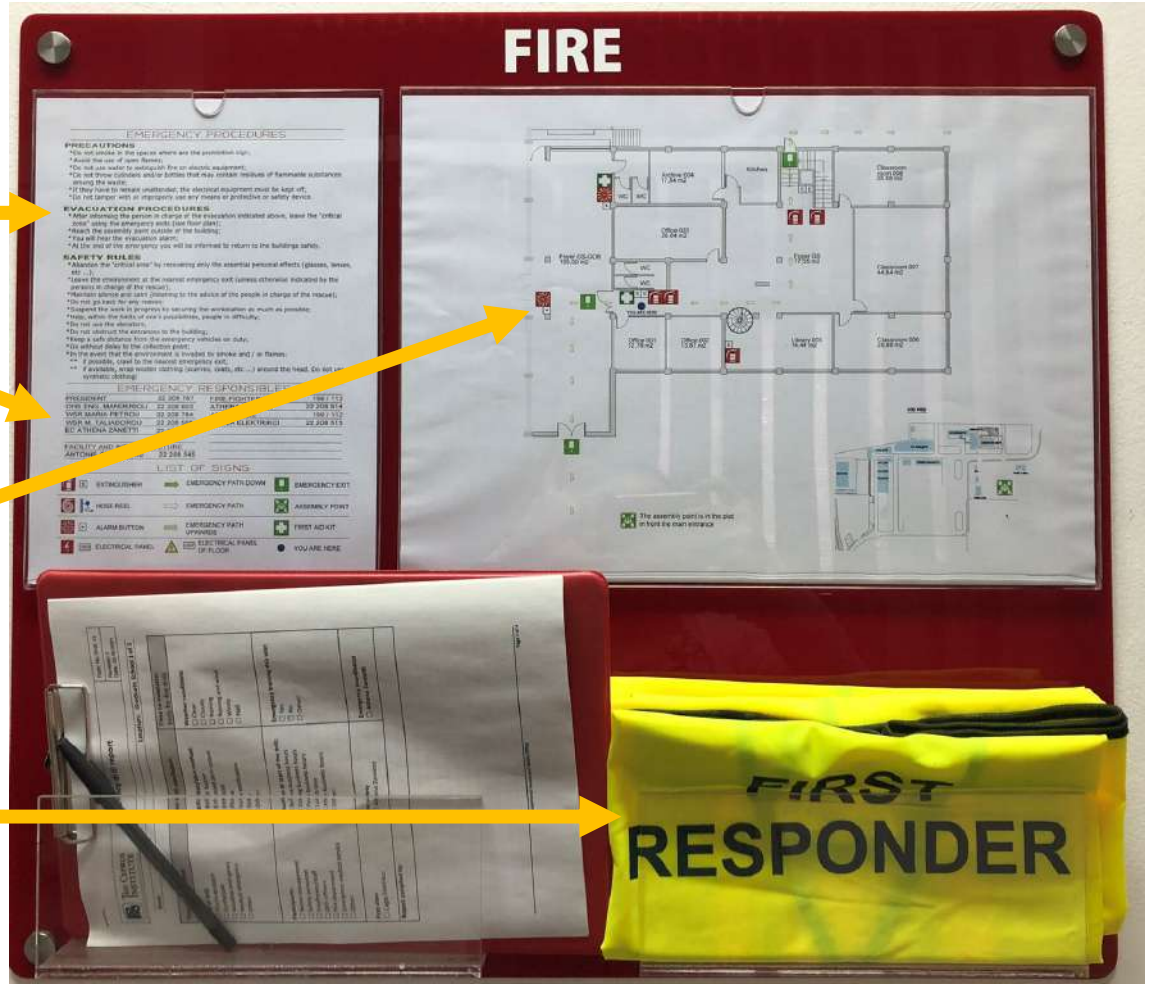
If you develop any of these symptoms PLEASE TAKE A RAPID TEST,
Inform immediately the Autumn School coordinator (Tuija Jokinen) and the OHS Officer.

If you will tested positive for COVID19 stay home and follow the instruction provided by the OHS officer:
Natascia Manderioli
n.manderioli@cyi.ac.cy
T: +35722 208 603

Emergency preparedness

The fire boards are displayed in each corridor, and they contain the following information:

- Emergency procedures
- Name of the first aiders of the floor and telephone number
- Location of fire extinguishers, first aid kits, emergency buttons and emergency exits
- In case of an emergency follow the directions of the first responders that will be wearing the reflective coat showed in the picture.



Contacts

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Virtual office
Physic office in GOB building, ground floor.

1

The Cyprus Institute

Short history

Overview & Mission

A **Research, Educational** and **Innovation** institution suited to a knowledge economy

A **European** institution for the Eastern Mediterranean based in Cyprus

A **Non-Governmental, Non-Profit** institution advancing peace and prosperity in the region using Science, Technology and Innovation.

Timeline

- **04** — CREF Established
- **05** — Cyl Established
- **07** — EEWRC Established
- **08** — STARC/CaSToRC Established
- **10** — PhD Programs
- **16** — Innovation Division Launched
- **18** — MSc Programs
- **20** — CARE-C Established
- **22** — Technology driven Innovation & Development (under development)

Commencement of Operations

PROFILE

THE CYPRUS INSTITUTE

CARE-C
CLIMATE AND ATMOSPHERE RESEARCH CENTER

Established in Jan. 2020
(4th Research Center of the Cyl)

103 staff
17 different nationalities
50% non Cypriot
1/3 Cypriots repatriated

9 Faculty
2 Prof. in the top 2% world scientists Geoscience

21 PhD students
9 different nationalities
8 Joint PhDs with EU univ.

3 Advanced Partners
(Finland, France, Germany)
(UHEL, CEA, MPIC)

1,500m²
Infrastructure

5 Research Labs
(22 tech. experts)

3 Spin-off companies

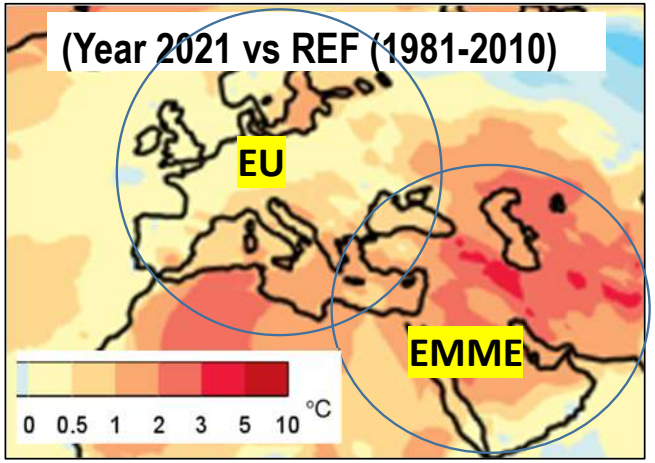
18 Ongoing Research Projects (1 ERC, 4 H2020, 1 HE, 2 ESA, 1 LIFE, …)

>2 M€ of revenues/year
(>500k from products/services)

>100 peer-review publications / year
(**40% in top 10 journals**)

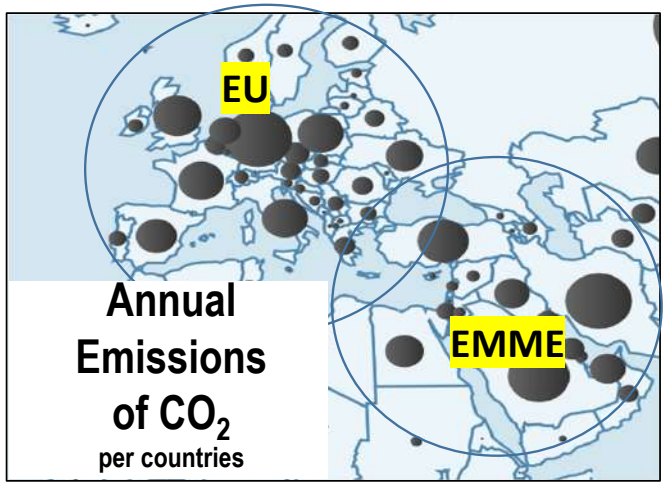
CHALLENGES (1/3)

Temperature Anomalies



https://public.wmo.int/en/media/press-release/state-of-climate-2021-extreme-events-and-major-impacts

Greenhouse Gases Emissions

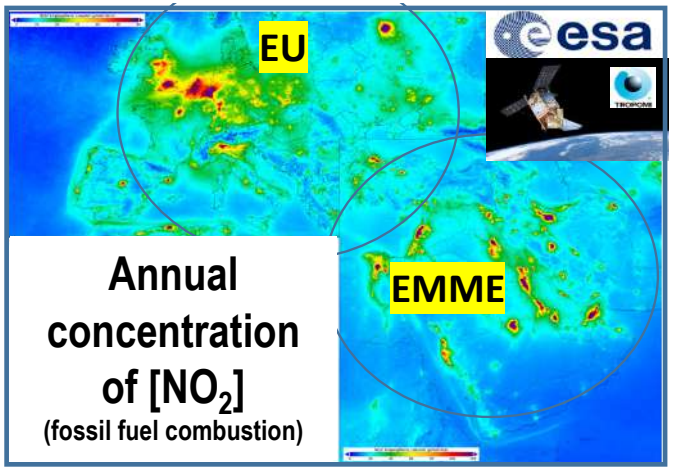


http://www.globalcarbonatlas.org/en/CO2-emissions

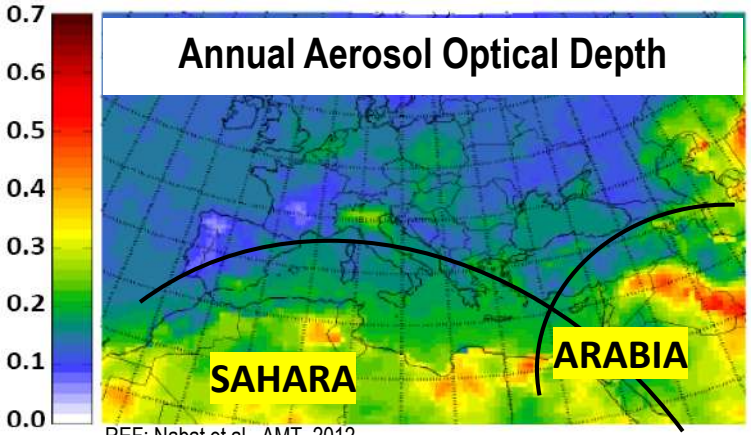
The **E**ast **M**ed. & **M**iddle **E**east (**EMME**) region is a

Hotspot
for
Climate Change
&
Air pollution

Human-made Air Pollution



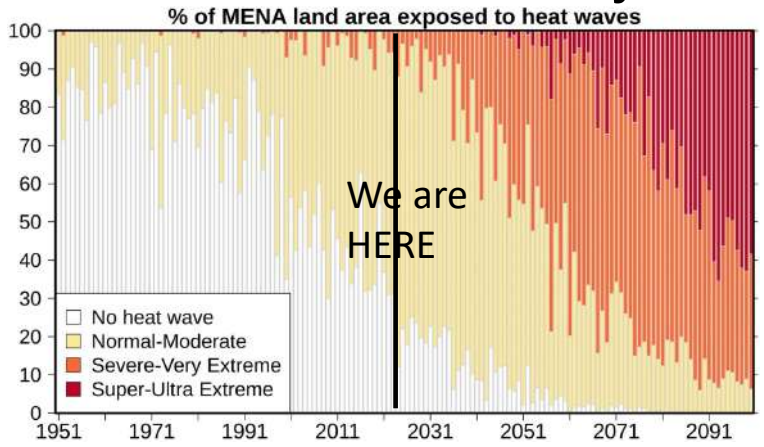
Desert Dust Air Pollution



REF: Nabat et al., AMT, 2012

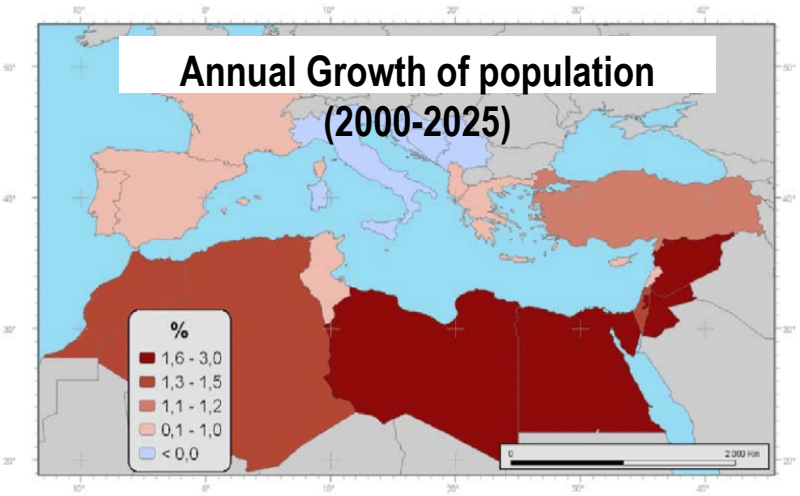
CHALLENGES (2/3)

Heat waves will intensify



Source: Zittis et al. (2021b)

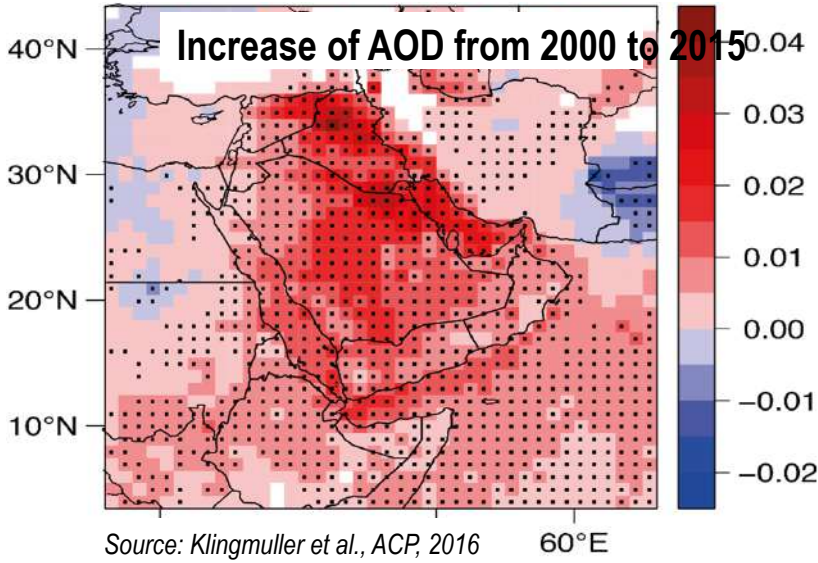
Population will grow rapidly



Source: UN, 2005

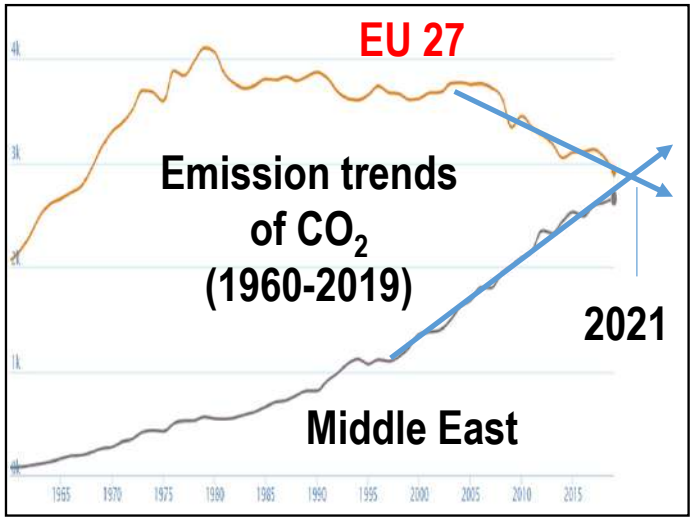
The current regional situation will get **worse**

Dust emissions will increase



Source: Klingmuller et al., ACP, 2016

GHG emissions will increase



http://www.globalcarbonatlas.org/en/CO2-emissions

CHALLENGES (3/3)

Health

With major regional **socio-economic impacts**

Water resources

Ecosystem Agriculture

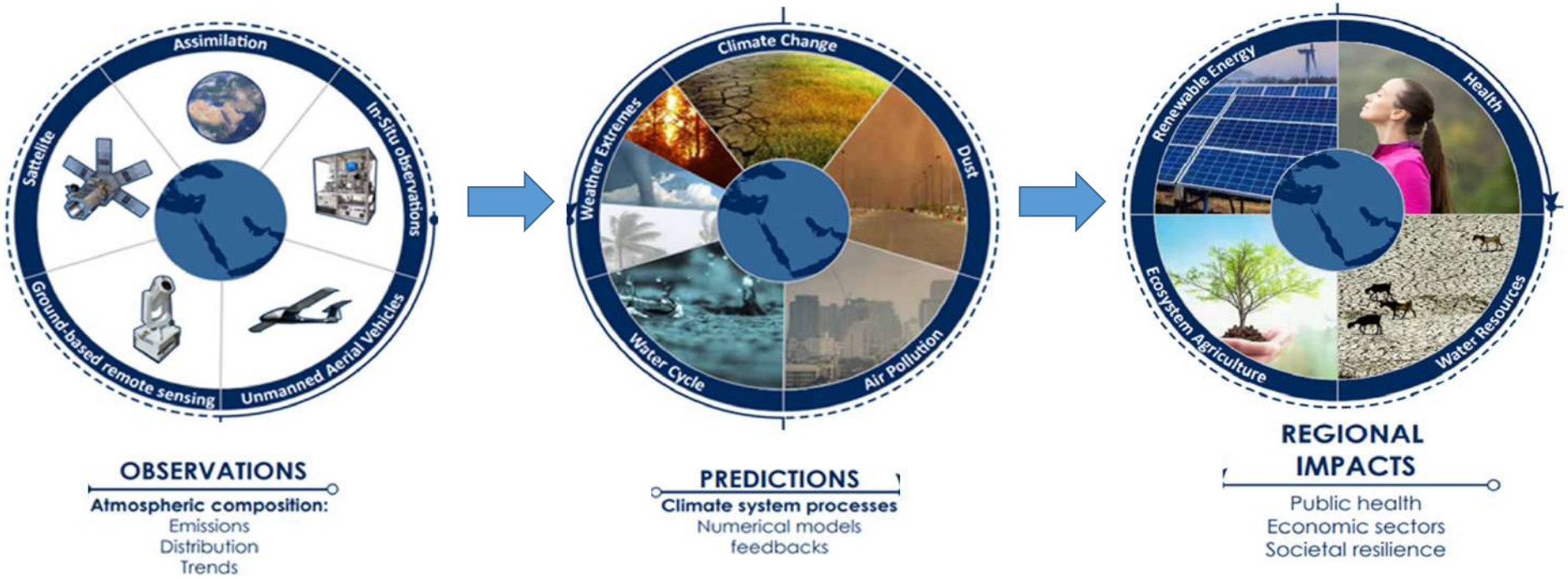
Renewable Energy

Possibly leading to massive “climate migrations” (in Europe) with regional socio-political instabilities and conflicts

CARE-C

CLIMATE AND ATMOSPHERE RESEARCH CENTER

4 Research Departments



Our aim is to fill the gaps in **OBSERVATIONS** …

To better **PREDICT** …

The **REGIONAL IMPACTS** to enhance resilience

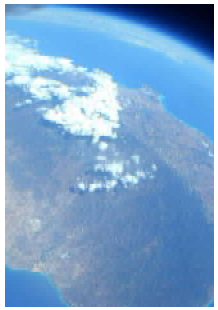
MAIN EXPERIMENTAL ACTIVITIES (1/2)

Long-term **atmospheric observations**

Contributing to international networks

Cyprus Atmospheric Observatory

ACTRIS Aerosols, Clouds and Trace gases Research Infrastructure
ESFRI
emep
NASA
AERONET AEROSOL ROBOTIC NETWORK
WORLD METEOROLOGICAL ORGANIZATION
GLOBAL ATMOSPHERE WATCH
TCCON total carbon column observing network



High Quality **Environmental Chemical Analyses**

Sunset Lab OC-EC

Thermo ICS 5000

Thermo IC-PAD

Agilent ICP-MS

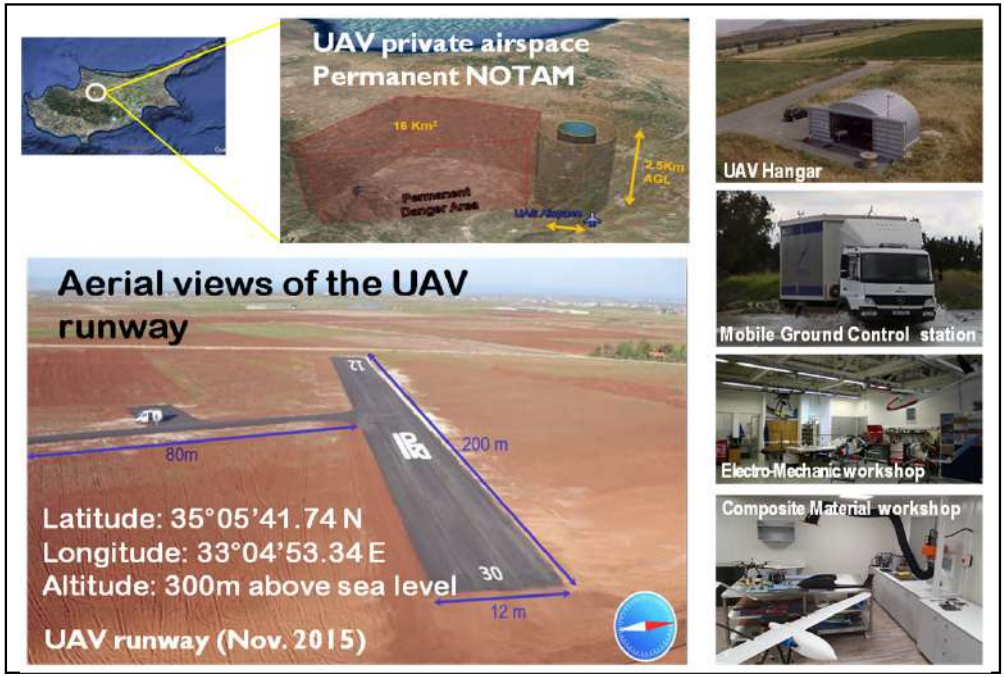
Agilent GC-MS

MAIN EXPERIMENTAL ACTIVITIES (2/2)

Development of **Unmanned Aerial Systems** (UAS)

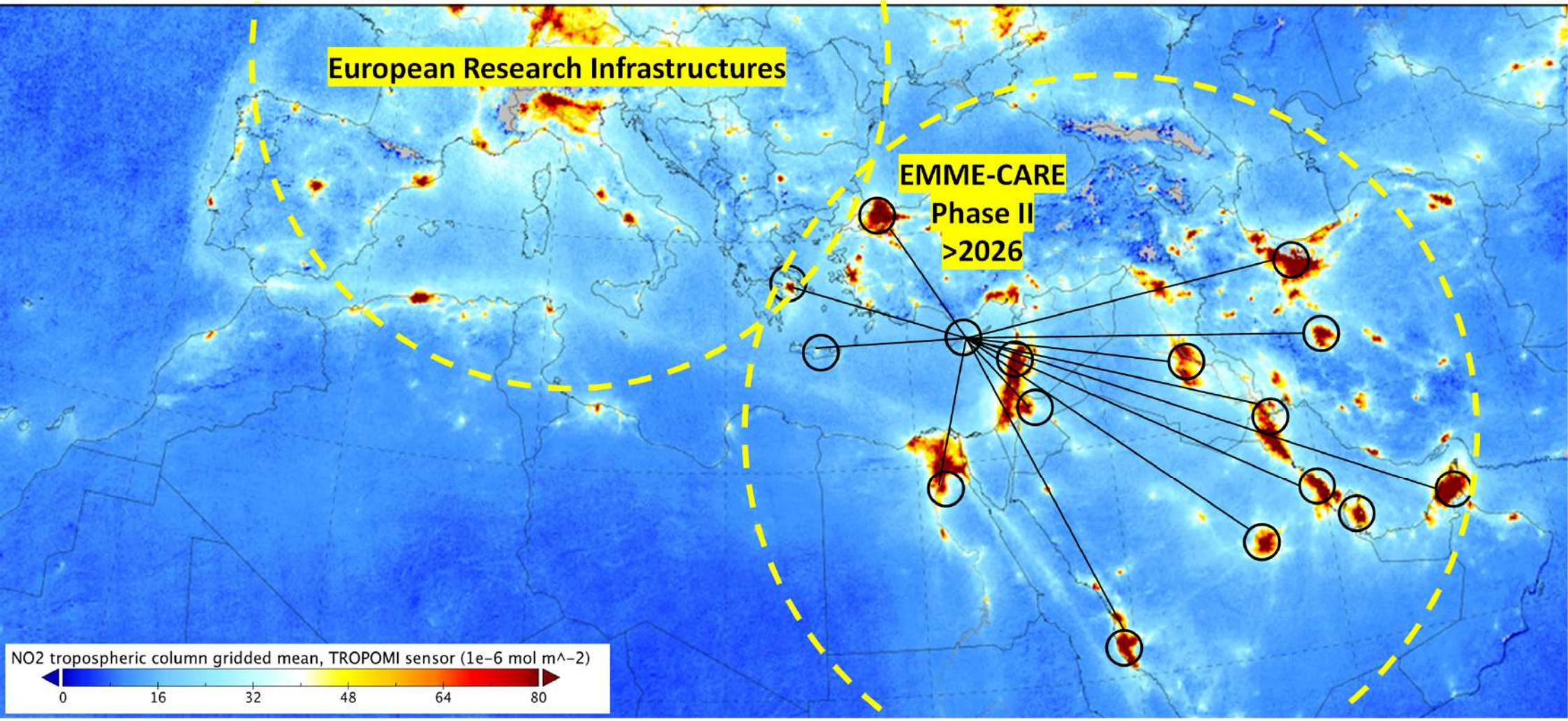
UNMANNED SYSTEMS RESEARCH LABORATORY

EASA European Aviation Safety Agency



FUTURE DEVELOPMENT PLANS

Enhancing regional observations and better connect them with EU R.I.



Aim of the autumn school

is to enable students to transition from being a student to becoming independent scientists.

1) Collaborative and integrated learning
2) students and teachers from different fields working together on scientific research questions
3) Working with complex environmental data sets
4) Project and time management
5) working in small groups with other students
6) deadlines for presenting your results
7) presenting also “half-ready” results and getting feedback on those

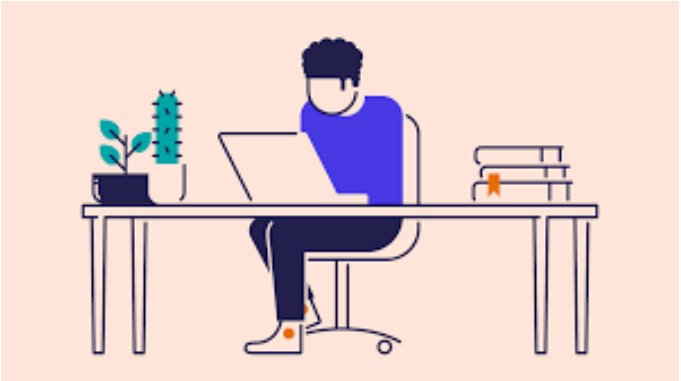
Passing the course

-Credits and workload: 5 ECTS, 125 h study load, 85 h during the intensive course and 40 h writing the course report

The assessment is based on the course report and returning of course feedback questionnaire.

- **Group report**

-main results from your group work in the form of scientific article
-intro, methods, results, figures, tables, discussion, references
-written after the two week intensive period
-Peer reviewed by teachers



- **Feedback**

-Filled after the course in Moodle.

Course theme

- Air pollution, aerosols, green house gases and their sources.

- Research questions:

  - What are the effects on ecosystem and atmospheric processes (e.g. VOC emissions from vegetation/ the next spring and summer; aerosol chemical composition; new particle formation occurrence)
  - How air pollution events can be predicted or prevented?
  - What is the effect of dust on NPF?

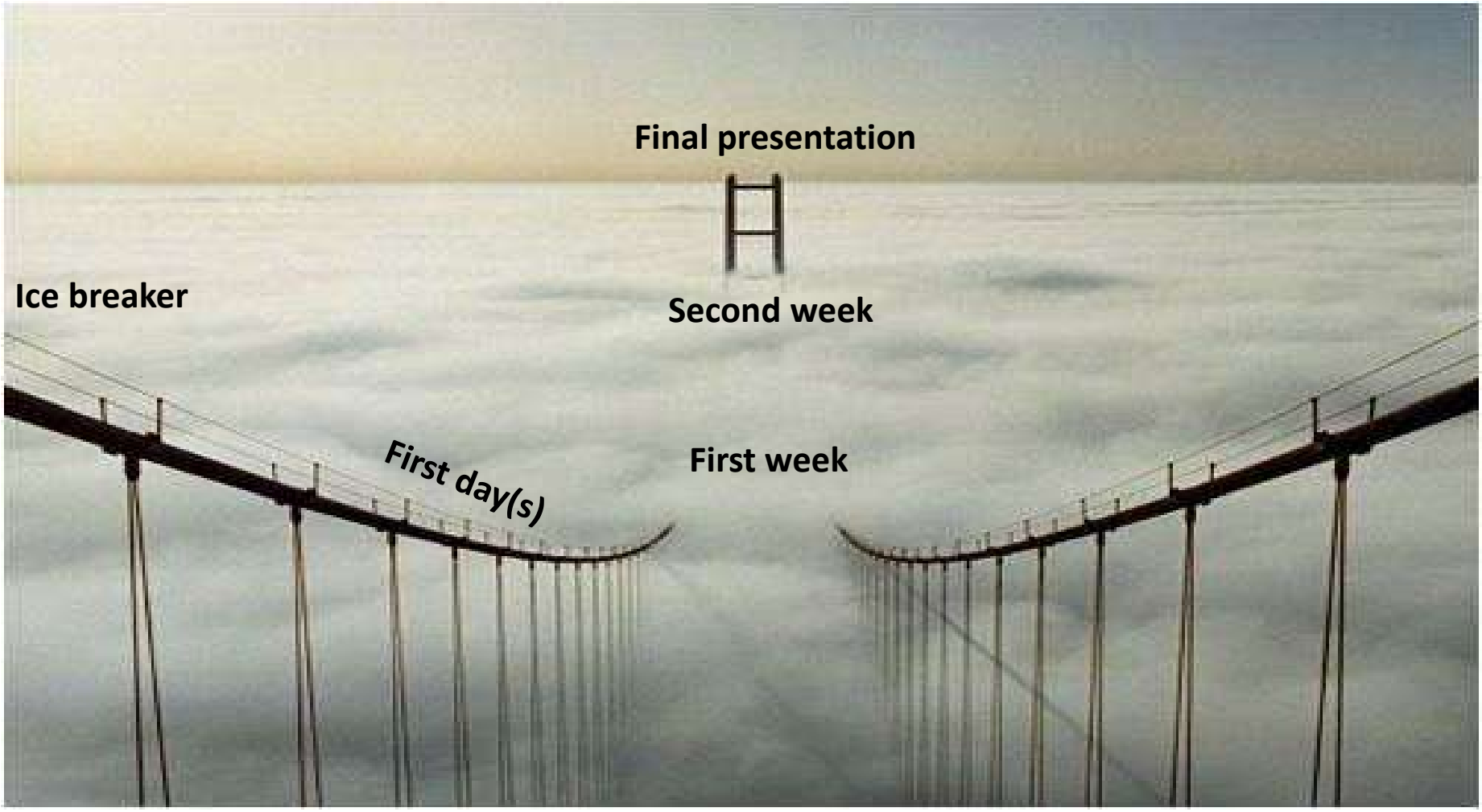
Where to start

- Course Moodle page:
- https://moodle.helsinki.fi/course/view.php?id=54762

Group division

- 3 groups
  1) Aerosol (small diameters)
  2) Aerosol (larger diameters)
  3) Trace gases

- First week: groups 1 & 3 will share at the NTL conference room and group 2 will be at Main Conference Room, GOB
- Second week:


Final presentation
Ice breaker
Second week
First day(s)
First week