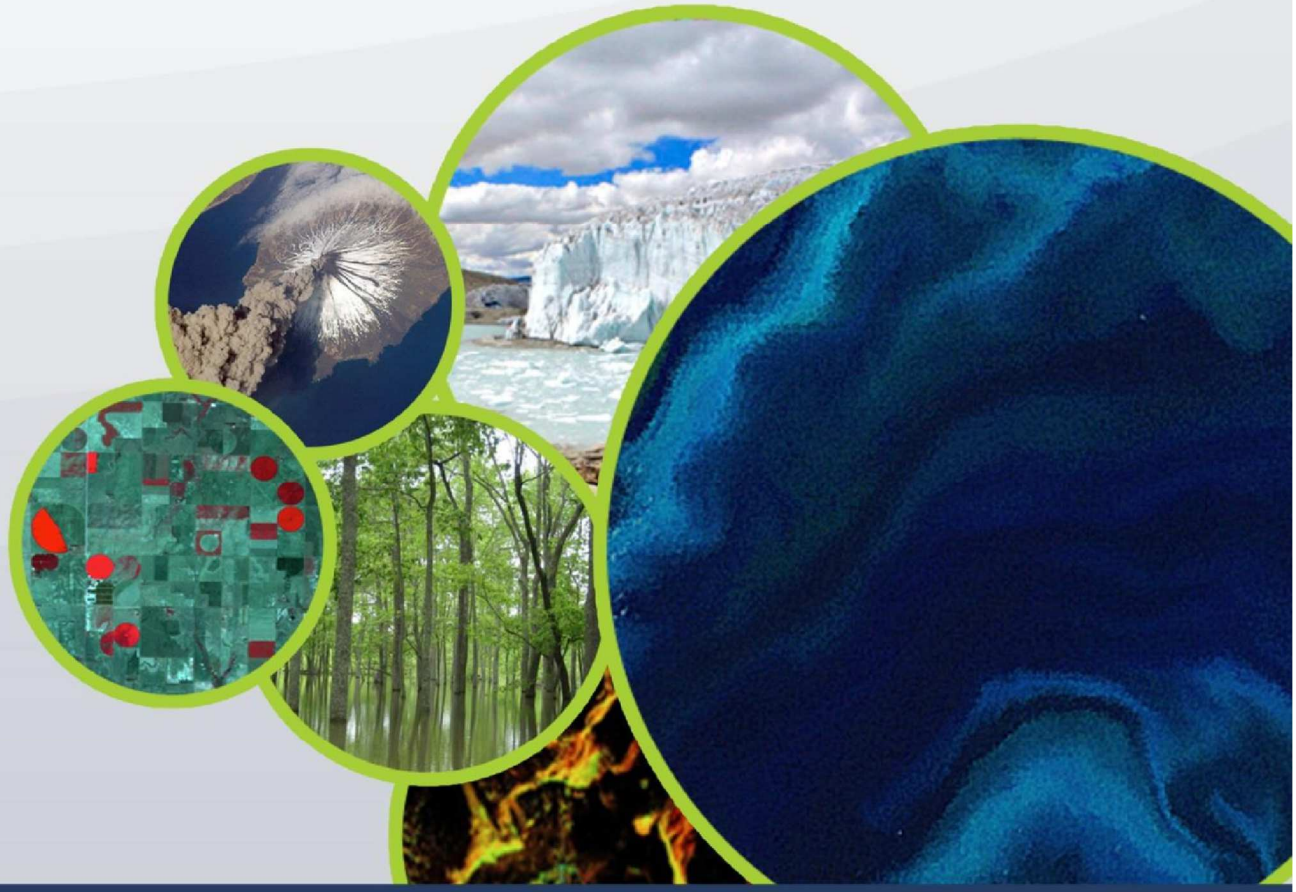
Committee on Earth Observation Satellites



CEOS WGCapD SAR Training Workshop

10-14 October 2016, University of Zambia, Lusaka

A. Workshop Coordination

The Committee on Earth Observation Satellite Working Group on Capacity Building and Data Democracy (CEOS WGCapD) held one of two SAR training workshops at the University of Zambia in Lusaka from 10th to the 14th of October 2016. The workshop was attended by twelve participants from Southern Africa. The objectives of the workshop were to contribute in bridging the skills gap of SAR technology in the region and to provide an awareness on how and where to access freely available SAR data and processing software such as the Sentinel Application Platform, commonly known as SNAP. In addition, as part of the working group's contribution to the "*Training the Trainer*" initiative, about 95% of the workshop participants were lecturers at universities. Such an approach ensures that the knowledge and material acquired can be furthered shared with students. Workshop Coordinators and Instructors are listed below:

Title	Name	Surname	Organization	Country	Responsibility
Mr	Phila	Sibandze	SANSA	South Africa	Course Coordinator
Prof	Christy	Hansen	Delft University of Technology	Netherlands	Course Coordinator
Prof	Chris	Schmullius	Friedrich-Schiller-University Jena	Germany	Course Coordinator
Prof	Chris	Stewart	European Space Agency	Italy	Course Coordinator
Prof	Mikhail	Urbazaev	Friedrich-Schiller-University Jena	Germany	Course Coordinator

B. Sponsors

C. Workshop Banner

Figure 1: The workshop banner

Figure 2: Group photo of the participants who attended the course.

The success of the workshop can be attributed to the collective effort from the following institutions;

- University of Zambia
- The National Remote Sensing Centre of Zambia
- European Space Agency (ESA)
- ESA Copernicus
- The South African National Space Agency (SANSA)
- Delft University of Technology
- SAREDU-Remote Sensing Education Initiative
- DLR (Germany Aeronautical and Space Research Centre)
- United Nation Office for Outer Space Affairs
- Friedrich-Schiller-University Jena

The course focused on a number of SAR applications such as: crop monitoring, crop classification, biomass estimation, flood mapping, surface deformation and oil spill detection.

D. Strengths

1. Practical

Taking into account one of the recommendations made during the SRTM workshop that participants have to be screened to meet the minimum requirements. Having acted upon these recommendations proved to be worthwhile as most of the participants showed to understand and followed the hands-on practical session. Even those that lacked behind a bit, quickly adjusted to catch up.

2. Focus on different applications

The course focused on basic principles of SAR remote sensing and how SAR is used in different applications such as agriculture, marine applications and water applications. The agricultural applications looked at crop classification, biomass estimation and forestry, while marine uses were on object detection and oil spill mapping. Finally, we also looked at flood monitoring and mapping water bodies.

3. Free Open Data and Software

The participants were introduced to two open source software, the SNAP and the Water Mapping Processing known as “WaMaPro”. The former can process both SAR and optical data; it was specifically developed to process the Sentinel group of data. On the other hand, WaMaPro, was developed by DLR for masking water bodies using data from TerraSAR-X, ENVISAT ASAR and Sentinel 1.

4. Preload software

The SNAP and WaMaPro softwares used during the workshop were installed in the computers before the workshop started. This helped significantly; it saved a lot of time because all the computers had to be reconfigured to enable virtualisation which was required for WaMaPro to work on the computers.

5. Informing Participants of Freely Available Data

The participants were also shown how and where to acquired free SAR data (Sentinel 1) from different online sources such as the ESA Copernicus scihub. There were other websites shared with the participants where Sentinel data can also be acquired, these sites were the *remote pixel* and *mapshup* websites.

6. Local Partner

The Remote Sensing Centre and the University of Zambia were our local partners. These two institutes contributed considerably in the organisation of the workshop. The University sponsored the workshop the venue which was fitted with eighteen internet connected computers. SANSA, as the chair of the working group, coordinated all operations of the workshop such as ensuring that all the participants received their return flight tickets, a shuttle

was available to pick up and drop off the participants at the airport and it was also available to take the participants to the university and surrounding areas from the lodge.

7. WGCapD Rep/Facilitator

SANSA provided the WGCapD representative who not only facilitated the proceedings and ensured the comfort of the participants but also gave a lecture and practical session on WaMaPro.

8. Take Home Materials

The presentations and training material were shared with the participants. In addition and in continuing with the objectives of the SRTM 30m DEM workshop, the participants were also given the African Coverage of the DEM.

9. Closing Ceremony

On the last day of the workshop, the participants were awarded with certificates for attending and completing the course.

E. Suggestions for Improvement:

1. More time for practical sessions

The participants indicated that there should be more time allocated for the hands-on session or the programme should be structured in such a way that there is a balance between theory and practical sessions.

2. Increase number of days of training

It was recommended that more days should be allocated to the workshop due to the amount of content that was presented during the course. Another participant suggested that, the workshop should rather focus on few applications so as to grasp the principles of working with SAR data.

3. Computer processing capacity

It was also suggested that the processing power of the computers should be adequate enough to accommodate large dataset. This was in view of the challenges experienced during the hands-on exercises where processing was slow due to insufficient memory in the computers.

F. Anonymous Online Survey

The following are results from an online survey conducted to get feedback from the participants of the workshop. There were six participants of the survey at time of writing the report.

Q1

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How would you rate the course?

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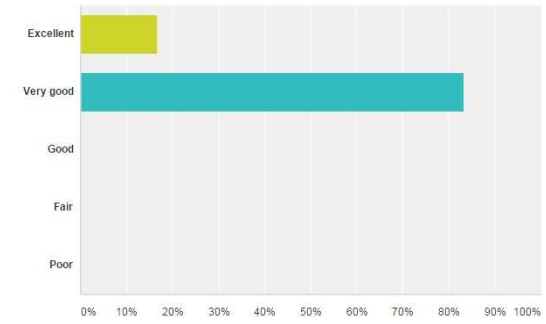

Q2

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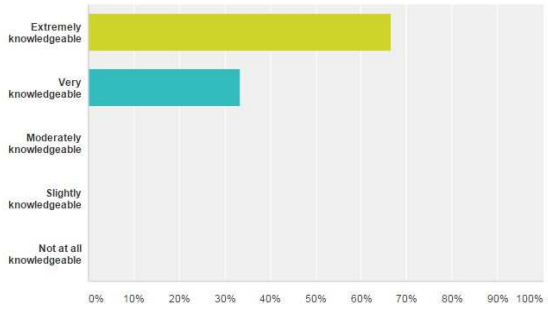
How knowledgeable was the trainer?

Answered: 6 Skipped: 0



Q3

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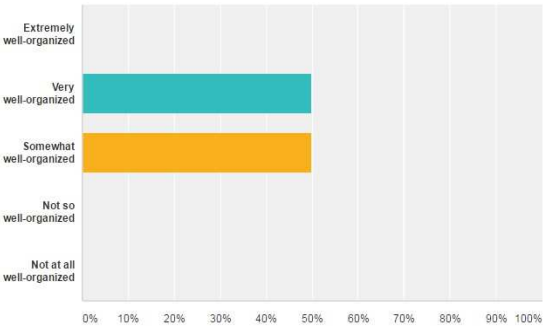
How well-organized was the course?

Answered: 6 Skipped: 0



Q4

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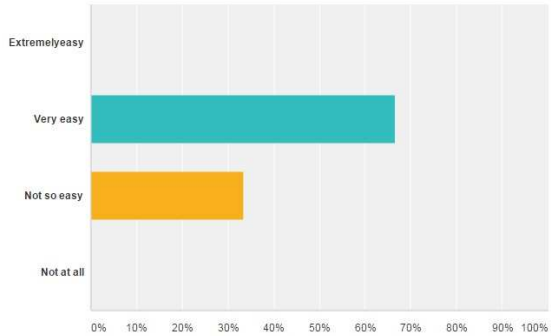
Was the content easy to understand

Answered: 6 Skipped: 0



Q5

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How well did the course meet your expectations? Was it...?

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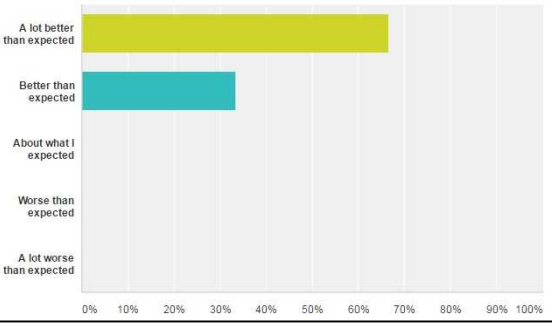

Q6

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How did you find the practical session

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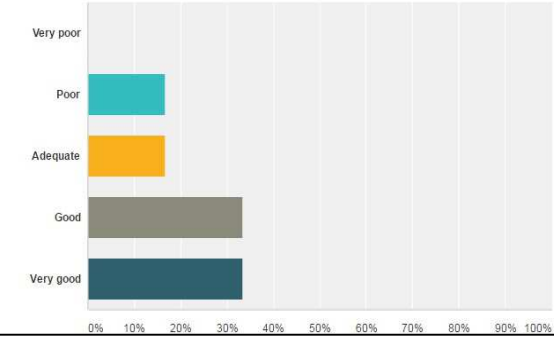

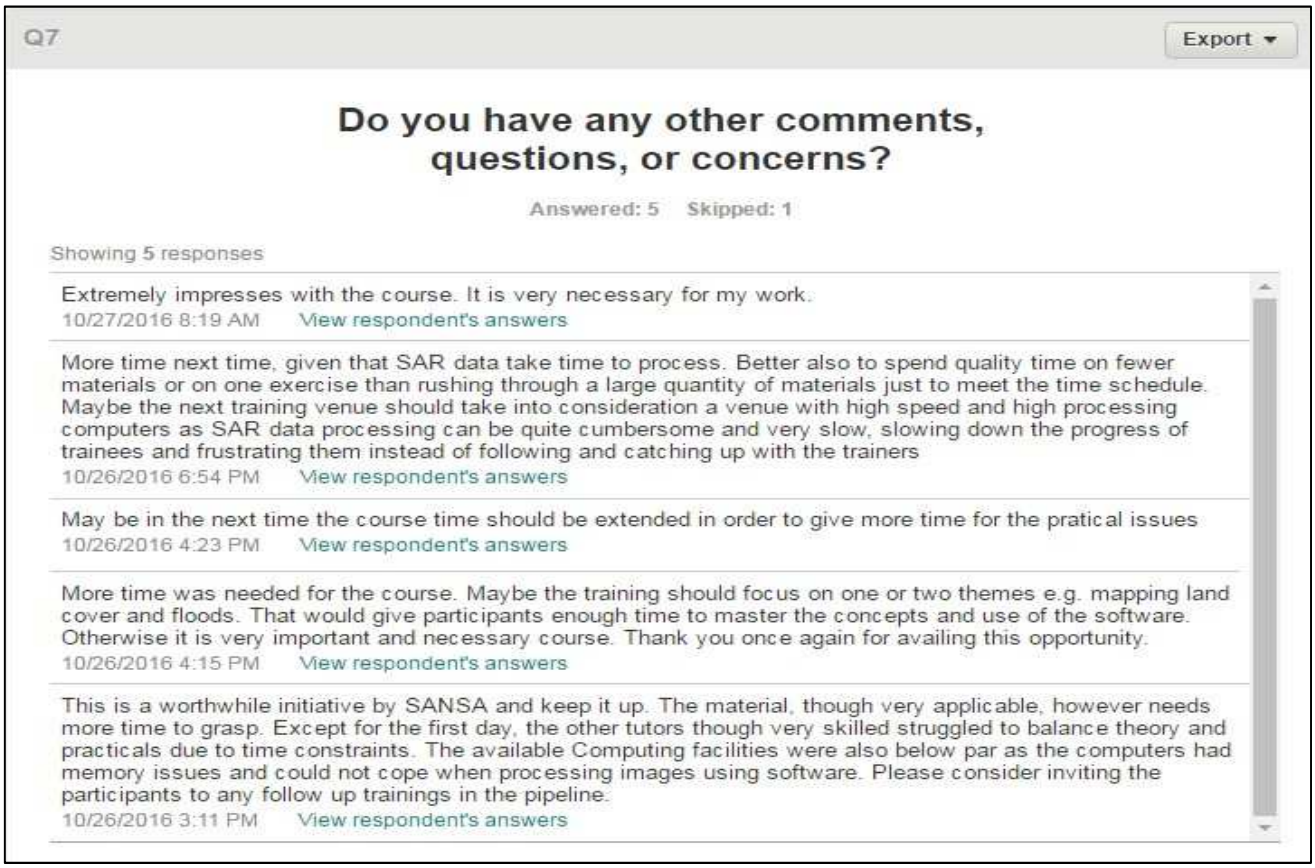

SAR Training Workshop Programme

Day One: Monday, 10 October 2016

Item #	Time	Activity	Presented By
0	08.30-09.00	**Registration**	All
1	09.00–09.45	**Welcoming Remarks**	Uni-Zambia, NRSC, SANSA
2	09.45–10.30	**Overview of NRSC & UniZam**	Uni-Zambia, NRSC
	10.30–10.45	Tea Break	
3	10.45–12.30	**Introduction to SAR Remote Sensing**	Schmullius, FSU Jena
	12.30–13.30	**Lunch**	
4	13.30–16.00	**Introductions to SAR EDU**	Schmullius, FSU Jena
5	14.15–15.00	**SAR Applications: Biomass & Forestry**	Schmullius, FSU Jena

Day Two: Tuesday, 11 October 2016

Item #	Time	Activity	Presented By
6	09.00–10.30	**SAR Applications: Agriculture, Land Cover & Soil Moisture**	Schmullius, FSU Jena
	10.30–10.45	Break	
7	10.45–12.00	**SAR Data Access: Sentinel data hub**	C. Stewart, ESA
	12.00–13.00	Lunch	
8	13.00–14.30	**Introduction to ESA Toolboxes (SNAP, NEST, BEAM, Pol-SAR-Pro)**	C. Stewart, ESA
	14.30–14.45	Break	
9	14.45–16.15	**Exercise: SAR-Processing with Snap**	C. Stewart, ESA

Day Three: Wednesday, 12 October 2016

Item #	Time	Activity	Presented By
10	09.00– 10.30	**SAR Applications Water & Flood monitoring Using Sentinel 1**	C. Stewart, ESA
	10.30–10.45	Break	
11	10.45–12.15	**Marine applications – Ocean Object Detection and Oil spill detection with Sentinel 1**	C. Stewart, ESA
	12.15–13.15	Lunch	
12	13.15–14.45	**Exercise: Biomass & Forestry**	M. Urbazaev, FSU JENA
	14.45–15.00	Break	
13	15.00–16.30	**Exercise: Agriculture & Landcover**	M. Urbazaev, FSU JENA

Day Four: Thursday, 13 October 2016

Item #	Time	Activity	Presented By
14	09.00– 10.30	**INSAR Applications I**	Ramon Hansen
	10.30–10.45	Break	
15	10.45–12.15	**INSAR Applications II**	Ramon. Hansen, Delft
	12.15–13.15	Lunch	
16	13.15–14.30	**Exercise: INSAR I**	Ramon. Hansen, Delft
	14.30–14.45	Break	
17	14.45–16.15	**Exercise: INSAR II**	Ramon. Hansen, Delft

Day Five: Friday, 14 October 2016

Item #	Time	Activity	Presented By
18	09.00–10.00	**SAR data access (SANSA, CEOS USGS, NASA, DLR, ASI, CSA,)**	Phila Sibandze, SANSA
19	10.00–10.30	**Exercise: Water & Flood Mapping using WaMaPro**	Phila Sibandze, SANSA
	10.30–10.45	Break	
20	10.45-12.15	**Exercise: Water & Flood Mapping cont.**	Phila Sibandze, SANSA
	12.15–13.15	Lunch Break	
21	13.00–13.45	**Introduction to CEOS & Wrap-up**	Phila Sibandze, SANSA
22	13.45–14.30	**Feedback from Participants**	SANSA/ESA/FSU Jena
23	14.30–14.45	**Awarding of Certificates & Workshop Closure**	SANSA / UniZam / NRSC