NewsLetter

Issue No.4, Vol. 7 – March 2014

SPECIAL ISSUE PART 2: WOMAN IN SCIENCE & ENGINEERING

It is a man's world (with a woman in it)

Male dominated world

How can we understand climate cange?

Addis Ababa 2013 Summer School Report

ISPRS SC NewsLetter

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And also...
If you **would like to publish your research work** in the SC Newsletter send us your abstract on email written above. We will soon contact you for further information.

Dear ISPRS SC Newsletter readers,

Malcolm X once said: “To educate a man is to educate an individual; to educate a woman is to educate a nation”. Like many sayings, this one makes its point by unqualified exaggeration to capture our attention. And yet, remote sensing, photogrammetry, geomatics and GIS fields are still dominated by men. Women are especially underrepresented in the hard sciences or STEM fields (STEM stands for ‘Science, Technology, Engineering and Mathematics’), especially in leadership positions. Therefore the scientific community remains male-dominated, although the situation should be different: women and men are equals and hence deserve equal opportunities.

Despite the gains that have been made through history by female scientists and engineers, many problems still hinders the progress of bright women. It is not possible to find the exact gender distribution of men and women in remote sensing, photogrammetry, geomatics or GIS fields, but according to some research done in similar sectors for some parts of the world, women make up less than one quarter of the team. But according to The Guardian[1], female scientists, despite being underrepresented overall, are more productive and have a greater scientific and/or societal impact than men. This means that providing women with greater access to scientific frontier is good for society and the economy as a whole.

We would like to inspire all female readers to get more involved in the profession. Therefore we decided to dedicate a special issue of the Newsletter to women in the geosciences and the geo-related engineering disciplines. Since we have received a lot of support for the special issue we have decided to expand it into two parts. All articles in both issues are written about and/or by women.

Enjoy your reading!
Urša Kanjir,
SC Chair

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ISPRS Student Consortium

Let's Come Together to Make The World Smaller and Smaller, While Enlarging and Powering Our Student Consortium Network!!

JOIN US!!!

This is a man's world (with a woman in it)

by Research Engineer Anita Soni, UCL

I stumbled across Geomatic Engineering completely by chance when I was 17. Whilst applying to university I'd originally been looking to study either Geography or Mathematics, as they were my favourite subjects at school. However I was excited and intrigued when I found an undergraduate course that incorporated and literally combined both these subjects to create a discipline new to me: geomatics.

During the summer before starting the degree, I was so busy worrying about whether or not I'd chosen the right programme that the thought of studying in a potentially male dominated environment didn't even cross my mind. Coming from an all-girls school and having one sister, I'd grown up with little interaction with boys. At school, anybody seen talking to a boy would get teased or automatically paired up with him as a couple (we were very mature back then). Therefore it was striking to me when I turned up to university on the first day to find one other girl in the programme. Due to the novelty of the programme, the group consisted of 15 people in total. At the time the department comprised solely male academics, which again, was a complete contrast to school where 99% of my teachers were female. Suddenly I felt very intimidated, self-conscious and daunted at the prospect of speaking to a man, let alone spending the next 4 years in close proximity to several of them! I felt stupid for not realising sooner how different the working environment was going to be for me. I was overwhelmed. Starting university is such a scary experience in itself that I hated the idea of this thrown in on top of it! As I felt so exposed, I remember being very quiet and shy for the first few years and trying to keep my head down to avoid any further attention as I was convinced all the boys would just tease and laugh at me for being a girl.

During the summer holidays of my second year I did some work experience at a land survey company. I was nervous, as I knew this was going to give me insight into the real world of geomatics and I really wanted to love working in it as much as I did studying it. I was fortunate enough to be sent out on a wide variety of survey jobs, mainly involving laser scanning. Not only did the theory from the coursework build up my confidence whilst doing site work, but the amount I was learning with all the different survey instrumentation really improved my skill set. Admittedly there were experiences, which reminded me that I was indeed female. Whenever I went on a construction site, I would get stared at by everyone I walked past as it wasn't (and still isn't) a common workplace for women. This would bring back feelings of fear and self-consciousness but this was soon overcome by small wins in awkward situations. One experience that stands out was when I was sent out to a construction site for a week and noticed there wasn't a single woman's toilet because a woman had never before set foot on the site. As it was in the middle of nowhere, I had to drive for about ten minutes before finding the nearest facility I could use. This was not a sustainable solution for me. By the end of working on this site, I had made friends with the male cleaner who'd make sure one set of toilets was closed to the men and even acted as lookout for me! At the time I found this quite amusing and now that I look back I'm grateful for how well they adapted to a woman being there without complaining or making fun of me. By the time I finished my experience I was being sent out on jobs by myself and was left alone in charge of thousands of pounds worth of kit! This is when I realised I had been looking at the situation from the wrong angle. I was lucky to be in such a unique situation by being one of very few women in the industry with these skills. This attitude remained with me as I went back to university to complete my degree.

As I'd enjoyed the experience so much, I returned to industry to work as a surveyor. Because I had built up my practical and processing skills during my work experience, I was placed in the specialised 3D survey team and then became a member of the "Entertainment Team". When I first read the name of the team, I thought I was going to be required to provide some sort of comedy sketch to clients. Thankfully it involved carrying out surveys and scans of sets, people and props for visual effects teams in the film and TV industry. I got to travel to all parts of the world and meet a lot of famous actors. It was an exciting experience being behind the scenes of movie sets. The core team I worked with consisted of three people; I was the only woman. As a team we became very close and bonded during the long tiring working hours that are demanded in this industry. They never treated me differently for being a woman apart from when one particular scanner had to be set up. This was one of the bigger scanners, which required an hour and four people to lift and manoeuvre the parts to build it. And by four people I mean four strong men. As a female surveyor I was proud that I could carry a full traverse kit across a site, so I was insulted when I wasn't even considered for this role.

Instead, I was always left in charge of making sure the cables didn't get caught which was a very menial task and could have been done with my eyes closed. One day we couldn't find enough people to set the scanner up so I, as always, volunteered my services. Out of desperation my boss agreed. I quickly realised that he was being completely realistic in not letting me ever take part in this activity. I couldn't even lift the lightest bar of the scanner, let alone move it and align it to another piece! After that I never kicked up a fuss about any of the heavy lifting required and happily let others carry on. This job gave me some of the best experiences and I definitely learnt a lot about myself, particularly how to think quickly on my feet. It was a very last minute kind of job where we would be given quite late notice of where we would have to be and when. This often resulted in times where I was the only one sent abroad to work on a film and had to deal with limited supplies, or broken or missing equipment that was required immediately for the job. One memory that I often look back on was the time I was sent alone to Bulgaria to scan some actors. This involved setting up the bigger scanner, by myself, which hadn't arrived yet. On my arrival I was also informed that the laptop, which is essential to run the scanner, was not with the scanner. Due to the time restrictions we only had a small window of opportunity to scan the actors, which was a couple of hours away. Oh, and nobody else spoke English. Let's just say that day involved me playing charades with four security guards and we managed to get the job done! I also discovered later on that the only words they knew in English were "Manchester United" and "Arsenal". I can confidently say that I learnt how to deal with stressful situations and it made me a very calm person by the end of it.

Anita Soni at a site visit to the Terminal 2A development at Heathrow.

After leaving university I'd always planned to go back into academia and carry out research in laser scanning, but I was hesitant about leaving the variety of work that the geomatics industry had provided me. Therefore when the opportunity to take an Engineering Doctorate (an industry led research programme) arose, I was thrilled to come back to studying whilst being able to use the lessons I'd learnt whilst working. Despite having focused on laser scanning and photogrammetry, I'm now working in a completely different area of geomatics: structural monitoring in the railway industry. I've swapped the glamorous film sets for dark, dingy, rat-infested tunnels. And the best bit is that I get to wear really flattering fluorescent orange clothing, which is five sizes too big for me. This environment is the most extreme one I have come across in terms of the male/female divide as there are even more men and even fewer women.

My research focuses on implementing monitoring on railway projects. The work requires me to be on site as well as in the office whilst carrying out my research. As soon as I set foot on my first railway site, the staring returned. But this time, instead of feeling intimidated and wanting to hide in my oversized clothing, I embraced it. I smiled and waved back. Confronting the stares throws most people off and they don't quite know how to react which makes me feel more confident. The office work was a novel situation for me. This mainly involves endless boardroom meetings, full of men not listening to each other. It was quite overwhelming at the beginning due to the intimacy a meeting room holds compared to site work. For a while every meeting that I walked into, I'd be very conscious of the fact that I was the only woman in the room. However I quickly realised I was the only one making a big deal out of it. Nobody was singling me out of the crowd apart from me. Nowadays the only time I notice there isn't another woman is when the meetings turn into more of a chat and we go completely off topic and I wonder why nobody else is getting us back to our agenda. I've actually had to put my foot down at times to keep the topic of conversation relevant.

It has been nearly 10 years since I started my degree in geomatics. I've really enjoyed every aspect that I've been a part of. The only criticism I have of working in a male dominated environment is of my expectations. Initially I was the one who segregated myself from the year group and almost expected the men to discriminate against me. There has never been a time when a man has made a sexist remark against me (for which I am grateful). They have always been considerate and treated me like one of the guys, sometimes too much like one of the guys! Engineers and surveyors that I come to meet still say how pleasantly surprised they are to see a woman working in the field. It may be an obvious thing to say but it's important to embrace the uniqueness of the situation and to remember that people are more likely to notice you and your work because of this factor. I now find myself comfortable when working in this type of environment and it's amazing to see how much I've adapted since my school days. I'm now seeing more female surveyors trickling through which is refreshing to see and I hope that grows over time.

I must say I'm looking forward to seeing where I end up next on my career path…

How Can We Understand Climate Change from Satellite Images?

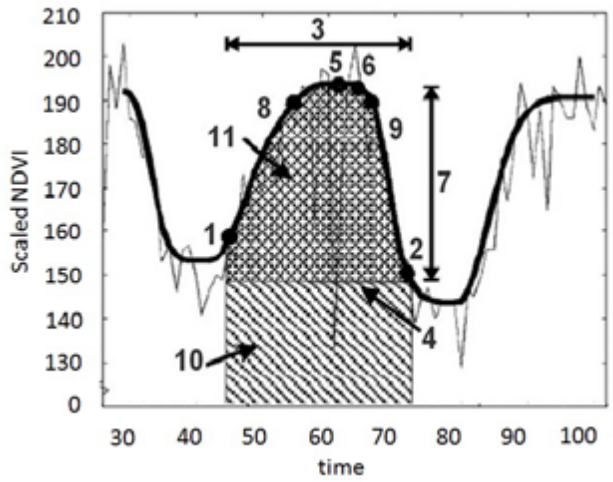
by Tanita Suepa, Geo-Informatics and Space Technology Development Agency, Thailand

The relationship between temporal and spatial data is considered the major advantage of remote sensing in research related to biophysical characteristics and climate variation. Research in vegetation phenology has brought on intense interest in the context of climate change because differences in phenology trends between ecosystems can be used to assess responsiveness to climate change. The degree of interannual variability of phenology, particularly during severe dry and wet years, is suggestive of ecosystem susceptibility to future climate change (Bradley & Mustard, 2008). The temporal and spatial characteristics of remote sensing data are both important for the study of vegetation phenology.

What is phenology and why is it important to climate change?

Vegetation phenology is the study of recurring patterns of vegetation growth and development, as well as their connection to climate (White et al., 1997). Phenological properties, such as the timing and rate of green-up, amplitude and duration of the growing season, and timing and rate of senescence of plant classes, have become an emerging indicator of global environmental changes. Land surface phenology (LSP) is a key indicator of ecosystem dynamics under a changing environment (Xiao et al., 2009). LSP is defined as the seasonal pattern of the spatio-temporal variation in the vegetated land surfaces observed from remote sensing (White & Nemani, 2006; de Beurs & Henebry, 2010). Therefore, remote sensing technology has changed the observation of LSP from points (specific life cycle events using in situ observations of individual plants or species) to coverage (macro region) for better phenology observation across regions, countries, continents, and even across the globe (Zhang, 2006;Tan et al., 2011).

Vegetation phenology is sensitive to changes in weather and climate. Changes in vegetation phenology can affect the carbon cycle, water cycle, and energy fluxes through photosynthesis and evapotranspiration (Xiao et al., 2009), which consequently may influence food security, water resources availability, and climate. The length or magnitude of the plant growing season may change only slightly, but this could result in large changes in annual gross primary production. Furthermore, shifts in the timing of plant activity (e.g., the start of the growing season) provide evidence that species and ecosystems are being influenced by global environmental change (Reed et al., 2009). Accordingly, it is useful to characterize LSP and understand how phenology responds to interannual variability, climate, and land use.



Phenological Parameters
1) Start of season
2) End of season
3) Length of season
4) Base level
5) Middle of season
6) Maximum of fitted data
7) Amplitude
8) Left derivative
9) Right derivative
10) Large integral
11) Small integral

Figure 1 A simple NDVI profile for a typical patch of vegetation phenology
Source: Jönsson & Eklundh, 2010

Phenology and climate data derived from Satellite time series

Multi-temporal remote sensing data provide opportunity to characterize LSP at the regional level (Reed et al., 2003). MODIS (The Moderate Resolution Imaging Spectroradiometer) is the most commonly used remote sensing data source from which understanding of phenology is derived because it provides an improved basis for monitoring global ecosystem dynamics with appropriate spatial and temporal resolutions and substantially improved geometric and radiometric properties (Zhang et al., 2006). Phenological parameters such as the start and end of the growing season are usually extracted from time series of vegetation indices (VI) based on satellite observations (NDVI, EVI). The phenological parameters extracted from satellite images are shown in Figure 1.In addition to satellite derived phenology, climate data such as temperature and precipitation can be also extracted from satellite time-series data. For example, phenological properties derived from MODIS have been linked to rainfall seasonality by using TRMM (Tropical Rainfall Measuring Mission) (Zhang et al., 2005; Suepa, 2013). Rainfall data retrieved from satellite imagery can provide daily rainfall and can be used to calculate both the onset and the end of rainy seasons to assess the relationship between phenology and rainfall. Therefore, the response of vegetation phenology to climatic variation on a regional scale is possible to monitor by using satellite time series data (Figure 2). The patterns and changes of phenology and climate are important to understand regional vegetation variability and ecosystem dynamics in light of global climate change. Most importantly, these data can solve the problem of the unavailability of real-time climatic and environmental data in some areas.

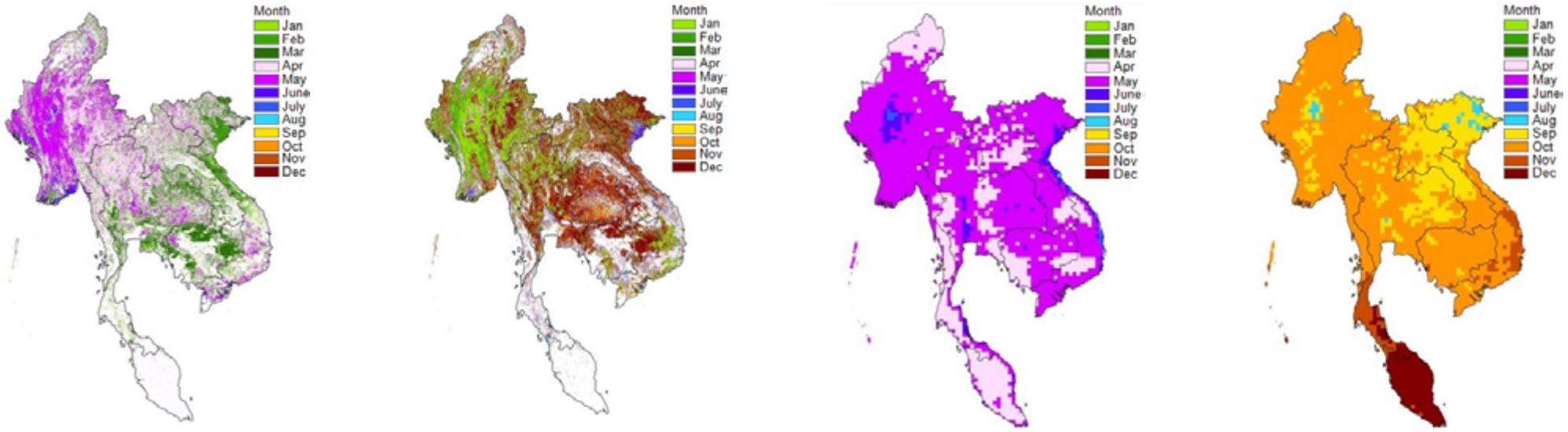


Figure 2 Spatio-temporal Variations of Phenology and Rainfall Seasonality in Southeast Asia
Source: Suepa, 2013

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Male Dominated World

by Rubini Narayanan, PhD research graduate student, Geomatics-OSU

A young girl from a remote place in the south of India, who is the first female university graduate of her family, writes about a part of her journey in this fascinating world of remote sensing and GIS. The girl is from a place where going to school is still considered unacceptable for her, and being the first child of the family, she has had to withstand a lot of emotional fights. But in every part of the struggle, the world showed her a beautiful face. For every time that she failed to convince her parents to let her study further or permit her to travel at least to the neighboring towns, the world is now offering her the chance to travel and see the world from high above what she once dreamt about.

She was trained to think constantly on how to raise her children, to obey her in-laws, and to nod to her husband. A world did not exist beyond that. Education was merely a tool to engage the female child until she reached marriageable age. When it was time for her to walk through that door, she wanted to try one last time to convince her parents to let her study further.

Magically, in a joint family with 11 members, support came only from her father when the women in the family were reluctant to send her to school. As often happens in many families in India, the male`s voice won; in this case, for a woman`s education. She was sent to a school near her small town to study engineering. But it was not long before she realized that this was not what she wanted to do. When she told this to her family, it was concluded that she could not understand engineering subjects and that her ability was limited to the kitchen. The plant took a while to take root in the engineering labs instead of the kitchen where it was originally grown. It is not just weapons, which impede the spread of knowledge, but also discouragement and denial of opportunities. Every time she failed, voices, which repeated that she was meant to be in the kitchen, caused her a lot of self-doubt and questioning. But then, she was helped by her male friend, who explained the concepts patiently. When she thought she was ready to fly up, she realized that her wings had already been clipped. The many relatives who primarily govern any girl's life in a south Indian family advocated that her parents restrict her to what she was born to do, namely to serve a man forever within the institution of marriage. The men, who had gone to school and read about the importance of female education, strongly believe that education is way too removed from this reality. Surprisingly, her brother who is 6 years younger than her stood by her side and convinced her father to send her to study further, against the will of the women in the house.

She already knew what she wanted to study, but had not been open about this till the time came when she had no fear about disclosing her plans. Since then, the world has started offering her the best. Interestingly, it was the male community, which encouraged and respected her. When she took up GIS and remote sensing for her master's degree, most of her relatives thought she would fail miserably without national and English language proficiency. Little did they know that her undergraduate English professor, a man, had helped her enough to take the first step.

The encouragement and support she received from the faculty in her master's programme transformed her into a new "HER". The mind which was first trained to think about the proportions for making curry in the kitchen was now all set to think about the solar power potential trapped in every house, using GIS and remote sensing techniques. She was then beginning to believe that it is not a male dominated society she is in as it had always been told to her. She was raised amongst men who feared that a rise in the status of women might leave them in the shadows. Now, respect and acknowledgement from counterparts most of whom were men motivated her to take a step further.

She decided to extend her horizon. This time, her struggle was not how to convince her family. She knew she had travelled much beyond that stage. Her fear was finding enough financial support to live her dream. But the world is always good to people who search. When she was busy talking at a conference about the importance of GIS and satellite imagery for mapping floods in her area, an offer came from a professor in the United States to consider research.

She showed him 350 emails she had written to almost every single school in the world which works with GIS and remote sensing.

Again, she was guided and directed at the right time and given enough financial support to make the initial applications to schools in the United States by the professor who met her at the conference in India.

When she came to the United States, she started working with a group of men in her research lab. Travelling in all kinds of rough weather and receiving constant support from an advisor who did not stop her from doing anything just because she is a girl made her realize women are not the weaker sex anymore. Rarely does the group realize that she is the only woman in the research lab. What a big smile she now has - she who was not allowed to talk or sit in front of men seven years ago, she who can now sit and exchange ideas with alpha males, she who is currently working towards her PhD using LiDAR and GIS techniques for disaster management studies, all with the encouragement of her husband who is living 25,000 km away.

The power of science is universal. It has not changed just one girl`s life - it has changed the outlook of upcoming generations and set a new benchmark. The girl knows that in the days to come, when she speaks, the world will listen. It is not because of the struggles she underwent - every human being is prone to struggles - but because of her willingness to fight when she knew that she had no weapon but herself. I would not be writing this story if I had already had someone to spoon-feed me at every step of my life. I had to open my own doors; I had to get my own financial support, unlike many of my “not so fortunate” female friends for whom the family offered everything. But did I miss anything? No. I realized that men have not contributed just to the development of science but of womanhood as well. When I achieve my dreams I will dedicate my success to all the men who encourage women in education, particularly in science and technology.

“Honest heart, steadfast look, mettle which does not fear anyone in the world – comes from a woman as she has the tenure of wisdom.” – Barathiyar (Tamil Poet who fought for women’s freedom and education). Any man smiling in approval while reading this has a Barathi in him.

RESOURCES

PortableMaps.com
http://www.portablemaps.com/

EDUCATION

Open Courses from the Geography Department with several for GIS (Penn State)
http://open.ems.psu.edu/courseware

FREE SOFTWARE

QGIS 2
http://qgis.org/en/site/forusers/download.html

GeoTools 8.0
http://sourceforge.net/projects/geotools/

JOBS, CAREER OPPORTUNITIES

SCGIS Jobs
http://www.scgis.org/Lev3Page.aspx?Page3ID=20

eBOOK

Land Administration for Sustainable Development e-Book
http://www.esri.com/landing-pages/industries/land-administration/e-book#sthash.621ywy57.dpbs

RELATED ORGANIZATIONS, ASSOCIATIONS

International Council for Science — ICSU
http://www.icsu.org/

JOURNALS

Earth’s Future
http://earthsfuture.agu.org

TUTORIALS

Visual 3D Modeling from Images
http://www.cs.unc.edu/~marc/tutorial/

The Remote Sensing Core Curriculum
http://userpages.umbc.edu/~tbenja1/umbc7/

Report on 10th SPRS Student Consortium & WG VI/ 5 Summer School
Geospatial Science for Monitoring of Environment for Sustainable Development

by Sarah Murabula

The 10th ISPRS Student Consortium & WG VI/5 Summer School was held from October 29th to November 2nd 2013 at the UN Economic Commission for Africa (UNECA) Headquarters in Addis Ababa, Ethiopia. The Summer School brought together scholars and GIS scientists from ten countries – Rwanda, Uganda, Tanzania, Ethiopia, Nigeria, Kenya, Turkey, Slovenia, Switzerland and the United Kingdom. The theme was "Geospatial Science for Monitoring of Environment for Sustainable Development" and the following topics were covered:

- Change Detection
- Food Security
- Agricultural Monitoring
- Land Cover/Land Use
- Disaster Monitoring

The training schedule consisted of lectures and practical sessions where the participants carried out exercises designed to improve their skills and educate them on the use of optical and Synthetic Aperture Radar (SAR) data with examples of change detection and disaster monitoring. On the first day of the training, Dr. Paul Aplin gave an introductory lecture on remote sensing and thereafter guided the participants in carrying out land cover mapping and a change detection exercise. The participants were also encouraged to submit their land cover classification exercises to Dr. Aplin under the "guinea pigs" exercise, where he would use their data to analyze land cover classification, class semantics and reference data influence on the selection of land cover classes. The results from this analysis will be presented at the 2016 ISPRS Congress in Prague.

On the second day, Dr. Francesco Holecz, lectured on agricultural monitoring using data derived from Synthetic Aperture Radar (SAR). He also demonstrated how to effectively monitor agriculture using the SAR data. He introduced the participants to Synthetic Aperture Radar (SAR) technology, processing techniques, land applications based on space-borne SAR systems, operational and future space-borne SAR systems, SAR data planning and ordering, and specialist tools available for SAR data. On the third day Dr. Holecz focused on using SAR for the monitoring of food security for agricultural areas. He explained that SAR data could be used in the processing of potential crop extent, potential cultivated area at the start of the growing season, crop growth extent and the cultivated area. This he explained could be used in the analysis of food security of an area.

The technical visit to the Ethiopian Mapping Agency was scheduled for the fourth day of the Summer School. The participants were able to see how the Ethiopian Mapping Agency maps land cover and land use change in Ethiopia; what data is available on agriculture for agricultural monitoring; and how it conducts disaster risk planning for the country. After the technical visit the participants also enjoyed a visit to the National Museum in Addis Ababa where the history of the Ethiopian country was showcased. Here, the participants got to view the bones of Lucy, known locally as "Dinknesh", an Australopithecus afarensis which were discovered in 1974 at Hadar in the Awash Valley of Ethiopia's Afar Depression. This was followed by a visit to Merkatu, the largest market in Addis Ababa, where students managed to buy cultural Ethiopian dresses and jewellery. The fourth day ended with a trip to view the sunset over Addis Ababa at Shiro Meda.

The fifth day of the Summer School focused on Disaster Monitoring and this was taught by Dr. Tesfaye Korme of the Regional Centre for Mapping of Resources for Development (RCMRD). Dr. Korme lectured on the development of early warning systems and disaster risk planning. He focused on the rapid mapping of flood impacts to help in rescue and recovery efforts.

The Summer School was declared officially closed by Mr. Byron Anangwe and the participants were invited to join the AfricaGIS conference that was to officially begin on 3rd November 2013. A cultural night was organized for the participants at Habesha where Ethiopian delicacies were served and traditional Ethiopian dances were showcased. This was certainly a befitting end to the intense week.

FUTURE ISPRS RELATED EVENTS

Wavelength Conference 2014
Malvern, Worcestershire, United Kingdom, 14-16 April 2014
For more info visit: http://www.rspsoc-wavelength.org.uk/

Split remote sensing summer school 2014 (SplitRS 2014)
Split, Croatia, 22-23 May 2014
For more info visit: http://splitremotesensing.com/

11th ISPRS SC WG VI/5 Summer School & 2014 GeoInformatics Summer Camp
Wuhan, China, 22-28 May 2014
For more info visit: www.lmars.whu.edu.cn/isprscom6/summercamp.html

ISPRS Technical Commission V Symposium
Riva, Italy, 23-25 June 2014
For more info visit: http://isprs-commission5.fbk.eu/

6th International Summer School on Radar SAR
Bonn, Germany, 4-11 July 2014
For more info visit: radarsummerschool.fraunhofer.de/summerschool/

3rd International Workshop on Earth Observation and Remote Sensing Applications (EORSA 2014)
Changsha, China, 11-14 June 2014
For more info visit: http://www.eorsa2014.org/

ISPRS Technical Commission III Symposium & Photogrammetric Computer Vision (PCV 2014)
Zurich, Switzerland, 5-7 September 2014
For more info visit: http://www.isprs.org/pcv2014/

Workshop of Photogrammetry, Remote Sensing and Laser Scanning
Telč, Czech Republic, 3-5 November 2014
For more info visit: http://lfgm.fsv.cvut.cz/?cap=&zal=408&lang=en