



**OPTICAL AND MICROPHYSICAL  
CHARACTERISTICS OF AEROSOLS OVER EGYPT  
FROM NASA'S SATELLITES (2003-2014).**

By

**Nashaat Gad Abdalla Gad**

A Thesis Submitted to the  
Faculty of Engineering at Cairo University  
In Partial Fulfillment of the  
Requirements for the Degree of  
**MASTER OF SCIENCE**  
In  
**Aerospace Engineering**

FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
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**Title of Thesis:** Optical and Microphysical Characteristics of Aerosols over Egypt from NASA'S Satellites (2003-2014)

**Key Words:** Remote Sensing – Aerosols – Aerosols types – Aerosol spatial distribution – Aerosol seasonal pattern

### **Summary:**

The main objective of this thesis is to develop the knowledge of usages of remote sensing data for monitoring aerosols (pollutants) over Egypt. This has been achieved by addressing the following items:

- Acquiring daily-average aerosol data from two space-borne sensors: NASA's MODIS and MISR as well as the ground-based AERONET station in Cairo over 12-year period (2003-2014).
- Inter-comparison of derived aerosol optical parameters from the three data sources, MODIS, MISR and AERONET station in Cairo, for the purpose validating MODIS and MISR Aerosol products, considering AERONET data as being truth data
- determining aerosols optical and microphysical characteristics from three data sets.
- Identify spatial and seasonal patterns of aerosols optical parameters over five selected cities: Alexandria, Cairo, Asyut, Hurghada and Aswan as well as two regions: Western Desert and Nile Delta then the entire country.
- Using the available optical properties as proxy indicator of aerosol types. Approximate aerosol type maps are generated
- Identifying days of severe events (high aerosol loading) during the study period (2003-2014) and identify the aerosols type(s) that characterize these events.





## Acknowledgments

First and foremost, I would like to express my deepest appreciation to my mentor, Prof. Dr. Mohammed Shokr, for offering me the opportunity to fulfil my dream of continuing on research work and obtaining my master degree. His tremendous knowledge of the subject has always inspired me to achieve higher goals, and many of my achievements would not have been possible without his support. During the period of my thesis writing, he proposed a lot of scientific opinions on the layout of the thesis and spent a lot of time on the laborious task of polishing up the work. In other words, without his effective push and effort, there would never have been this final thesis.

I would also like to sincerely acknowledge Prof. Dr. Mohamed Bahai ElDeen Argoun who supervised my work during these four years. I am grateful that he gave me the opportunity to conduct this Master. I have surely learned a lot from his experience. Thank you for guiding me carefully through all steps. Thanks for your patience when you were reading and correcting this manuscript.

There are several other persons to whom I am grateful to, as they have made important contributions to the work presented in this thesis. I am very much indebted to Muhammed Samir El-Tahan for his technical assistance and for his tremendous help. I am also grateful to Dr. Alaa Ibrahim for leading me to the scientific research work on aerosols and offering me the opportunity to work with him in research project.

I am very grateful to all members of the master degree examining board for accepting and fulfilling this role.

Last but not least, I would like to thank my family for their understanding and support during my four years of study. I am grateful to my wife, Mariam Adel, for her patience and support to accomplish my target of carrying on research work and obtaining my master degree.

Nashaat Gad,



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