Enterprising in space science as a national from a developing country

Having a career degree in a space science for a national of a developing country

My experience as a national from a developing country to get a degree in a carrier in space science.

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INTRODUCTION

Space science is a multidisciplinary major recently has become a matter of interest for so many people including some people coming from developing countries. Definitely, those of the developing countries have realized that space science is of great importance, because of the emergence of a new research field which is space weather. Space weather has impact on most of modern technologies in so many sectors including: communication, electric power and oil pipeline. All these sectors remain vital in both developing and developed nations. Therefore, an intense awareness of the impact of space weather has become necessary worldwide, in particular for nationals from developing countries. However, in developed countries governments adopt plans of full programs on space science, but on the other hand in developing countries there is a lack of awareness from governmental entities about space science programs and their importance. Instead, space science in some developing countries is still "A single story that has been told", and for the anatomy of these words, the author advice to read carefully narration in the introduction of (Timiebi, 2016). Actually, the author, personally, had experienced that danger of the "Single story" for when he returned back home after finishing a study in abroad towards earning a degree in space science, the author had a short dialog with the admin principal of the university where he works. The admin principal was concentrating in to know what the author had studied in abroad and after an explanation by the author to the principle about what studied in abroad, the principal just murmured with the statement: "We expect those of you who had a chance to study in abroad to specialize in a major of more benefits to our nation". No matter the degree of awareness of the principle about what is space science and its importance to us in our developing countries, but his statement exactly is just because he had been told a "single story" about space science. Here, the author makes this point just similar to the argument of (Timiebi,

2016) in the introduction part as she was trying to explain that the answer to the question of: who can engage in space exploration, is just “A single storey has been told”.

In this book the author will share his own experience when he was striving hard to get a degree in a space science as a national from a developing country. And he will reflect how some of us in our developing nations have just an enterprising experience with a space science.

CHAPTER ONE

1.1. HOW SPACE SCIENCE HAS BECOME MY MAJOR

I will present in the following, how did I have involved in space science to become my career, me as an academician working at a University in my home country, Sudan. And the success key to me to get to such a career was the installation of a geomagnetic observatory belong to the MAGnetic Data Acquisition System (MAGDAS) project of Kyushu University in the campus of the University where I used to work in, and at that time the principle investigator (PI) of which is the late emeritus professor: Professor Kiyohumi Yumoto.

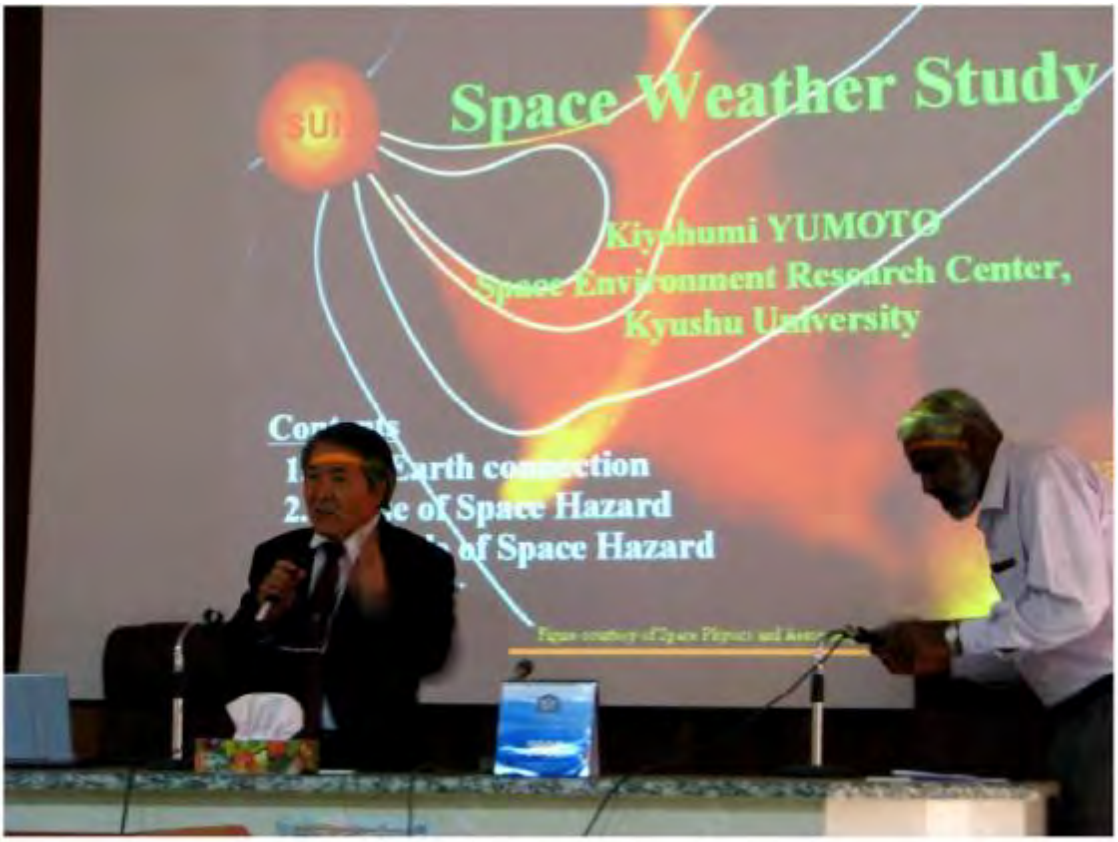
The beginning was dated back to around: August, 2008, when I was in an early stage in my career as lecturer working in the university where I was graduated at, i.e. the Sudan University of Science and Technology (**SUST**) in the College of Science, Physics Department. It was a time when we were attending a departmental board meeting we were all attending, when the head of the department at that time has read a letter was sent to him from the Secretary of the Deanship of Scientific Research in the University, the letter addressed him requesting him to appoint candidate who should be responsible of any research aspects of collecting data from a geomagnetic observatory that will be installed in the Southern Wing Campus of SUST, the Engineering Campus, and that observatory was said to belong to Kyushu University of Japan. The head of the department was focusing on addressing those of us who are in same early stage of career like me in that departmental board meeting, requesting us to agree of the responsibility accordingly to the request from the Secretary of the Deanship of Scientific Research. All those who attended that meeting seemed to pay no great attention but me, for I was immediately raised my hand up as a sign of acceptance to be responsible of all research aspects related to data

collected from such an observatory. Actually, I was much exited since I was dreamed to study in depth magnetisms and also my great desire was to get a career in space science. So for me to get involve and be responsible of research aspects related to collecting data from the magnetometer observatory was like a golden opportunity to make my dreams come true. And I took my final decision to get a career in a space science, what so ever to happen next.

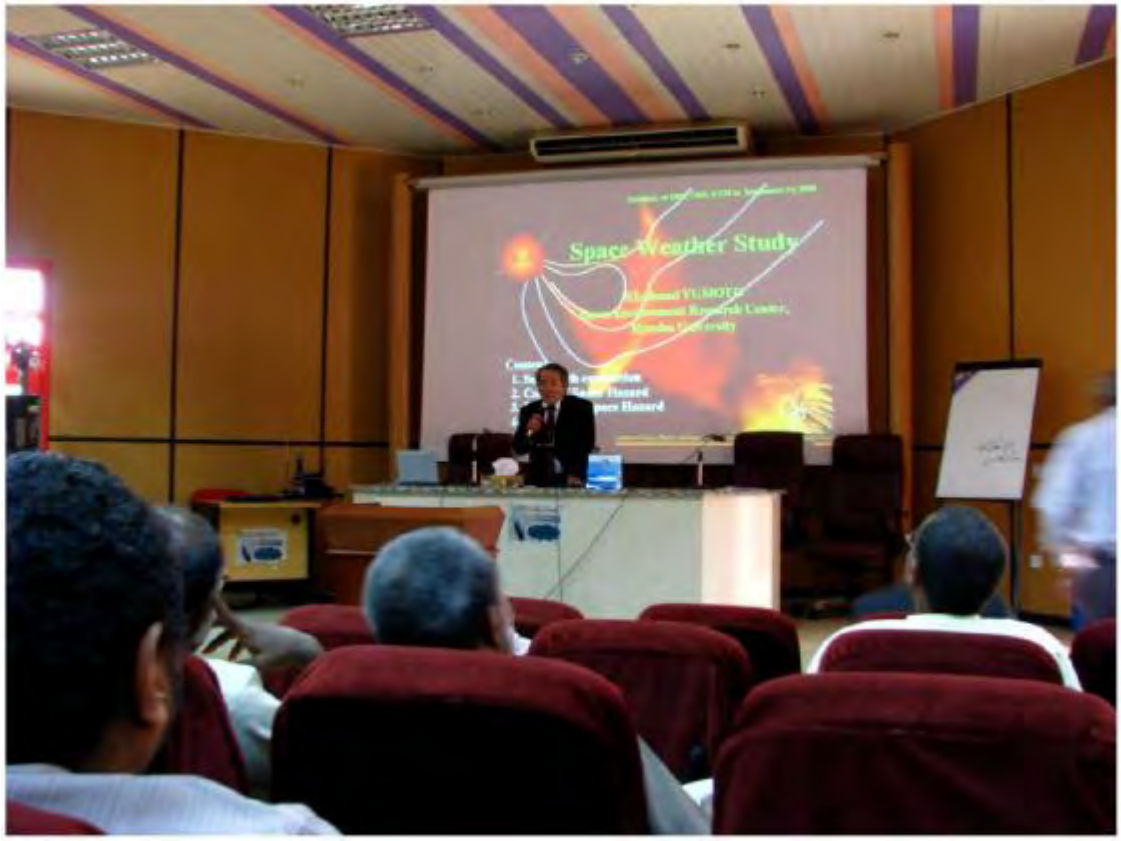
1.2. THE MAGNETOMETER OBSERVATORY IN SUST

The magnetometer in SUST was one of magnetometers that belong to a chain of the **MAG**netic **D**ata **A**cquisition **S**ystem (**MAGDAS**) project (Yoshikawa, 2005) which are installed worldwide. The Principle Investigator (PI) of the project, i.e. Professor Kiyohumi Yumoto, from Kyushu University of Japan was accompanied with his team had visited SUST and he delivered an outstanding lecture at Alshaheed conference hall in the main Campus of SUST, i.e. the West Wing Campus. The following pictures were taken from inside the conference hall during delivering the lecture at SUST by Professor K. Yumoto (photos are taken by Tokonaga).

Picture1. 1 Professor K. Yumoto of Kyushu University delivering his lecture pre-installation of MAGDAS station at SUST, in the picture also can be seen: Professor A. Rahman Elhassan, Dean of College of Science at SUST.



Picture1. 2 Professor K. Yumoto delivering a lecture at SUST pre- installation of MAGDAS at SUST with almost full attendance of SUST College of Science staff.



So, the visit of Professor K.Yumoto was a success because the magnetometer observatory, i.e. the MAGDAS was installed exactly in September 23, 2008 at the Southern Campus of the college of engineering at SUST, the observation station was named Khartoum station (KRT) with geomagnetic longitude and latitude: & , respectively. Picture1. 3, down here show the installation of MAGDAS done in Khartoum.

Picture1. 3 MAGDAS observatory installation done in Khartoum at SUST Southern Wing Campus of the College of Engineering

And back to the aforementioned beginning with space science as my career, I hold my appointment letter from the head of the department I had gone immediately to the office of the Secretary of the Deanship of Scientific Research and I met him and that is to discuss my responsibilities. I had learned that I should be in contact with the PI of MAGDAS project, i.e. Professor K. Yumoto and I should take care of data cards of the MAGDAS in Khartoum. Moreover, I had learned that there are couples of emails in the inbox of the Secretary of Deanship of Scientific Research with no prompt reply. That was the beginning of my contact with Professor K. Yomoto; and some members of his team did reply to my emails and among them was an outstanding member, George Maeda who replied to so many of my emails.

Consequently, I got to know more who is Professor K. Yumoto, and from a simple click in a node of a mouse and buttons in a keyboard browsing through the INTERNET I got some information about Professor K. Yumoto; of course he is the PI of the MAGDAS project and he is a full time professor of Kyushu University, he has great contribution in research since he published as author and coauthor over hundred papers in the major of space science. His specific research interest was space, earth electromagnetisms in particular geomagnetic pulsations sources and mechanisms. He used to be the director of Space Environment Research Center, Kyushu University.

I realized that Professor K. Yumoto should be my mentor, and my thinking is that he must be quite different in his thoughts about people from developing countries and he is well to understand circumstances therein, I learned that simply because his selection to where to install MAGDAS in most of African countries including my country is unique: Almost all MAGDAS stations in Africa were installed within a prominence of academic institutions I compared that with some other similar data device, i.e. an analogue ionosonde belong to United Kingdom which I think was installed somewhere within the prominences of the Khartoum airport and under authority of civil aviation but its data not available, maybe just after installation then all was gone because no great care about data.

CHAPTER TWO

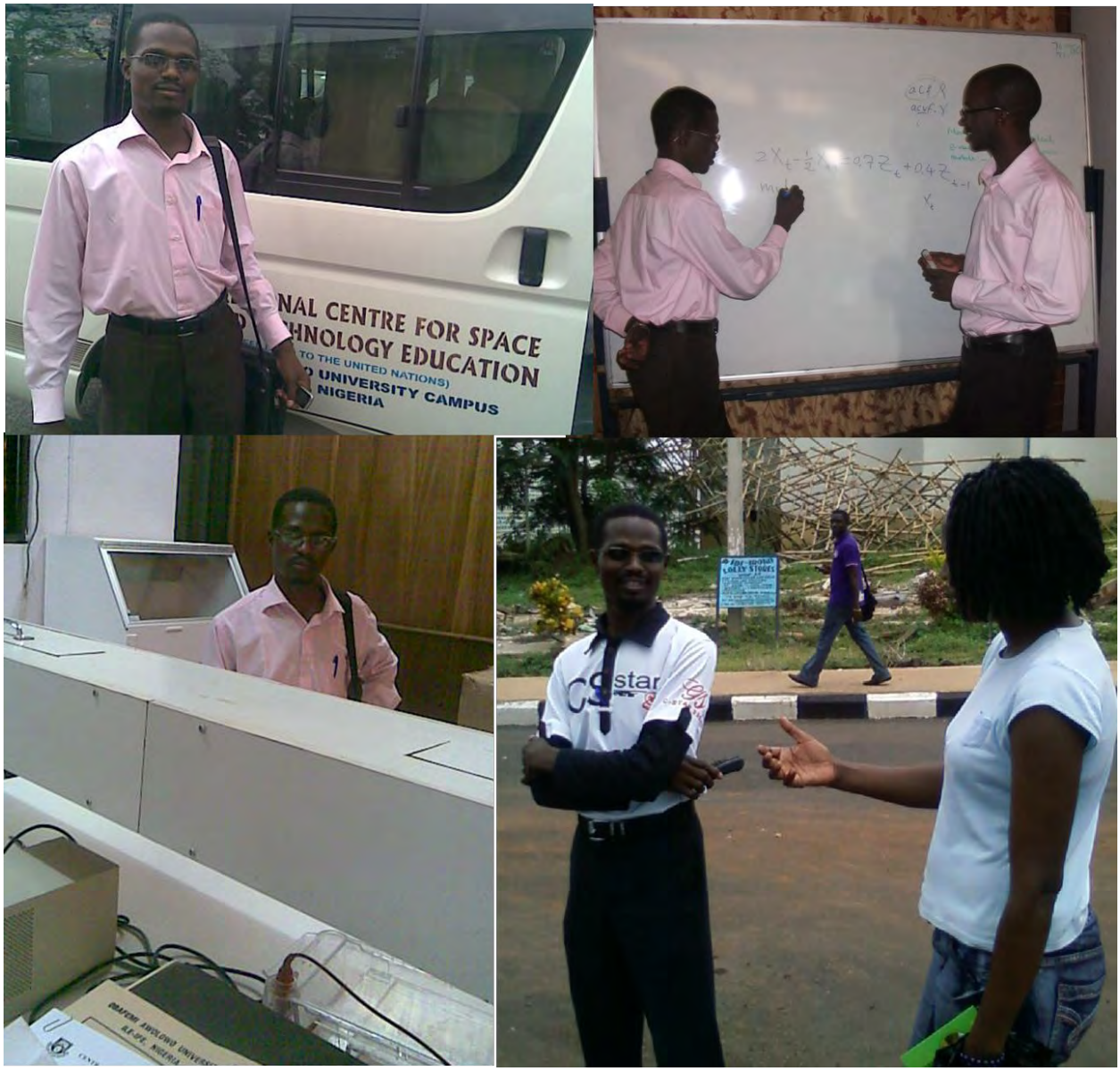
2.1. FIRST STEP TOWARDS SPACE SCIENCE TO BECOME MY MAJOR

It was a long way for me to go, because when I contacted Professor K. Yumoto he asked me to publish a paper using data from the magnetometer in Khartoum. I just got a M. Sc. degree in solid state Physics. And I have quite a bit knowledge about magnetisms as phenomenon but to link that phenomenon with space science to me like delving into new major and actually it was. Professor K. Yumoto gave me some papers and gave me as a gift a book titled: Advances in Solar- Terrestrial Physics; so that I can study what is new to me. After facing many obstacles in terms of couples of new terminologies to me in a space science I decided that I should take some classes and study space science. But how to get enroll in any academic institution to me it was another challenge, I didn't give up and searched for any academic institution that provide courses leads to a some degree in a space science. A one day and in a circulated email through the group of emails of the MAGDAS project team I got an email with some information about what is known as regional centers for space science that under the auspices of the United Nations Office for Outer Space Affairs (UN-OOSA). They are located in different regions to satisfy the needs of education of a space science in developing countries. Then I found that the center that suits me to join it to study space science is: the African Regional Center for Space Science and Technology Education, in English (ARCSSTE-E) hosted by Obafemi Awolowo University, Ogun State, Nigeria.

Professor K. Yumoto encouraged me to join ARCSSTE-E to get a postgraduate diploma in basic space science and probably he recommended me to ARCSSTE-E admin. So I get admission at ARCSSTE-E to study basic space science. The period of study was so fruitful to

me, the knowledge I acquired helped me to uncover many ambiguous terminologies to me in the major of space science. Following group of pictures show my participation in some activities at ARCSSTE-E.

Picture1. 4 Show my participation in some ARCSSTE-E activities



Picture1. 5 Show my participation in ARCSSTE-E excursion to Olumo Rock

It is very important to overcome the danger of this “Single story” in our developing nation. Further, we should have to push forward, probably effectively when supported by others, for a more engagement to contribute in international “Space Science” forums and meetings, in particular “Space weather” international forums, meetings and events. Why specifically space weather, this is because quantitatively the impact of space weather could be evaluated and be narrated to our nation’s governors and publics as “Another story”, at least to those of us, like the former mentioned principle, who has been overwhelmed with that “Single story” of “Space Science”.

Of course, many of us who question methods of how to overcome this danger of that “Single story”, would agree with me that one possible effective way to overcome that danger is through adopting capacity building programs, in particular, programs focusing on establishing a special “Space Science” educational institutions, or alternatively, establishing “ Space Science” career programs in our national educational institutions; moreover, supports for training, summer schools, workshops and conference programs dedicated to “Space Science” in particular “Space weather”. It is worth to note here that this method of advancing space science through capacity building was already been formulated to be effective (e.g. (Gracita, 2014)).

Hence, with the presence of some individuals who are interested in advancing “Space Science” in our country, recently some institutions become interested in organizing some events dedicated to “Space Science”. But, notwithstanding that not all these institutions are educational and academic institutions, plans of capacity building programs within these institutions if been supported, then shall be the key in advancing the progress of contributions in international

"Space Science" forums from Sudan's side. Here, we present events and activities that relate to "Space Science" and that took place recently in our country. And since capacity building could be categorized mainly into instruments and/or data productivity capacity building, and human capacity building, so we shall introduce first the available "Space science" related instruments, and then we shall introduce the recent "Space science" related activities being recognized recently in Sudan.

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