Geophysical Research Abstracts
Vol. 20, EGU2018-18855, 2018
EGU General Assembly 2018

EMME-CARE: A new regional Centre of Excellence for Air Pollution and Climate Change in the Eastern Mediterranean and the Middle East

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With a population of about 400 million, the Eastern Mediterranean and Middle East (EMME) region is one of the most prominent climate change and air pollution "hot spots" worldwide. Adverse impacts from extreme weather events, droughts and poor air quality are expected to exacerbate in the coming decades and could even contribute to mass migration of people to more temperate and wealthier areas, such as Europe (Lelieveld et al., 2016).
To mitigate these impacts and better adapt, unprecedented efforts are currently underway to establish a new regional Centre of Excellence in Air Pollution & Climate Change in Cyprus (the only EU Member State located in the Middle East). This initiative is currently supported by the EMME-CARE project led by the Cyprus Institute and recently funded (in its first phase) by the EU Horizon 2020 Programme. EMME-CARE's general objective is to take regional leadership in advancing scientific understanding of the mechanisms underlying the EMME climate change and air pollution, through an integrated programme combining research, innovation, and education, in collaboration with three internationally leading research organizations in the domain: CEA, France; Max Planck Institute, Germany; University of Helsinki, Finland. This will involve laboratory studies, instrument development, continuous comprehensive atmospheric observations, field experiments and computer modelling of the regional climate and atmospheric environment. The programme focuses on greenhouse gases, the water cycle, extreme weather, atmospheric dust and air pollution, and it will address their various impacts (health, energy, agriculture, to name a few) regionally.
One of the most promising developments in EMME-CARE is the establishment of atmospheric research infrastructure with an EMME view: the Cyprus Atmospheric Observatory (CAO). Representative of the regional atmosphere, CAO is providing, for the first time in this part of the world, high quality long-term observations of key climate forcers, using a wide range of in-situ and remote sensing scientific instrumentation. The Unmanned Systems Research Laboratory (USRL) is another highly competitive research infrastructure of EMME-CARE. This facility encompasses a private runway/airspace granted permanently by the civil aviation authorities and exclusively dedicated to a fleet of research Unmanned Aerial Vehicles (UAVs). Supported by an instrumentation laboratory specialized in lightweight miniaturized sensors, USRL is the first facility of its kind worldwide dedicated to analyze on a continuous (weekly) basis the vertical distribution of air pollutants in the lower 10 km of the atmosphere, thus filling the gap between ground-based and satellite observations. To challenge the difficulties inherent to the physical (human) access of the EMME atmospheric environment by international research teams, recent efforts have been placed to provide transnational access of the EMME-CARE flagship facilities (CAO and USRL) in the framework of several European Research Infrastructures.
This presentation will provide a short and comprehensive overview of the EMME-CARE project, with emphasis on its flagship atmospheric research infrastructures and on opportunities arising from their transnational access.

Reference: Lelieveld, J., et al. : Strongly increasing heat extremes in the Middle East and North Africa (MENA) in the 21st century. Climatic Change, doi:10.1007/s10584-016-1665-6, 2016