Acknowledgements

One can not achieve any thing without support of his own loved ones and well-wishers. In completing my thesis there are many people whom I would like to acknowledge with my sincere thanks.

First and foremost, I would like to express my deep sense of gratitudes to my Ph. D. supervisor Dr. Sujit Basu for guiding me through out this work. Without his constant support and guidance this work would not have been possible. He has always been a driving force for me to complete this thesis in due time and helping me out in writing this work. Despite his other commitments he checked my whole thesis and provided the invaluable suggestions and modifications.

Further, I would also like to express my sincere thank to Dr. B. S. Gohil for developing my interest in the field of the retrieval techniques. He introduced me to the field of retrieval of geo-physical parameters from the satellite based observations. It is because of him that I could learn the FORTRAN programming without which the implementation of the retrieval algorithms is not possible. He has always been very supportive to me whenever I felt any difficulty in understanding the basics of microwave remote sensing, FORTRAN programming etc. I also would like to acknowledge the support and guidance from Dr. A. K. Mathur in completing my research work.

I am very thankful to Dr. C. M. Kishtawal, Group Director, Atmospheric and Oceanic Sciences Group (AOSG) for his encouragement to carry out this dissertation. I owe my sincere thanks to Dr. R. M. Gairola, Head, Geo-physical parameter Retrievals Division (GRD), AOSG for his appreciation towards my thesis.
Further, I would also like to thank Director, Space Applications Centre (SAC), Dr. P. K. Pal, Deputy Director, Earth, Ocean, Atmosphere, Planetary Sciences and Applications Area (EPSA) for permitting me to utilize the resources at the Centre to the maximum extent throughout the course of my research work. I also appreciate the support and assistance of Mrs. Pushpalata Shah, Head, Database and Web Development Division (DWD) and her team in obtaining relevant data.

I express my sincere thanks to Prof. M. N. Patel, Vice Chancellor, Gujararat University, Prof. S. R. Dave, Director, University School of Sciences, Prof. P. N. Gajjar, Head, Department of Physics, Electronics & Space Sciences, Gujarat University, and staffs of Ph. D. section for their kind support.

I would also like to convey my thanks to my colleague Dr. Munn Vinayak Shukla who helped me out in checking and correcting my whole thesis.

Finally, I would like to express my gratitudes to each and every one of my AOSG colleagues and friends who have always been very kind and supportive to me in successfully carrying out the present work.

At last, I would like to say thank to the God almighty for His blessings in the form of my lovely and affectionate family. I would always cherish the love and affection showered upon me by my beloved parents. Their blessings have always been an inspiration to me to complete my thesis. My brothers Ravi and Rahul and my beloved sister Vineeta have always supported me throughout this work for which I have no words to thank.
Acknowledgements: Data & Software Support

Several datasets, data visualization tools were used exhaustively in carrying out this thesis work:

- NCEP GDAS Profiles data were obtained from [http://nomad1.ncep.noaa.gov/cgi-bin/ftp2u_gdas.sh](http://nomad1.ncep.noaa.gov/cgi-bin/ftp2u_gdas.sh).
- ECMWF profiles data were obtained through a MOU between ISRO and ECMWF.
- AMSU-A and MHS data from EUMETSAT ([http://www.eoportal.eumetsat.int](http://www.eoportal.eumetsat.int))
- SAPHIR data from MOSDAC ([http://www.mosdac.gov.in](http://www.mosdac.gov.in))
- Radio-sonde Profiles from RDA ([http://dss.ucar.edu](http://dss.ucar.edu))
- Gridded Analysis and Display System (GrADS), developed at Center for Ocean-Land-Atmosphere Studies, Calverton, MD, U.S.A were used for generating the figures.
- LaTeX editor and LaTeX compiler from MiKTeX project ([http://miktex.org](http://miktex.org)) were used for writing this thesis.