Monitoring the composition of Aerosol and their Radiative Efficiency.

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Aerosols rank as the second most significant contributor to climate change after CO_2. The absorbing fraction of these aerosols plays a critical role in the climate dynamic, mainly inducing atmospheric warming and surface cooling. This atmospheric warming, combined with greenhouse gases, exacerbates urban heat islands, intensifies heat waves, triggers forest fires, etc. While most climate policies focus on reducing CO_2, few consider aerosols. However, aerosols cause severe risks to human health and exert significant climatic effects. To mtigate atmospheric warming caused by aerosols, one solution involves altering the composition of emitted aerosols by reducing their absorbing capacity.

Using data from the AERONET network data [1] and reprocessed with GRASP-Component [2,3], we derived a complete set of aerosol properties and a linkage between optical and microphysical characteristics to proxies of aerosol chemical composition. Therefore, we derived the Aerosol Daily Radiative Efficiency (ADRE), which is related to the intrinsic nature of the aerosol, i.e., its chemical composition, and define its capability to warm or cool the atmosphere.

Thus, we focused on the yearly trend of ADREs within the atmosphere (ATM) and at the bottom of the atmosphere (BOA). For ADRE_ATM and ADRE_BOA, we found a small decrease of about 0.5-1.0%/year and about 0-0.5%/year respectively, meaning no significant changes. Trends have been linked as well to the chemical proxies provided by GRASP-Component.

In this talk, we will present all results and our objectives of using of 3MI and assessing trends with the Socio-Economic indicators and Climatic Geo-Hazards.

References

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