Archontoula Karageorgopoulou, PhD researcher, NKUA

Archontoula Karageorgopoulou graduated in 2020 from the Physics' department of the National and Kapodistrian University of Athens, having chosen the field of Environmental Physics-Meteorology. In July 2022 she received a Master's degree in "Applied Physics", specializing in Environmental Physics at the National and Kapodistrian University of Athens. She specializes in air quality studies since both her bachelor's and diploma's thesis focused on atmospheric issues. Her bachelor's thesis focused on studying the emissions of various pollutants, particles, and greenhouse gases in the atmosphere from different source categories in Greece. Her master's thesis investigated the characterization of aerosols using AERONET data. Mrs. Karageorgopoulou started her Ph.D studies, under the supervision of Dr. Giannakaki in December 2022. She participated in the research program entitled «Atmospheric pollen characterization using active remote sensors» (Acronym: APOC). During this period, she is involved in the research program «Space derived aerosol-dependent Cloud Properties» (Acronym: SCOPE). She investigates the retrieval of Cloud Condensation Nuclei and Ice Nucleation Particles for different aerosol types based on ground and space-based lidar sensors. She participated as the primary contributing author in the preparation and submission of three conference posters and as a co-author in two others. Furthermore, she has authored a peer-reviewed scientific paper titled: "CALIPSO Overpasses During Three Atmospheric Pollen Events Detected by Hirst-Type Volumetric Samplers in Two Urban Cities in Greece", published in Atmosphere (https://www.mdpi.com/2073-4433/16/3/317).

Cloud Condensation Nuclei (CCN) and Ice Nucleating Particles (INP) conversion factors based on Thessaloniki AERONET station

Several studies] have shown the potential of polarization lidar to provide vertical profiles of aerosol parameters from which cloud condensation nuclei (CCN) and ice-nucleating particles (INP) number concentrations can be retrieved. The results are based on reliable of conversion factors between aerosol optical thickness and column-integrated particle size distribution based on Aerosol Robotic Network (AERONET) photometer observations. A crucial point regarding the efficacy of aerosol particles to act as CCN or INP depends on aerosol type.

AERONET Inversion Data (Level 1.5) were analyzed over the period 2006-2021. The Ångström exponent was used to separate the particles into pollution and dust dominated cases. To obtain a better classification of aerosols we also utilize aerosol typing from CALIPSO. Only cases which are classified as either purely dust or polluted continental aerosols within 100km from Thessaloniki are selected. The conversion factors between optical and microphysical properties were found for dust and polluted continental particles.

Iliana Koutsoupi, PhD researcher, NKUA

Iliana Koutsoupi graduated from the Physics Department of the University of Patras in 2021. During the Bachelor studies, she studied the fluid mechanics of the tropical cyclones. She received her M.Sc. degree in the field of “Atmospheric Physics and Meteorology” from the Physics Department of the National and Kapodistrian University of Athens in 2023. Her Master thesis focused on the relationship of atmospheric blocking and heatwaves over Europe and the Mediterranean region. She is a PhD Candidate since May 2023. Her main scientific interests are the rain and clouds microphysical properties and formation mechanisms over the Mediterranean region using satellite radars’ data, while she has also studied the atmospheric dynamics applied in Tropical-Like Cyclones and Omega blocks.

Analysis of Cloud Types and their Geometrical Properties over the Mediterranean using CloudSat Observations

Earth's climate system and weather are affected by clouds, as they regulate the global radiative budget, depending on their altitude, structure and composition. Therefore, accurate cloud information is crucial, particularly above the Mediterranean, which is considered as a climate hotspot. In this work we utilize space-based radar products from the CloudSat mission to provide statistics on the properties of the clouds observed above the Mediterranean during the period 2007 – 2017. CloudSat’s payload, the Cloud Profiling Radar (CPR), is the first spaceborne 94-GHz (W-band) radar producing vertical cloud profiles over the globe. Three domains are selected in the Mediterranean to study the geometrical properties and the cloud types by month and altitude. Our results reveal that low-level clouds are dominant above the Mediterranean region especially during winter and spring periods, mainly appearing at altitude up to 4 km, while high clouds prevail throughout the year at altitudes above 9 km, except in July and August above the East Mediterranean, where they are nearly absent. In the East Mediterranean, a higher frequency of low-level clouds is observed during the summer period. The majority of the deep convective clouds are observed above the West and Central Mediterranean, indicating the influence of the Atlantic systems and the mid-latitude cyclones on the Mediterranean weather conditions. Additionally, a cloud climatology is constructed in order to examine trends in each cloud type. These results will be compared with retrievals from climate models to evaluate or refine their cloud predictions. Future research includes also the comparison of the observed clouds with modeled cloud datasets and the simulation of the interaction between aerosols and liquid-phase clouds in the Mediterranean.

Aris Georgoulis, Post Doc. Researcher, NKUA

Aristeidis K. Georgoulias (AKG) is a Physicist with a Master's degree in Environmental Physics (Aristotle University of Thessaloniki - AUTH). In 2011, he obtained his PhD from the Department of Environmental Engineering, Democritus University of Thrace (DUTH). After his PhD, AKG received a two-years postdoctoral fellowship to lead his own scientific project (QUADIEEMS) at the Department of Meteorology and Climatology of AUTH and the Multiphase Chemistry Department of the Max Planck Institute for Chemistry (MPIC) in Mainz, Germany. During the last decade AKG worked for various institutions (universities, institutes and companies) in Greece, Cyprus and the Netherlands in the field of atmospheric physics, satellite remote sensing, atmospheric pollution and climate change. His research focuses on the investigation of aerosols, clouds, trace gases, radiation and their interrelations, atmospheric pollution, its trends and its effect on human health as seen from satellites as well as on the analysis and interpretation of regional and global climate simulations. So far, AKG has participated in 18 research projects being author (15 papers) or co-author (33 papers) of 48 scientific articles in peer reviewed scientific journals (References: 1576 and h-index: 22 according to Scopus, 02/04/2025), 3 book chapters, and more than 100 papers/abstracts presented at national and international conferences and has served as a reviewer for the Dutch Research Council (NWO) and for around 30 scientific journals. He is also a contributing author of the IPCC Working Group I (WGI) Sixth Assessment Report (Chapter 6).

Cloud Condensation Nuclei (CCN) and Ice Nucleating Particles (INP) profiles based on CALIPSO lidar

The potential of using spaceborne lidar measurements to provide vertical profiles of cloud condensation nuclei (CCN) and ice-nucleating particles (INP) has been shown in several recent studies. So far, our project has focused mostly on the development of algorithms to retrieve CCN from CALIPSO (Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations) and validate our results against aircraft and ground in-situ measurements. To do so we have used the latest version of CALIPSO measurements and new conversion factors produced within the framework of the project. Results from our retrievals during the ACEMED campaign which took place in September 2011over the greater Thessaloniki area are shown and compared against simultaneous aircraft measurements. We also present preliminary results from our retrievals during the ORACLES campaign which took place for three consecutive years (2016, 2017 and 2018) for one month each time over the SE Atlantic.