

CARO NF: A Key Component in Holistic Atmospheric Observation and Complex event Analysis

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Abstract (*up to 300 words*)

The Cyprus Atmospheric Remote Sensing Observatory (CARO) National Facility (NF), part of the ERATOSTHENES Centre of Excellence, plays a key role in atmospheric monitoring and satellite validation efforts in the Eastern Mediterranean. Located in Limassol near the coastline, CARO NF benefits from its unique position to observe atmospheric conditions influenced by both continental and marine sources, including complex dust transport, pollution events, and cloud systems.

The observatory is integrated into the European ACTRIS framework and is a significant ground-based component of ESA-JAXA EarthCARE satellite validation. CARO NF enables synergistic observations that are essential for validating satellite retrievals and improving the understanding of aerosol-cloud interactions in a climatically sensitive region. By integrating aerosol and cloud measurements with wind and radiometric profiling, CARO NF provide a holistic approach to atmospheric monitoring, especially in challenging scenes involving high aerosol loading or mixed-phase clouds. Complex atmospheric schemes observed in Limassol will be analyzed and presented in this study.

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