

# NATIONAL COUNTRY REPORT TO THE GENERAL ASSEMBLY OF THE INTERNATIONAL CARTOGRAPHIC ASSOCIATION

## SOUTH AFRICA

2011 – 2015

### 1. INTRODUCTION

This national report of South Africa covers the cartographic and geo-spatial information science activities related to the International Cartographic Association for the period 2011 to 2015. The report is submitted to the 16<sup>th</sup> General Assembly of the International Cartographic Association.

### 2. NATIONAL COMMITTEE

South Africa is a level-3 member of the International Cartographic Association (ICA). The national membership is through the ICSU Secretariat of the National Research Foundation (NRF) ([//www.nrf.ac.za](http://www.nrf.ac.za)).

To assist the NRF with the membership of ICA it has a National Committee for ICA. The members of this committee are nominated by the cartography and geo-spatial information science community in South Africa. The members serve for a three-year term. The current members are:

Dr D Clarke (chair)  
Prof EC Liebenberg  
Ms M Roos  
Mr A Cooper  
Ms S Kay  
Ms F Makgale  
Ms H Mutswari (capacity building person)

### 3. CONTRIBUTION TO ICA

#### ***Serving on ICA Structures***

The following South Africans served on ICA structures during period 2011 to 2015:

Executive Committee:

Vice-President: Dr D Clarke

Commissions:

Commission on History of Cartography, Chair: Prof E C Liebenberg

Commission on Geospatial Data Standards, Chair: Mr A Cooper

ISO TC 211 Geographic Information/Geomatics, Liaison: Mr A Cooper

***Barbara Petchenik Children's World Map Competition***

South Africa has participated in every Barbara Petchenik Children's World Map Competition since the inception of the competition in 1992. Since 2009, participation has been organised and coordinated by the Department of Geography at Unisa (University of South Africa) in Pretoria. Until 2000 this Department was headed by Prof Elri Liebenberg who is the national coordinator of the Competition. The current Chair of Department, Melanie Nicolau, is an ardent map enthusiast and encourages map-use in all the department's courses. In 2009 the Department also approached the Greater Rustenburg Community Foundation (GRCF) to co-ordinate the competition amongst the rural areas under their jurisdiction in the North West Province of South Africa as part of their environmental awareness programme.

The Department of Geography does its utmost to encourage children from all population groups and cultural backgrounds to participate in the Competition. University students enrolled for Geography are asked to market the Competition nationally, and as many secondary and primary schools as possible are visited to liaise with teachers and children and to explain the competition theme. (For 2012 -13 as many as 16 schools were visited, and for 2014-15 the figure was 18). During these visits the Department of Geography annually distributes approximately R13-15 000 of globes, atlases, paper, crayons, paints and other drawing material to disadvantaged schools which are interested in participating in the competition.

For the 2013 and 2015 Competitions national prizes such as MP3 players, mini-globes, atlases and books on the environment were sponsored by the University of South Africa, and groups of children were invited on a regular basis to visit the Department where they were given the time and opportunity to draw a map. In 2014 a special opportunity for the children of Unisa employees was organized at the Department. During these visits, all equipment (paper, paint, crayons, etc.) were provided. Each child was also interviewed by the Chair of Department, Melanie Nicolau, who filled in a basic questionnaire on the child's map literacy skills and his/her understanding of the global world he/she lives in. The majority of children were black children who had never left their rural villages and the excursion to the Department was a highlight for many of them.

For both the 2013 (Dresden, Germany) and the 2015 competitions Unisa's Department of Geography organized two regional competitions, one in the Northwest Province and one in Gauteng. Entries were also received from the other provinces. For 2013 almost 6 000, and for 2015 approximately 5 000 entries were received. For both 2013 and 2015 the nine national winners all received prizes sponsored by Unisa.

### ***International Cartographic Exhibition***

South Africa submitted entries for the International Cartographic Exhibition to the 25<sup>th</sup> International Cartographic Conference, held in Santiago, Chile in 2009 but unfortunately these entries were held up in customs and did not appear on the Exhibition.

Entries have been submitted to the International Cartographic Exhibition at the 25<sup>th</sup> International Cartographic Conference held in Dresden, Germany in 2013.

### ***International Map Year (South Africa)***

South Africa is officially participating in the International Map Year (IMY).

Approval for this participation was obtained at the highest level when the Cabinet of the Government of South Africa gave its approval. This will be known as International Map Year (South Africa), or IMY (SA).

IMY (SA) was officially launched by Minister Gugile Nkwinti (MP), Minister for Rural Development and Land Reform, on 23 March 2015. This launch was particularly special because of the presence of the Executive Committee of ICA at the event.

A National Committee for IMY (SA) has been formed under the chair of Dr Derek Clarke. The committee members represent the South African National Committee for ICA (the lead organisation), the Geoinformation Society of South Africa, the national mapping organisation and universities.

It is envisaged that the national events for the International IMY will incorporate existing projects as well as IMY specific events. These would include, but are not limited to the following:

- (a) Map Literacy Workshop: workshops to be held across the country to improve the level of map literacy;
- (b) Map Awareness Exhibition: exhibitions at identified events to promote use of maps and geo-spatial information;
- (c) Barbara Petchenik Childrens' Map Competition: an international competition, with national selection, for school children to create their own map. The winners of various age categories will be entered into the Barbara Petchenik Childrens' Map Competition at the International Cartographic Conference to be held in Rio de Janeiro in August 2015;
- (d) Map Day: special 'Map Day' conducted in each province through 2015 and 2016 demonstrating the practical use of maps and geo-spatial information in various applications;
- (e) Distribution of promotional material for the International Map Year, including the publication 'The World of Maps' (published by International Cartographic Conference for the International Map Year)

### **ICA-OSGeo-ISPRS Lab**

In 2011, the International Cartographic Association (ICA) signed a Memorandum of Understanding (MoU) with the Open Source Geospatial Foundation (OSGeo) with a view to develop global collaboration opportunities for academia, industry and government organisations in the field of open-source GIS software and data. The MoU aims to provide expertise and support for the establishment of opensource geospatial laboratories and research centres across the world to support the development of open-source geospatial software technologies, training and expertise. In 2014, ISPRS joined the network.

The Centre for Geoinformation Science (CGIS) at the University of Pretoria in South Africa has been a member of the [ICA-OSGeo-ISPRS Lab Network](#) since 2012. They use open source for geospatial software and data, either by using the open source software and/or open data in their research and education, or by contributing to the software and/or data through our research.

The official launch was celebrated on 5 October 2012. Reports appeared in the local GIS industry news, on the UP website and in the December issue of the faculty's newsletter. OSGeo President, Jeff McKenna, and former ICA Vice President, Prof Elri Liebenberg, attended the launch. As part of the open source initiative, Gavin Fleming from Kartoza, has presented an annual five-day course on 'Spatial databases with PostGIS' since June 2013.

CGIS had a strong presence at the 26th International Cartographic Conference (ICC) 2013, Dresden, Germany, 26-30 August 2013. A number of peer-reviewed papers were presented and various pre-conference workshops were attended, including a workshop by the ICA Commission on Geoinformation Standards and Infrastructures, chaired by Mr Antony Cooper.



The photo shows South African attendants at the 26th ICC in Dresden, from left to right: Dr Derek Clarke, Dr Serena Coetzee, Ms Erika Pretorius, Mr Samy Katumba, Mr Johan Brits, Mr Wiafe Owusu-Banahene, Dr Peter Schmitz, Mr Kisco Sinvula, Ms Sanet Eksteen, Mr Antony Cooper, Ms Victoria Rautenbach.

Through the ICA-OSgeo-ISPRS network, Serena Coetzee is currently involved in a special issue of the ISPRS International Journal of Geo-Information (ISSN 2220-9964) on 'Open Geospatial Science and Applications'. Original research contributions on all aspects of open source geospatial software and its applications were invited in 2014 and are currently under review. The special issue aims to showcase the advancement of open geospatial science and applications by building upon the broader progress in open science, the synergies in the developments in open source geospatial software, open data, open standards, open hardware and open access to research publications. The call for papers is available at:  
[http://www.mdpi.com/journal/ijgi/special\\_issues/science-applications](http://www.mdpi.com/journal/ijgi/special_issues/science-applications).

#### **4. ACTIVITIES IN CARTOGRAPHY AND GEO-SPATIAL INFORMATION SCIENCE**

##### **4.1 National Committee and Societies**

###### ***South African Council for Professional and Technical Surveyors***

The South African Council for Professional and Technical Surveyors is a statutory professional body created by legislation for the registration and discipline of professional in the geomatics field. Provision is made for the registration of cartographers and geo-spatial information science practitioners in categories of technician, technologist and professional.

The legislation was revised by the Geomatics Profession Act late in 2014. This legislation will provide for improvements in the registration and control of the geomatics profession. The South African Geomatics Profession Council was recently appointed, but has not yet met. At the first meeting of this new Council the current South African Council for Professional and Technical Surveyors will cease to exist.

Contact: [//www.plato.org.za](http://www.plato.org.za)

###### ***South African Geomatics Institute***

The South African Geomatics Institute (SAGI) is a voluntary body for practitioners who are registered professionals with the South African Council for Professional and Technical Surveyors. Its primary objective is to serve the interests of its members and to act as a collective body on behalf of its members. It is actively involved in continuing professional development.

Contact: [//www.sagi.org.za](http://www.sagi.org.za)

### ***Geoinformation Society of South Africa***

The Geoinformation Society of South Africa (GISSA) is a voluntary body open to membership by any person with an interest in geo-spatial information science. Its primary objective is to provide services to its members as an umbrella body.

Contact: //www.gissa.org.za

## **4.2 Organisations**

### ***Chief Directorate of National Geo-spatial Information***

The Chief Directorate of National Geo-spatial Information (NGI) is the official national mapping organisation of South Africa. It has a legislative mandate to control all matters relating to geodetic and topographic surveying in south Africa and to provide for the:

- unique spatial reference frame (control survey network);
- acquisition of aerial imagery;
- maps of the national map series;
- provision of geo-spatial information;
- dissemination of geo-spatial information products.

### ***Fundamental Geo-spatial Data***

NGI is the primary provider of many of the fundamental geo-spatial datasets.

This is done through the:

- continuous maintenance of the control survey network of permanent trigonometric beacons, town survey marks, elevation bench marks and a continuously operating network of global navigation satellite system (GNSS) base stations, called Trignet;
- Annual acquiring at least 410 000 km<sup>2</sup> of digital colour aerial imagery at 0.5m ground sample distance (GSD), which is processed to ortho-images;
- Annually updating the topographic information database;
- Annually revising map sheets of the 1:50 000, 1:250 000 and 1:500 000 national map series.

In March 2010 NGI published a new geoid of South Africa. This geoid provides geoidal information at a spacing of 2.5' of arc with a vertical accuracy of better than 10cm. This geoid will be invaluable for obtaining orthometric heights from GNSS derived ellipsoidal heights.

There is currently no national land cover and land use mapping being done and so NGI has taken on this responsibility. The methodology for both land cover and land use has been developed and is currently being tested.

### *Access to Geo-spatial Information by Disadvantaged Persons*

NGI provides free maps and related teaching aids to schools, particularly in disadvantaged areas, for geography learners. Most of these schools would otherwise be teaching map work without the use of maps. Map literacy workshops are also conducted for educators and others adult groups. On average 36 such workshops are conducted annually.

### ***National Spatial Data Infrastructure***

The South African Spatial Data Infrastructure (SASDI) has been established in terms of legislation, with the primary objective to promote the sharing of geo-spatial information and the elimination of duplication of effort in the collection and management of geo-spatial information. The Committee for Spatial Information (CSI), a statutory committee responsible for overseeing the establishment and functioning of SASDI.

Two key policies were recently approved in terms of the SDI Act, namely the Policy on Pricing of the Geo-spatial Information and Products and the Data Custodianship Policy. These policies apply to all organs of State.

Contact: //www.sasdi.gov.za

### ***Council for Geoscience***

The Council for Geoscience (CGS) is responsible for the nationwide data dissemination of the following geoscience themes:

- Geology
- Metallogenic
- Geotechnical
- Geophysical
- Seismology

Contact: //www.geoscience.org.za

### ***Other Organisations***

There are a number of other public sector organisations that are involved in cartography and geo-spatial information management. These include Statistics SA, Dept of Water Affairs and Sanitation, Dept of Environment Affairs, Dept of Agriculture, Dept of Transport, ESKOM, Municipal Demarcation Board and Independent Electoral Commission.

Institutions like municipalities play a role in the promotion of Geographical Information Sciences and Geography as a subject in their society through GIS Road Shows. In 2012/13 municipal financial year, Ngaka Modiri Molema District Municipality (NMMDM) in partnership with its five Local Municipalities (Mahikeng, Ramotshere Moiloa, Ditsobotla and Tswaing) powered by three National Departments (STSSA, DRDLR, COGTA), five Provincial

Departments, two Private Organizations (Total Geo-Spatial Information Solution and ESRI South Africa), GISSA North West and North West University together with Community Development Workers and local businesses were able to reach eight remote rural schools within a period of four days with a total number of 272 learners in attendance, twelve geography subject teachers, subject specialists, Circuit Manager and other officials from Department of Education participating. With this kind of enthusiastic approach to vend the idea of spatial information to local communities, the Department of Education indicated that Geography subject pass rate increased by 5 - 6% in the schools that participated during the GIS road show.

A number of private sector organisations produce maps and provide services in cartography and geo-spatial information services.

Some of these services offer great benefits to capturing and maintaining infrastructure assets as well as ensuring a GAMAP GRAP 17, the *DPLG Guidelines for Infrastructure Asset Management in Local Government*, and the International Infrastructure Manual, compliant asset registers. Various District and Local municipalities, such as Dr Ruth S Mompoti District Municipality utilises the services of Total Geo-spatial Information Solutions (TGIS) in order to manage and maintain geographical information related to Land, Title Deed information, Document Management, Town Planning, Finance Water, Sanitation, Electricity and Road infrastructure in the Integrated Municipal Information System (IMIS). This system offers the same service to the 5 Local Municipalities which falls under Dr Ruth S Mompoti District Municipality jurisdiction. Although some challenges may arise, they are endeavouring their utmost best to maintain the Infrastructure data on an annual basis as well as updating all Land related information on a monthly basis.

Contact: //www.tgis.co.za

### 4.3 Education and Training

Cartography as an academic course has been offered only at the national diploma and B. Technology level. The institutions providing the national diploma qualification are:

- Cape Peninsula University of Technology, which also offers the B. Technology degree in Cartography;
- Tshwane University of Technology

Universities offering degree programmes in geo-spatial information science include:

- University of Cape Town: BSc Geomatics



- University of Stellenbosch: BSc (Hons) Geoinformatics
- University of the Free State: BSc Geoinformatics, BSc (Hons) Geoinformatics
- University of Pretoria: BSc Geoinformatics, BSc (Hons) Geoinformatics, MSc Geoinformatics, PhD Geoinformatics.

A number of universities offer cartography and geo-spatial information science within the geography degree programme.

## 5. RESEARCH AND PUBLICATIONS

A selection of publications by South Africans include:

### Journals

Serena Coetzee, Victoria Rautenbach and Heindrich du Plessis (2015). [Qualitative comparison of South Africa's geomatics professional body's academic model against a conceptual framework for SDI education and training](#), *Journal of Geography in Higher Education*, 39(1), pp. 4-17.

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Renaud Mathieu, Laven Naidoo, Moses Cho, Brigitte Leblon, Russell Main, Konrad Wessels, Gregory Asner, Joseph Buckley, Jan van Aardt, Barend Erasmus and Izak Smit (2013). [Toward structural assessment of semi-arid African savannahs and woodlands: The potential of multitemporal polarimetric RADARSAT-2 fine beam images](#), *Remote Sensing of Environment*, ISSN: 0034-4257, DOI: 10.1016/j.rse.2013.07.011, 138, pp. 215 - 231.

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- Joel O Botai, Ludwig Combrinck and Hannes Rautenbach (2013). [On the global geodetic observing system: Africa's preparedness and challenges](#), *Acta Astronautica*, ISSN: 0094-5765, DOI: 10.1016/j.actaastro.2012.09.002, 83, pp. 119 - 124.
- Frances Nsubuga, Jane Olwoch, Hannes Rautenbach and Joel Botai (2013). [Analysis of mid-twentieth century rainfall trends and variability over south-western Uganda](#), *Theoretical and Applied Climatology*, ISSN: 1434-4483, DOI: 10.1007/s00704-013-0864-6, 111(3-4), pp. 1 - 19.
- Frances Nsubuga, Joel Botai, Jane Olwoch, Hannes Rautenbach, Yvette Bevis and AO Adetunji (2013). [The nature of rainfall in the main drainage sub-basins of Uganda](#), *Hydrological Sciences Journal*, ISSN: 2150-3435, DOI: 10.1080/02626667.2013.804188.
- M Tesfaye, Joel Botai, V Sivakumar and G Mengistu Tsidu (2013). [Evaluation of Regional Climatic Model Simulated Aerosol Optical Properties over South Africa Using Ground-Based and Satellite Observations](#), *ISRN Atmospheric Sciences*, ISSN: 2314-4645, DOI: 10.1155/2491, 2013.
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- Serena Coetzee, Sanet Eksteen and Christopher Grundling (2013). [Sustainable Development: The contribution from GISc education in South Africa](#), *South African Journal of Geomatics*, ISSN: 2225-8531,2(3), pp. 246 - 259.
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Kisco M. Sinvula, Serena Coetzee, Antony K. Cooper, Emma Nangolo, Wiafe Owusu-Banahene, Victoria Rautenbach, and Martin Hipondoka (2013). [A Contextual ICA Stakeholder Model Approach for the Namibian Spatial Data Infrastructure \(NamSDI\)](#), In *Cartography from Pole to Pole, Lecture Notes in Geoinformation and Cartography*, edited by Manfred Buchroithner, Nikolas Prechtel, and Dirk Burghardt Springer, ISBN: 978-3-642-32618-9, DOI: 10.1007/978-3-642-32618-9, pp. 381 - 394.

Wiafe Owusu-Banahene, Foster Mensah, Serena Coetzee, Antony K Cooper, Victoria Rautenbach, Kisco M Sinvula, Emma Nangolo and Martin Hipondoka (2013). [A description of spatial data infrastructure stakeholders in Ghana using the ICA model](#). In *Spatial Enablement in Support of Economic Development and Poverty Reduction: Research, Development and Education Perspectives*, edited by Onsrud H and Rajabifard A, GSDI Association, 2013, ISBN: 978-0-9852444-2-2, pp. 63 - 84.

Edward Kurwakumire, Serena Coetzee and Peter Schmitz (2013). [Towards modelling the SDI supply chain in South Africa: The case of land administration data](#). In *Spatial Enablement in Support of Economic Development and Poverty Reduction: Research, Development and Education Perspectives*, edited by Onsrud H and Rajabifard A, GSDI Association, 2013, ISBN: 978-0-9852444-2-2, pp. 21 - 36.

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Sanet Eksteen, Erika Pretorius, and Gregory Breetzke. (2012). GIS in secondary schools in South Africa: Three case studies and some comments, In [International Perspectives on Teaching and Learning with GIS in Secondary Schools](#), edited by Milson AJ, Demirci A and Kerski JJ. ISBN 978-94-007-2120-3, Springer.

### Refereed Conferences

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## 6. CONCLUSION

South Africa is a developing country with strong democratic principles enshrined in its Constitution. In empowering its people to achieve their full potential and participate in civil society the South African Government recognises the role that geo-spatial information plays in this process. It therefore places significance on geo-spatial information management. Contributions to this by international bodies such as the International Cartographic Association (ICA) are appreciated and valued.

South Africa remains committed to participating in the structures and activities of the ICA. The South African National Committee for ICA will continue to foster the activities of ICA within the South African community.