

**AN ANALYSIS OF SHORT TERM VARIABILITY SUNSPOT
(JANUARY-SEPTEMBER 2010) AND CORRELATION BETWEEN
SUNSPOT AREA**

FATIMATUN NUR BINTI ZAINAL ULUM

**Final Year Project Report Submission in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Physics
in the Faculty of Applied Sciences University Teknologi MARA**

NOVEMBER 2010

ACKNOWLEDGEMENT

First and foremost, I would like to express my deepest gratefulness to ALLAH S.W.T for giving me good health, strength and faith upon my completion of this study. I would also like to express thanks to my supervisor for this project, Miss Zety Sharizat Binti Hamidi for all the helpful guidance and advices she gave me right from the start. Her motivation and willingness to keep encouraging and entertaining me contributed enormously right to the end of this project. And to my co-supervisor Dr. Zamri Bin Zainal Abidin, thanks for always supports me on my research proposal.

Besides, I would also like to thank the authority of both of Mara University of Technology (UiTM) and University Malaya (UM) for their willingness in providing me with a good environment and facilities for completion this project.

And finally, for my families and friends, the honorable appreciation goes for them as for their understandings and undying supports on me in completing this project. Without the help of those that I mentioned above, certainly I would be facing difficulties while conducting this project. Thank you very much.

Fatimatun Nur Binti Zainal Ulum

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1 INTRODUCTION	1
1.1 Background of study	1
1.2 Problem statements	7
1.3 Objectives of study	7
1.4 Scope and limitation of study	7
1.5 Significant of study	8
CHAPTER 2 LITERATURE REVIEW	9
2.1 On the Relation between Sunspot Area and Sunspot Number	9
2.2 Synchronization of Sunspot Numbers and Sunspot Areas	11
2.3 Sunspot Unit Area: A New Parameter to Describe Long-Term Solar Variability	14
CHAPTER 3 METHODOLOGY	17
3.1 Data Analysis	17
3.2 Object that being tested	17
3.3 Method	17
CHAPTER 4 RESULTS AND DISCUSSIONS	20
CHAPTER 5 CONCLUSION AND SUGGESTION	42
CITED REFERENCES	44
APPENDICES	46
APPENDIX A	47
APPENDIX B	50
APPENDIX C	53
APPENDIX D	55
APPENDIX E	57
CURRICULUM VITAE	59

ABSTRACT

AN ANALYSIS OF SHORT TERM VARIABILITY SUNSPOT (JANUARY-SEPTEMBER 2010) AND CORRELATION BETWEEN SUNSPOT AREA

The Sun is one of the salient features in our galaxy which emit energies in term of light and radiations. For the explanations, the energies created within the Sun are somehow yet to be determined in more detail and precise explanation. The Sun is full of many mysterious phenomena that need to be revealed. One of the phenomena that are studied in this project is sunspots. There are some association between sunspots and other hazardous effects it may have on earth as for example solar flares and Coronal Mass Ejection (CMEs). Also, sunspots were said to have some effects on earth climate upon the creation of solar flares and CMEs. The methodology in this project is using the radio telescope and helio v3.2 software to take the data of sunspot number and sunspot area from January 2010 until September 2010. The Sun was found to be most active and least active according to the sunspot number and the sunspot area. At the end of this project, the highest total number of sunspot was recorded in August which is 875 while the lowest total number of sunspot was recorded in April which is 336. In this project, the correlations between sunspot number and sunspot area have been observed and they not precisely linear correlated. Furthermore, based on sunspot number and sunspot area we can conclude that the Sun now is in a minimum 23rd cycle since the sunspot numbers and sunspot area nowadays are low.

ABSTRAK

ANALISIS TERHADAP PERUBAHAN TOMPOK MATAHARI DALAM JANGKA MASA PENDEK (JANUARI HINGGA SEPTEMBER) DAN HUBUNGKAIT TERHADAP LUAS TOMPOK MATAHARI

Matahari merupakan salah satu bintang yang menonjol di galaksi kita yang menghasilkan dan memancarkan tenaga dalam bentuk cahaya dan radiasi. Secara lazimnya, tenaga yang terhasil dan yang dihasilkan oleh matahari boleh ditentukan melalui kajian yang lebih mendalam secara terperinci. Banyak fenomena misteri yang perlu diungkap daripada matahari. Salah satu fenomena yang dikaji dalam projek ini adalah tompok matahari. Tompok matahari dikatakan mampu menghasilkan suar matahari dan Coronal Mass Ejection (CMEs) yang memberikan kesan dan impak negatif kepada bumi dan iklim bumi. Dalam projek ini metodologi yang digunakan adalah dengan menggunakan radio teleskop dan perisian Helio v3.2 ketika mengambil data mengenai bilangan tompok matahari dan luas tompok matahari dari bulan Januari 2010 sehingga September 2010. Berdasarkan kepada bilangan tompok matahari dan luas tompok matahari pada setiap hari dan setiap bulan kita boleh menilai sama ada matahari itu aktif atau tidak pada hari atau bulan tersebut. Hasil daripada projek ini, bilangan tompok matahari yang paling tinggi dicatat pada bulan Ogos iaitu sebanyak 875 tompok matahari manakala bilangan tompok matahari yang paling rendah dicatat pada bulan April iaitu hanya sebanyak 336 tompok matahari. Di dalam projek ini, hubungkait antara bilangan tompok matahari dan luas tompok matahari juga telah dikaji dan didapati kedua-duanya sebenarnya tidak selari. Selain daripada itu, berdasarkan daripada bilangan tompok matahari dan luas tompok matahari kita dapat membuat kesimpulan bahawa matahari sekarang berada dalam kitaran 23 minimum kerana bilangan tompok matahari dan luas tompok matahari adalah rendah.