



# South African --- Weather Service

ANNUAL REPORT 2005/2006

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List of abbreviations

- **Vision**

To be a world-class meteorological organisation that contributes to the sustainable development of South Africa and beyond.

- **Mission**

To collect, process and provide meteorological and climatological products and services for the public good and commercial use of all South Africans and beyond.

- **Corporate identity**

The South African Weather Service logo represents the movement of weather systems and its interaction with the earth, sun and atmosphere. It also portrays a fresh, dynamic visual appearance that identifies SAWS as a proudly South African organisation.

The **red-brown** represents the earth from which all growth and life originates.

The **green** symbolises sustainability and life.

The **dark blue** represents the atmosphere in which all weather occurs.

The **light blue** represents water which is our main source of life.

The **yellow circle** represents the sun.

- **Shared values**

SAWS values are firmly entrenched in the corporate culture and the mission will be realised through visionary leadership and competent staff who embody the following values:

- Professionalism
- Integrity and honesty
- Respect and excellence
- Teamwork and partnership
- Recognition of excellence in performance

## Message from the Minister of Environmental Affairs and Tourism



**Marthinus van Schalkwyk, MP**  
**Minister: Environmental Affairs and Tourism**

Natural disasters make the greatest impact on those nations and communities least able to afford the damage. The South African Weather Service (SAWS) modernisation process is positioning itself to be of service to all to protect life and property.

SAWS has been involved in a number of initiatives to co-operate and share knowledge to face climatic challenges:

- For the first time on the African continent, SAWS hosted the Commission for Atmospheric Sciences (CAS) in Somerset West. The conference was also the venue for the presentation to South Africa of a prestigious award earned by SAWS and our Water Research Commission – the Excellence Award from the United Arab Emirates for work done in advancing the science and practice of weather modification.
- In the spirit of NEPAD and Southern African regional co-operation, SAWS and the Mozambique Meteorological Service have initiated a radar image/information exchange. Two Mozambican radars in Xai Xai and Beira are now connected to the South African network to provide additional radar coverage beyond South Africa's borders. In return Mozambique has access to the radar network of SAWS. Our long-term vision is to develop a regional weather radar network linking South Africa, Mozambique and other SADC countries.
- SAWS 2006 World Meteorological Day celebration took place in Polokwane in March and was held under the banner of 'Prevention and Mitigation of Meteorological Disasters'.

To remain at the forefront of issuing severe weather warnings to help us protect both life and property SAWS needs to modernise on a continuous basis to remain the authoritative South African source of weather and climate forecasts. This has been achieved during the past year through the following initiatives:

- As part of its infrastructure Recapitalisation strategy, SAWS has installed 19 Lightning Detection Network (LDN) sensors at strategic locations throughout South Africa. The footprint of this network covers the whole of South Africa, Lesotho and Swaziland and extends to some parts of other neighbouring countries. The ultimate aim is to establish a Regional LDN.
- This modernisation process also included the launch of the Meteosat Second Generation (MSG) training centre to build the capacity of SAWS to issue accurate weather forecasting and nowcasting services. The facility is one of three in Africa and has already offered training to a number of meteorologists from other African countries.

- During the year SAWS also received Norwegian donor funds which were used to refurbish ageing meteorological and upper air sounding instruments aboard the SA Agulhas. The funds were also used to install Automatic Weather Stations (AWS) at Tristan da Cunha, South Thuli and Bovet islands. The equipment aboard the ship, and on these remote islands, will provide observations in the southern oceans vital for delivery of improved services to the maritime sector and to the broader South and Southern African community.

To have truly global value, meteorology must make a real difference to the everyday lives of people in all South African Communities. This report outlines that SAWS has done precisely that – an achievement for which it is to be commended.



**MARTHINUS VAN SCHALKWYK, MP**  
**MINISTER OF ENVIRONMENTAL AFFAIRS & TOURISM**

## Foreword by the Chairperson of the South African Weather Service Board



**Sizeka Rensburg**

Chairperson: South African Weather Service Board

This year was another challenging and yet fruitful year for the South African Weather Service Board. The Board expresses its delight in the organisation's ability to continue to live up to its statutory mandate. In developing our plans and interventions, the Board is mindful of the need to maintain a balance between the public good and its commercial intent.

The Minister's reappointment of six members to the South African Weather Service Board for a further three-year term ensured that the organisation continued to receive significant experience and expertise at this highest level of decision making. The work of the Board Committees has been rewarding, in its support to Management and the Board.

A key milestone was reached by the Board, supported by the Department of Environmental Affairs and Tourism (DEAT) and the Regulator, when after three years of hard work by its members and staff, new tariffs with the aviation sector were finalised. The finalisation of these tariffs is critical for the organisation as it ensures that a significant component of the commercial revenue is stabilised. In this year, the commercial revenue has grown by 5% and now constitutes 38% of the overall revenue budget of the Weather Service.

Of significant note, is the approval of the recapitalisation plan for the infrastructure development of the organisation. This plan will ensure the modernisation and expansion of the observational network to rural and remote areas and the modernisation of the infrastructure. It is one of the important plans that the Board continues to monitor.

During this year, the South African Weather Service launched the Meteosat Second Generation Training Centre. The centre will provide training to our own internal staff and is available as a training resource to the rest of Africa. Training to students from the rest of Africa has already started.

The Board continues to ensure that the human resource capital is strengthened to make certain that the organisation can perform its functions. The appointment of Dr. Jonas Mphepya, to the position of Acting CEO in July 2005 ensured continuity and stability within the organisation. The approval of key human resource policies and implementation of a Performance Management System in this reporting year is a significant highlight for the organisation.

SAWS is expected to maintain a system of internal controls designed to provide reasonable assurance that assets are safeguarded, transactions are properly authorised and recorded in compliance with legislative and regulatory requirements. The Board commissioned an audit of the organisation's abilities to meet the above expectations and the outcome was a report highlighting some gaps in sensitive compliance areas. The Board used the contents of this report to engage management on the shortfalls and to implement effective solutions. The Board is pleased that

through stringent interventions by its members and management, for a second year in a row, the organisation has received an unqualified audit.

I wish to commend the Board members, past and present, and staff of SAWS for their dedication and support throughout the year. Looking ahead, we can expect more work and challenges for the Board. A lot of work still needs to be undertaken to ensure the co-ordination of delivery of services, identification of gaps in services and best use of resources in the coming years.

The Annual Report of the South African Weather Service, established in terms of Act No. 8 of 2001, is hereby submitted to the Minister of Environmental Affairs and Tourism, for tabling in Parliament.

**SIZEKA RENSBURG**  
CHAIRPERSON: SOUTH AFRICAN WEATHER SERVICE BOARD

## Overview by the Chief Executive Officer



**Dr. Jonas Mphepya**  
Acting Chief Executive Officer

During the past year, the Western Cape has experienced what could be widely acknowledged as one of its worst droughts in recorded history, while further inland, heavy rains, leading to floods, have been experienced after a dry start of our summer season. The extremity of the drought, floods and the flaring of the fires are a stark reminder of the vulnerability of South Africans and the important role the South African Weather Service (SAWS) plays in this regard to assist and warn our communities.

Having assumed the role of an Acting Chief Executive Officer (CEO) on 19 July 2005, this report represents the recent activities, achievements and performance of SAWS. I would like to acknowledge the enormous contributions that the previous CEO, Mr Jerry Lengoasa has made to the South African Weather Service over the past two year period of his stewardship.

The year has been one with many challenges and significant changes, and a year in which the South African Weather Service has focused on modernisation by means of the following:

- Installed a Lightning Detection Network that will enable SAWS to detect 95% of lightning strikes over South Africa. This will help to protect life and property, as well as enhance decision-making for weather sensitive industries;
- Continued to enjoy 98.5% uptime in both international and local communications;
- Launched an initiative to enhance the meteorological early warning system for severe weather. The activities include current research projects into the use of the new Meteosat 8 and lightning detection network as tools for early warning. These activities are aimed at improving the warning detection procedures at forecasting offices, the dissemination of warnings and collaboration with disaster management centres and the public; and
- Modernising infrastructure increases weather observations that enhance the quality of products and services.

Challenges faced by SAWS during the past year included the following:

- Delays in the installation of the Skukuza radar; and
- Limited growth in commercial revenue.

SAWS will continue to provide high quality service to both our public and commercial customers. Some of our important projects in 2006-2007 will include:

- Assistance to the Department of Environmental Affairs and Tourism in the implementation of the Air Quality Management Plan;
- Advice to decision makers on issues related to climate variability and change;
- Implementation of the science strategy; and



- Implementation of the commercial strategy.

Finally, I would like to thank the Board for the valuable input SAWS has received over the past year. I would also like to thank SAWS staff for their dedicated efforts throughout the reporting period, through which they continue to provide the South African community with a broad range of important public good and commercial services.

**DR. JONAS MPHEPYA**  
ACTING CHIEF EXECUTIVE OFFICER

## Board members



**Ms Sizeka Rensburg**  
Chairperson  
Non-executive



**Mr Prince Maluleke**  
Deputy Chairperson  
Non-executive



**Ms Patricia Maqubela**  
Non-executive



**Dr Joseph Matjila**  
Non-executive



**Dr Jonas Mphepya**  
Non-executive



**Mr Ian Robinson**  
Non-executive



**Mr Rowan Nicholls**  
Non-executive



**Rev Lulamile Mbetse**  
Non-executive



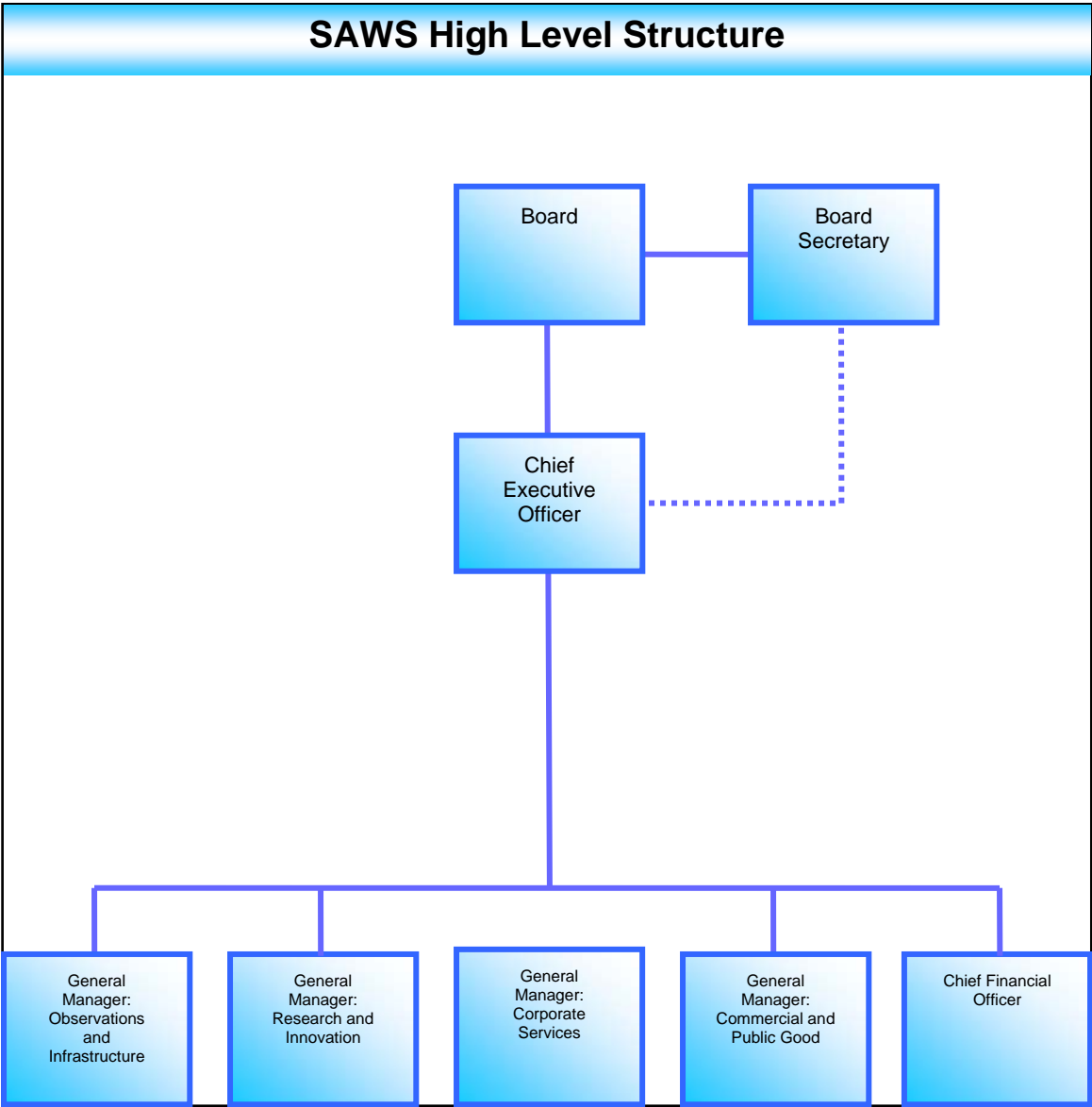
**Dr Linda Makuleni**  
Non-executive



**Mr Welcome Msomi**  
Non-executive

**Joanne Yawitch**  
Non-executive – (DEAT)

Organisational structure



## Corporate governance

### INTRODUCTION

The South African Weather Service (SAWS) is a public entity reporting to the Ministry of Environmental Affairs and Tourism.

SAWS derives its mandate from the South African Weather Service Act No 8 of 2001, read with the Public Finance Management Act No 1 of 1999. The Board of SAWS subscribes to good corporate governance principles and ensures that it is subscribed to throughout the organisation.



In addition to the South African Weather Service Act and the Public Finance Management Act, the Board is also guided by the King II Report on Corporate Governance as well as the Protocol on Corporate Governance of 2002.

In line with its statutory mandate, SAWS provides two services which are:

### Public good services

The gathering of meteorological and climatological observational data over South Africa and surrounding oceans to enable the provision of weather and climatic forecasting and warning services. These are intended for the general public through various public sector and non-public sector intermediaries. The public good service is funded by the Government.



### Commercial services

The provision of specialised weather forecasting and climate information services to regulated and non-regulated commercial sectors. The commercial service is funded through revenue generated from various commercial clients.



## GOVERNING STRUCTURES

### The Board of the South African Weather Service

Chapter 3 of the South African Weather Service Act 08 of 2001 provides that there shall be at least 10 (ten) members and no more than 12 (twelve) members comprising:

- Ten non-executive members, one of whom shall be the Chairperson, appointed by the Minister in accordance with Section 5 (3) and taking into account the provisions of Section 5 (2) of the South African Weather Service Act No 8 of 2001;
- The Chief Executive Officer by virtue of his/her office; and
- A senior official of the DEAT designated by the Director-General with the approval of the Minister.

During the reporting year the Chairperson of the Board was Ms Sizeka Rensburg and the Deputy Chairperson was Mr Prince Maluleke.

The term of the first Board of the South African Weather Service commenced on 1 March 2005. The following six members from the first Board were reappointed to ensure continuity, succession planning and the retention of organisational knowledge:

Ms S Rensburg (Chairperson)  
Mr P Maluleke (Deputy Chairperson)  
Ms P Maqubela  
Dr J Matjila  
Dr J Mphepya  
Mr I Robinson

The following four new Board members were appointed:

Mr N Nicholls  
Rev L Mbete  
Dr L Makuleni  
Mr W Msomi

The Chief Executive Officer, Mr Jerry Lengoasa, by virtue of his position remains a Board member. Dr Jonas Mphepya, by virtue of his position as Acting Chief Executive Officer from 19 June 2005 to 31 March 2006 was a Board member.

During the reporting year the Board had the following resignations from members:

Dr J Matjila (DEAT) – 31 July 2005  
Mr L Maasdorp – 31 December 2005  
Mr J Lengoasa (CEO) – 31 July 2005  
Dr J Mphepya – 30 April 2005

The Minister of Environmental Affairs and Tourism appointed Ms Joanne Yawitch to represent the Department of Environmental Affairs and Tourism on the Board in the place of Dr J Matjila. Mr Peter Lukey was appointed as the alternate Board member from the Department of Environmental Affairs and Tourism.

## Functions of the Board

The Board is responsible for, amongst others:

- Strategic leadership;
- Monitoring operational performance of management;
- The protection of SAWS's financial position;
- Ensuring that SAWS adheres to high standards of ethics and corporate behaviour;
- Reviewing and adopting the appropriate risk management and regulatory compliance policies;
- Ensuring an efficient, cost-effective and high quality SAWS;
- Set policy, standards and objectives within the framework issued by the Minister and ensure that the executive management implements these policies, standards and objectives; and
- Ensure that the majority of the South African population benefit from the public good services of SAWS.

## BOARD COMMITTEES

The Board has constituted the following Board Committees that assist in ensuring that the Board executes its mandate.

### Risk and Audit Committee

The objective of the Risk and Audit Committee is to monitor the identification and evaluation of actual and potential risk areas as they pertain to SAWS as a total entity and to review a process of either termination, transfer, acceptance (tolerance) or mitigation of each risk.

The Risk and Audit Committee also monitors the financial management in SAWS to ensure that the Board members discharge their duties and responsibilities in the best interest of the organisation. This internal control structure includes financial control, accounting systems and reporting.

This committee consists of the following members:

1. Mr P Maluleke (Chairperson)
2. Dr J Mphepya (Acting CEO)
3. Ms J Yawitch (DEAT)
4. Mr T Bouwer (DEAT CFO)
4. Mr A Venter (DEAT)
5. Mr I Robinson
7. Mr N Nicholls
8. Auditor General's representative
9. Internal Auditors

### Human Resources and Remuneration Committee

The objective of the Human Resources and Remuneration Committee is to recommend and advise the Board on the design of the performance bonus of top management and the criteria to be used. It also facilitates succession planning of senior officers and provides guidance to the Board to recommend and review the terms and conditions of employment of the Chief Executive Officer and top management of SAWS. The Committee, in discharging this function, takes into account information from comparable public entities in compliance with relevant legislation, including the Basic Conditions of Employment Act, the Employment Equity Act, the Labour Relations Act and the Skills Development Act.

It consists of the following members:

1. Ms L Sangweni-Siddo (Chairperson and co-opted Board member)
2. Dr J Mphepya (Acting CEO)
3. Dr J Matjila (DEAT)
4. Ms J Yawitch (DEAT)
5. Dr L Makuleni

### **Commercial committee**

The objective of the Commercial Committee is to ensure that SAWS succeeds in executing its commercial mandate and complies with all its obligations towards the Regulating Committee in respect of regulated tariffs - both for the Marine and the Aviation sectors.

It consists of the following members:

1. Mr W Msomi (Chairperson)
2. Dr J Mphepya (Acting CEO)
3. Mr N Nicholls
4. Mr I Robinson

### **Finance Committee**

The objective of the Finance Committee is to monitor the financial management and to ensure that all revenue, expenditure, and assets of SAWS are managed efficiently and effectively.

It consists of the following members:

1. Mr N Nicholls (Chairperson)
2. Dr J Mphepya (Acting CEO)
3. Mr W Msomi
4. Mr I Robinson

### **Programmes Committee**

The objective of the Programmes Committee is to monitor the scientific programmes in the organisation to ensure that all research, developmental activities and opportunities of SAWS are managed efficiently and effectively.

It consists of the following members:

Ms P Maqubela (Chairperson)  
Dr J Mphepya (Acting CEO)  
Ms J Yawitch (DEAT)  
Professor G Brundrit (Co-opted member)  
Dr L Makuleni

### **Executive/ Corporate Governance Committee (EXCO)**

The objective of the Corporate Governance Committee is to ensure accountable and ethical management of the Board of SAWS so it fulfils the duties and mandate placed on it by the Executive Authority with utmost integrity.

It consists of the following members:

1. Ms S Rensburg (Chairperson)
2. Dr J Mphepya (Acting CEO)
3. Mr P Maluleke
4. Ms J Yawitch (DEAT)
5. Ms P Maqubela
6. Ms L Sangweni-Siddo
7. Mr W Msomi
8. Rev L Mbete
9. Mr I Robinson

## **MANAGEMENT COMMITTEES**

### **Executive Management Committee (EMC)**

The EMC, under the leadership of the Chief Executive Officer, consists of all General Managers and the Legal Advisor. In this forum the business of SAWS is driven. It is the pivot point where input is developed, debated, formulated and delivered into the business in a way that ensures the achievement of the business plan and that business best practice is implemented.

The purpose of the EMC is to support all SAWS operations by:

- Leading the business units of the organisation;
- Ensuring the attainment of business and performance targets;
- Establishing, coordinating and maintaining clear directives in terms of strategy, standards, guidelines, policies and procedures;
- Exercising appropriate governance principles and quality assurance activities to identify and mitigate operational risk;
- Providing support, advice and skilled resources to all departments and where appropriate, initiating interventions to optimise group assets; and
- Ensuring effective integration, consultation and communication of inputs across departments, alliance partners and service providers.



## INTERNAL CONTROL ENVIRONMENT

In line with its mandate derived from the South African Weather Service Act and the Public Finance Management Act, the Board ensures that SAWS maintains a sustainable internal control environment.

The Board of SAWS prides itself that since inception in 2001, SAWS has not had a qualified external audit report.

### Enterprise Risk Management

In performing the risk management function, management reports to the Risk and Audit Committee of the Board.

In terms of the Public Finance Management Act [sections 51(1) (a) (ii) and 76(4) (b) (e) as well as Treasury Regulation chapter 27.2.1], the Board in line with the South African Weather Service Act must ensure that a risk assessment is conducted regularly to identify emerging risks of the institution. A risk management strategy, which includes a fraud prevention plan, is used to direct internal audit efforts and priorities and to determine the skills required of managers and staff to improve controls and to manage these risks. The strategy is clearly communicated to all officials to ensure that the risk management strategy is incorporated into the language and culture of the institution.

The risk assessment is used to highlight the high, medium and low-risk areas within the organisation and as a basis to formulate the Internal Audit Coverage Plan.

SAWS has also developed a Risk Management Framework. It uses the Framework to identify, measure, evaluate, treat, monitor and communicate risks associated with an activity. Risk Management enables the effects of the identified risks to an activity to be mitigated or reduced. It also provides the climate for additional opportunities for the activity once risks have been adequately counteracted. These risks have a negative impact on an entity, and if not controlled adequately, will prevent SAWS from achieving its objectives, aims or vision.

The objectives of the Risk Management Framework are to:

- Align strategic objectives with supporting processes, risks and controls;
- Drive specific risk management and control processes to respond to the potential threats and opportunities;
- Provide a common understanding of how SAWS, its business processes and people, describe and prioritise objectives, risks and controls;
- Embed instinctive and consistent consideration of risk and reward in the day-to-day planning and achievement of objectives; and
- Provide clarity on SAWS's risk appetite - risks must be taken in the pursuit of opportunities.

The Risk Management Framework assists SAWS in the following ways:

- Improve risk awareness and culture;
- The identification of previously unknown risks, control gaps and excess controls;

- Leveraging competitive advantage by focusing on the key success factors;
- Improving operational efficiency;
- Enhancing stakeholder value by reducing the adverse impact of covering downside risk and maximising upside potential;
- More effective risk-based decision making; and
- Viewing risk as an opportunity rather than a threat to be avoided.

### **Internal Audit**

The Public Finance Management Act requires the establishment of an effective internal audit function under the control and direction of an Audit Committee.

Internal Audit is an independent, objective assurance and consulting activity designed to add value and improve an organisation's operations.

Its objective is to assist SAWS to achieve its objectives by bringing a systematic and disciplined approach to evaluating and improving the effectiveness of risk management, control and governance processes.

The internal audit function reviews:

- The reliability and integrity of information;
- Compliance with policies and regulation contracts;
- The safeguarding of assets;
- The economical and efficient use of resources; and
- Established operational goals and objectives.

During the reporting year, Sithole Incorporated were appointed to manage the internal audit function of SAWS. SAWS internal audit function reports to the Audit Committee of the Board.

### **CORPORATE GOVERNANCE PROJECTS**

During the reporting year the Board commissioned the following projects from the Corporate Secretariat.

Firstly, a three year report from the Board of SAWS was prepared for the Minister of Environmental Affairs and Tourism. The scope of the report was:

- A summary of the first three years of SAWS and recommendations for the next three year period;
- A review of all the policy issues brought to and approved/ not approved by the Board since inception;
- An overview of the Board, Board Committees and all the activities since inception to date;
- Challenges that have faced the Board from inception to date, achievements of the Board since inception to date and matters that the Board must bring to the attention of the Minister; and
- Conclusions reached.

The second project was the assessment of the performance of the Board and its Committees for the first three year period since inception. This report contained a summary of the Board Assessment Report including recommendations for the next three year period. The scope of the report was:

- Establishment of a framework for the annual assessment of the Board and its Committees;
- Outcome of a review of pertinent documents;
- Interviews with the Chairperson, the CEO, the Chairpersons' of the Board Committees and Board members and conclusions reached;
- Comments on the functioning of the Board focusing on the strategic versus the operational nature of the Board;
- Report on expertise required to fill vacancies on the Board; and
- Conclusions reached.

Thirdly, with a view to streamline the relationship between the organisation and the department, the Board sanctioned the preparation of a Memorandum of Understanding that will be signed by SAWS and the Department of Environmental Affairs and Tourism (DEAT). The objective is to clearly outline the principles underpinning the relationship between the organisation and the department, such as cooperative and consultative governance, effective and transparent management, transformation and regular meetings and interaction between SAWS and DEAT.

## OPERATIONS

The Operations unit of South African Weather Service is the backbone of our core business operations as it is the internal custodian of our meteorological observation infrastructure. The unit does not only maintain technical integrity of our infrastructure but it also converts observations generated from all observation platforms into products and services to serve the needs of our clients.



### Global cooperation for national good

SAWS plays a very significant role on regional, national and international level. Throughout the various highlights reported below, these three levels of activity are clearly discernable and in many instances SAWS has concluded partnerships in order to achieve optimum results, whether the activity be supportive of commercial or public good services.

The prediction of weather has improved significantly in the past few decades largely due to the development and implementation of sophisticated numerical weather prediction (NWP) computer models. However, these computer models are only as good as the amount and quality of the data received.

An area of extreme concern to meteorologists is the scarcity, unbalanced distribution and decline of the most important data sources, namely vertical soundings of atmospheric data. This is particularly the case in the southern hemisphere where only 15% of all soundings are made.

Quality observations – *in situ* and remote - are the lifeblood of operational meteorology. A major strategy of SAWS is the modernisation and recapitalisation of its observational network through the implementation of modern and proven technologies available today.

## WEATHER OBSERVATIONS

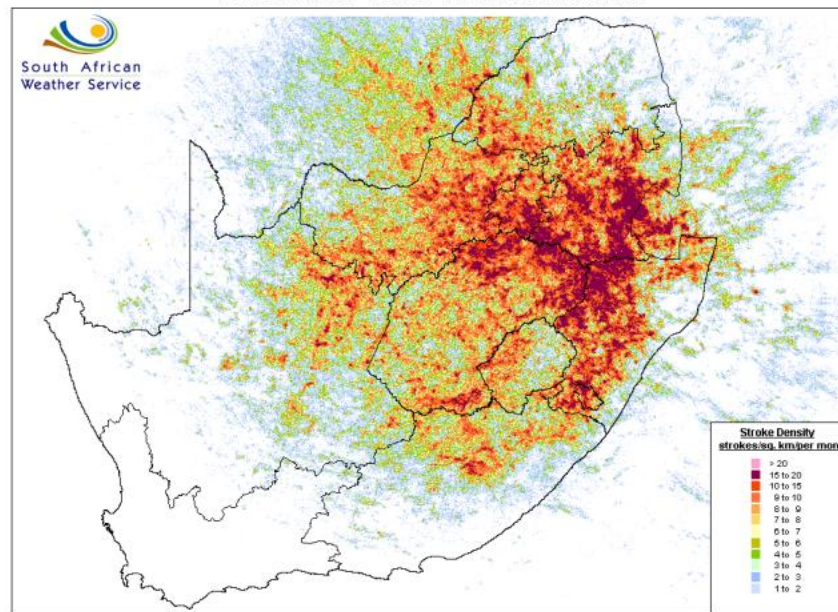
### National Lightning Detection Network (NLDN)

A vast improvement in the observing network of SAWS was the installation of a lightning detection system over South Africa. This system consists of nineteen sensors evenly spread over the country that has the ability to detect lightning strokes in real-time with a detection accuracy of 500 metres and closer.

The data from the system is already yielding some surprising results in that the lightning stroke density and intensity are significantly higher than previously believed. In January the system has detected more than 3.4 million lightning strokes and more than 3.9 million strokes in February. On the day of 20 March 2006 the system detected 47 870 lightning strokes in three hours and the intensity of the strokes was between 100 and 169 kilo amps. During this period some areas have recorded more than 8 lightning strokes over one square kilometre.

The figure below shows the lightning stroke density over South Africa from December 2005 to March 2006.

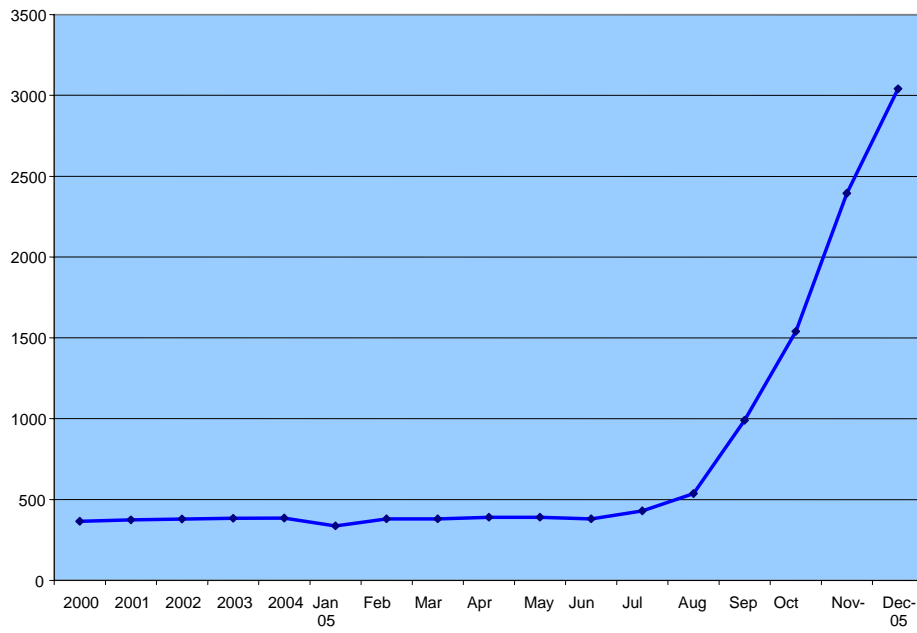
### Lightning Ground Stroke Density for December 2005 to March 2006



### AMDAR Data

To increase atmospheric temperature and wind soundings over Africa and the surrounding oceans by conventional methods is expensive and not a viable financial option for most countries. A new innovative and cost effective method using commercial aircraft flying over data sparse areas was implemented in order to obtain significantly more data in the vertical. One of these is the so-called Aircraft Meteorological Data Relay (AMDAR) data. Studies show conclusively that AMDAR data impacts positively on numerical weather forecast products.

Thanks to a partnership between SAWS and the South African Airways (SAA), arrangements were made to have several aircraft in the SAA fleet fitted with the AMDAR software. The first of the new aircraft fitted with this software were expected to be in operation towards the middle of 2004. However, due to circumstances outside the control of both role-players, and the need for additional software development, roll-out was delayed by a year. In the last 6 months of 2005 the number of SAA aircraft producing AMDAR reports increased to 28, of which 13 are used on the long-haul and 15 on domestic and regional routes. The number of reports has increased from 370 per day in 2000 to over 3,000 reports in December 2005 as outlined in the figure below.



**Mean number of reports/ day**

**The growth in the mean daily number of AMDAR reports produced by SAWS in cooperation with SAA**

The impact of this expansion on the availability of meteorological data over the sub-continent and surrounding oceans has been dramatic. The number of aerodromes within the region where at least 2 aircraft-based vertical profiles per day are being generated has increased from 2 to at least 14. This has increased the overall number of sites providing vertical soundings (AMDAR and conventional soundings) in Southern Africa from 8 to 18. Furthermore, there has been a dramatic increase in the number of vertical profiles at Cape Town, Durban and in particular Johannesburg.

This increase has not gone unnoticed by the international meteorological community. At the WMO's Nowcasting Training Workstation hosted by SAWS in November/December, international experts expressed their amazement at the achievement and said that they had not expected this could be achieved in such a short space of time.

**Upper Air**

SAWS also increased conventional vertical temperature and wind soundings over South Africa. The number of upper air observations during the past year was the highest since the mid 1960's, with 9 upper air observing stations doing 2 ascents per day (including Marion Island). The Met Office of the United Kingdom continued their support by providing the radiosondes and balloons for Gough Island. Norwegian funding has enabled SAWS to reintroduce upper air soundings from the SA Agulhas.

**Meteosat Second Generation (MSG) Receiving Stations**

To improve the satellite data availability at the forecasting and research offices around the country, seven ground receiving stations were installed at Pretoria, Johannesburg, Bethlehem, Bloemfontein, Cape Town, Port Elizabeth and Durban. Each office is now receiving the full extent of this valuable data. The added benefits of these receiving stations are the reduction of satellite

data communications costs and independency at the forecasting offices accessing this important satellite imagery.

### **National Weather Radar Network (NWRN)**

The NWRN, together with satellite remote sensing and the lightning detection system forms the backbone of severe weather monitoring and nowcasting by SAWS. SAWS operates a network of 11 integrated radar systems to provide detailed monitoring of the weather over a major part of the country. This network is operational 24/7 during the summer months, and on request from the National Forecasting Centre, during winter. Another achievement was that SAWS was able to link the two new weather radars of the weather service of Mozambique to the NWRN, thus initiating a long term objective of establishing a regional weather radar network for Southern Africa. It is envisioned to also add Botswana to the network in the future.

The radar antenna step direction has been inverted on all systems to enhance system operation and to increase availability of base scan data. In addition, a locally developed technique for the removal of ground clutter will enhance the network's ability to estimate rainfall.

Specialised radar spare parts to the approximate value of R 2 million were ordered and new, state-of-the-art test equipment. These spare parts were dispatched to the various radar stations in early December 2005 to ensure optimal up-time of the weather radars in the holiday season when nowcasting services are in greater demand.

At the request of the World Meteorological Organization (WMO), a survey of the weather radars in Malawi was done.

The S-band radar transmitter/ receiver at Bethlehem has been refurbished and is operational. This included the antenna pedestal, a new, simplified operating console/servo power amplifier and the new RDAS 2000 radar data processing and remote control unit. The unit has been interfaced to the radar transmitter.

Due to unforeseen circumstances the installation of a S-band radar at Skukuza has been delayed

### **Automatic Weather Stations (AWSs) and Hydrogen Generators**

As part of the modernisation drive at SAWS, a full testing and training AWS facility was completed. Training can now be given to weather observers and personnel visiting islands as well as to personnel from other weather services in Africa to install and maintain AWSs. Equipment for 34 AWS and all the components for 200 electronic rain gauges were purchased. Fifty of the rain gauges were assembled in March 2006.

The observational keypad was also developed during the year. With this keypad, an observer at an observing station will be able to enter the visual observations and estimated parameters, such as cloud and visibility, to be integrated into the AWS observation. The AWS observations are disseminated by SMS messages and stored on logger memory. Fifteen of these semi- AWS stations were deployed as per schedule in KwaZulu-Natal and the Eastern Cape. The next roll-out will be in the Western Cape.

Three new Hogen hydrogen generators were purchased and installed at Irene, Cape Town and Marion Island. However, several of the old electrolyser hydrogen generators still have to be maintained. The Springbok hydrogen generator was fully refurbished, which included the replacement of the compression and motor system, as well as the fitting of refurbished cells.

### **Drifting buoys and Island Automatic Weather Stations (AWSs)**

In October 2005, fifteen buoys were deployed southwest of Gough Island. During the relief voyage to the South African Base in Antarctica a further 21 weather buoys were successfully deployed to increase the model input data over the data sparse southern oceans. SAWS automatic weather station on Southern Thule Island was replaced during the buoy deployment cruise and the AWS on Bouvet Island was replaced on the return voyage to Cape Town, on behalf of the Norwegian Meteorological Service.

During the construction voyage to Marion Island two SVP-B weather buoys were deployed for the Australian Bureau of Meteorology. An opportunity to bridge the data gap in the areas southwest of Gough Island was taken through cooperation with commercial vessels travelling between Buenos Aires and Cape Town. Two weather buoys were deployed for SAWS along the AX-18 XBT line by a commercial vessel.

### **Aerodrome Meteorological Routine Observations**

A major requirement for aviation is routine reports from airports. This is costly, particularly when there are relatively few aircraft movements. By soliciting the cooperation of Air Traffic and Navigation Services (ATNS) and making use of non- SAWS aviation offices located at the smaller airports, the number of aerodromes providing aeronautical routine reports have almost doubled, at no extra cost to the user.

### **Webcams**

INSTOVIEW is a project to install cam-cameras in critical areas for low flying aircraft. It commenced with the setting up of a system on the Outeniqua Mountains.

## **WEATHER FORECASTING**

- **Aviation Weather Service**

SAWS's Aviation business unit is globally recognised as an African aeronautical service which provides services of international standards. These services are provided on a commercial, cost recovery basis. The provision of aeronautical meteorological services is the largest commercial service of SAWS. The direct aeronautical MET services are provided by the Aviation Weather Centre located at Johannesburg International Airport and twelve regional offices

### **The Promulgation of the Aviation User Fees**

A challenge for SAWS has been to convince the aviation industry (particularly the locally-based companies) that the charges for meteorological data are more than compensated for by operational savings. Locally and internationally recognised consultants were thus appointed by SAWS to do



Activity Based Costing (ABC) in order to develop a financial model to calculate the aviation weather user charges. They employed current best international practices and the result was a far greater acceptance by the aviation community.

The Regulating Committee of Meteorological Services has therefore accepted the proposed user charges resulting from negotiations and discussions between SAWS and the airline industry. The new aviation tariffs for the next three years were promulgated by the Minister on 31 March 2006 on the advice of the Regulating Committee.

### **New developments in business unit: Aviation**

In order to achieve its mission and vision the business unit: Aviation, in consultation with its user groups, has developed and is now implementing a 5 year business plan, covering all sectors of the industry. The development includes several new dissemination initiatives:

#### **The Aviation Weather Display System (AWDS)**

The AWDS is a workstation providing the formal sector with up to date (every minute) global aeronautical meteorological information. The information includes aerodrome reports, forecasts, en-route weather, wind conditions, satellite and radar images. Furthermore, it is possible to superimpose different data fields and zoom into critical regions.

The workstation has already been installed at two major air traffic control towers of the Air Traffic Navigation Services (ATNS), as well as the operation centres of the major airlines. Plans are in process to install AWDSs in other airline operation centres. The system was upgraded to display the latest satellite imagery as well as the Mozambique radar imagery. The system is seen as a major tool in the implementation of the advanced air traffic management system currently being implemented by International Civil Aviation Organization. (ICAO). Users have also commented very favourably and ICAO representatives requested that the AWDS be presented to a regional meeting in September.

#### **The Aviation MET web page**

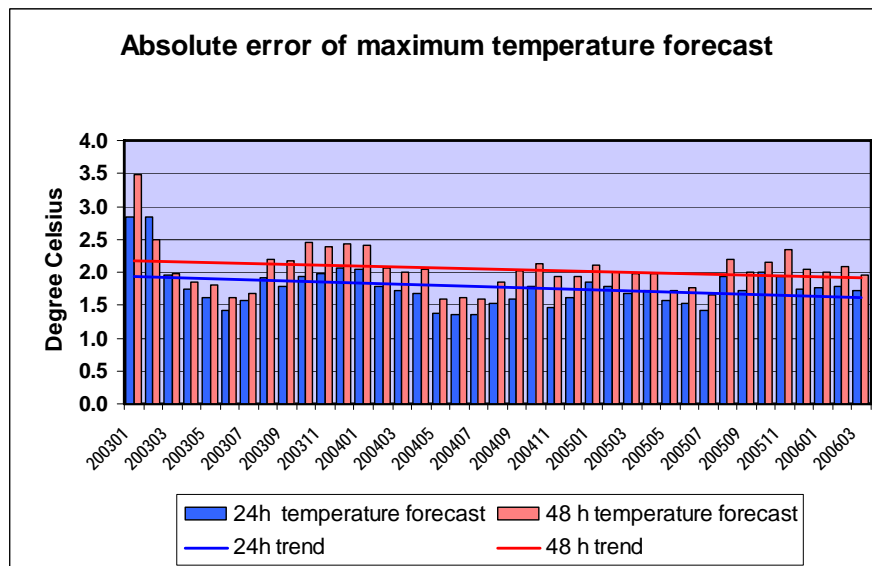
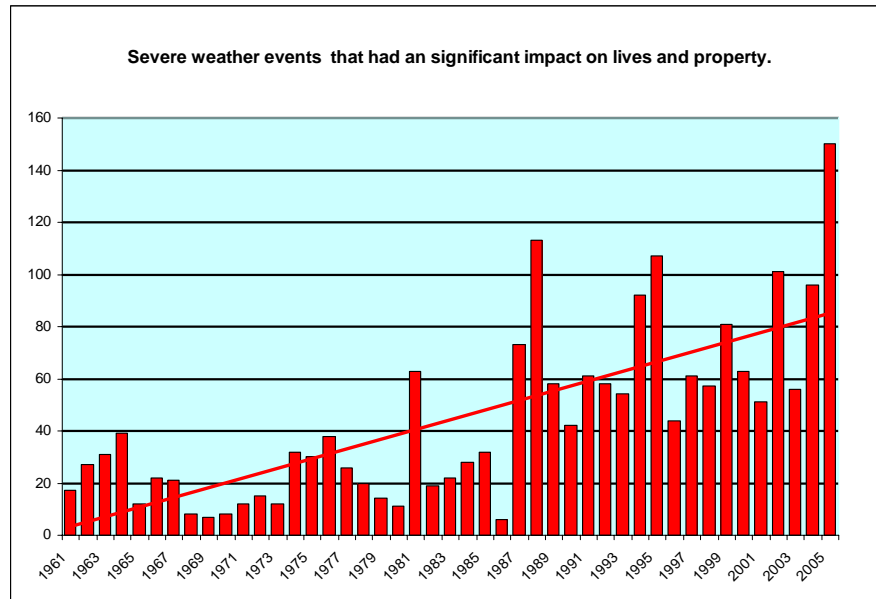
This web site was developed to provide easy access to flight documentation. Despite being a specialist service, the success is evident as the web site attracts over 400,000 hits per month, of which 60% is from outside of South Africa.

#### **Public Awareness**

Public awareness is grown on a number of fronts. Regular quarterly meetings are held with stakeholders and the quarterly Aviation Newsletter (14,500 copies) is sent to every registered pilot in South Africa. SAWS participated directly at fifteen major air shows during the past year and remote support was provided at smaller air shows. The first regional Advisory Committee for Aeronautical Meteorological Services (ACAMS) took place in Durban in August 2005 to ensure proper coordination of services. Talks were given at a number of aviation clubs to inform members of the services offered by SAWS.

- **General Weather Forecasting**

The graph below shows the increase in occurrence of high impact weather events in the last 44 years over South Africa. The data was derived from newspapers that reported weather events having a significant impact on the lives and property of South Africans. These events comprise of floods, severe thunderstorms, very cold spells, snow and strong winds. The greatest impact of these events was on the livelihood of the poorest and most vulnerable communities. Due to improvements in forecasting technologies and the modernisation of SAWS services, weather warnings were issued more regularly and with longer lead times.



Following World Meteorological Organization (WMO) protocols, SAWS has developed an automated system to calculate verification statistics from forecast products and actual observations. However, the true worth of a prediction is when it gives ample warning of an extreme event, thus enabling people to take action to minimise the effects on life and property. Individual case studies were undertaken to fully evaluate these predictions and the results were very encouraging and positive feedback was received from disaster managers.

A new forecasting workstation, a forecast product generator and media packaging system are in the process to be obtained for the forecasting business unit. The forecasting workstation is being developed by a consortium of major meteorological services and will be ready for operational use by September 2006. This system will provide our forecasters with the best forecasting methodologies to further improve their ability to produce reliable and usable weather forecasts to all our users.

## RESEARCH

Meteorology and related atmospheric sciences, like most sciences, are constantly evolving at a rapid pace. To keep pace and stay at the forefront of the meteorological fraternity our Research business unit continues to conduct focused research and development. Focused research strengthens and expands our core business as it produces new knowledge which is turned into new products or used to refine weather forecast production techniques.



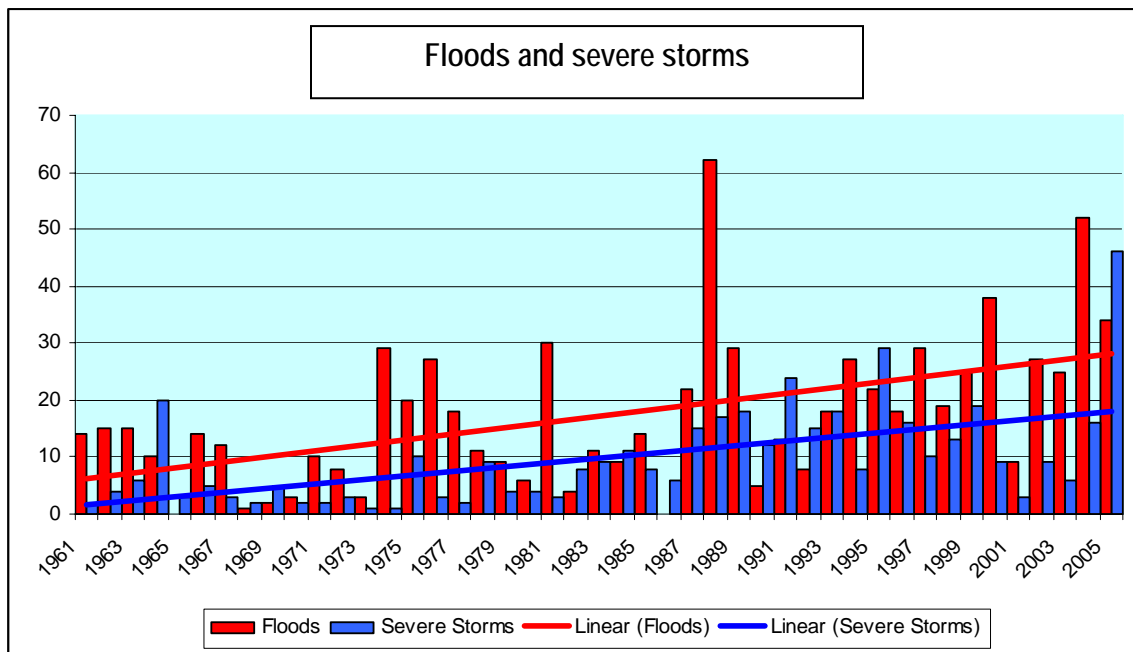
### Prediction Research

The weather forecaster has to assimilate data from many different sources in order to produce the final product issued to clients (the so-called 'man-machine' mix). However, he/she is particularly dependent on ongoing research as well as improved methods of disseminating and displaying results.

As part of the technological enhancement in weather forecasting, the Unified Model (UM) of the Met Office of the United Kingdom will replace the ETA numerical weather prediction (NWP) model in 2006. The ETA NWP model is currently producing high resolution weather forecasting guidance for the next two days to forecasters of SAWS. The first phase of the upgrade was concluded when the smaller workstation version of the entire system, the Ported Unified Model, was installed on a workstation, allowing the acquirement of local knowledge of the Unified Model system by research staff in preparation for the full system once the new high performance computer is installed in 2006.

An initiative was launched to enhance the meteorological early warning system (MEWS) for severe weather by integrating all current related activities with focused goals. These activities include the use of the new Meteosat 8 and the Lightning Detection Network in addition to all current activities. The aim is to improve the warning detection procedures at forecasting offices as well as the dissemination of warnings and collaboration with disaster management centres and the public.

The figure below shows the number of reports in newspapers in South Africa related to floods and severe storms from 1961 to 2005 underlining the importance of the MEWS.



Software codes for two international global climate models were implemented on workstations to improve the long range prediction capabilities at SAWS. These models form part of an ensemble of global climate models that will be used to improve the skill of seasonal forecasts. As part of this enhancement of seasonal forecasting, a new system called MOS-PP was developed and implemented operationally in SAWS. One of our scientists was invited by an international research centre to spend eight weeks in Italy to conduct research on another global climate model used by SAWS for the same purpose.

## Observation Research

The Observation Research business unit conducted its research activities in two main disciplines, namely remote sensing research and special observation research:

### Remote Sensing Research

Research in this discipline is weather radar research. The implementation of the new RDAS 2000 system at the Cape Town and Irene radars improves the calibration and maintenance of radars through constant monitoring and will in future be installed in all other radars in the network.

The National Radar Network has been expanded with the addition of the two Mozambique radars to the TITAN network display and the radar in Botswana will also be included in the near future. The Observation Research division has also integrated lightning data with other data sources on the TITAN display system which are used in the organisation's severe weather warning and now-casting services to the public and commercial clients.

Rainfall measurement has received specific attention over the past year. To remove ground clutter from radar precipitation fields, a new technique makes use of auto-correlation of radar reflectivity between volume scans, and flags a pixel suspected of containing ground clutter during the rainfall

accumulation process. If a pixel is found to contain exuberant values compared to neighbouring pixels, it is removed, and replaced using data from the surrounding points. This technique has led to substantial improvements in the determination of rainfall with radar over mountainous terrain.

To avoid errors introduced in radar rainfall fields due to poor sampling of radar at large ranges, especially during stratiform rainfall conditions, the dynamic determination of usable radar range has been introduced to avoid the transfer of deficiencies in the radar determined rainfall field, to the final rainfall field, that is produced and published on the Web.

Infrastructure to receive Meteosat Second Generation (MSG) satellite data was commissioned during the first quarter of 2005. The participation of the Observation Research business unit was through the management of the Pilot Project Initiative of the Meteorological Transition in Africa Programme (MTAP). SAWS was the leading partner in a consortium of institutions that included the CSIR-Satellite Application Centre, ARC-Institute for Soil Climate and Water, UKZN-Hydrological Research department and the meteorological services of all the neighbouring countries namely Botswana, Lesotho, Mozambique, Namibia, Swaziland and Zimbabwe.

The main objectives of the Pilot Project called Research on the Implementation of MSG in Southern Africa (RUMSA) were:

- To disseminate MSG data to users outside the meteorological community; and,
- To establish a network of MSG users in the region.

A training workshop involving the national partners and SADC countries and a final MTAP workshop were conducted at which twenty-one countries in Africa and Europe were represented.

Although the MTAP Pilot Project Initiative came to an end in September 2005, SAWS also became involved in the development of software for the display and manipulation of Meteosat Second Generation (MSG) data. Known as Software Utilizing MSG in Outlook Activities (SUMO), the software forms the basis of SAWS Voluntary Cooperation Project (VCP) as it will be distributed to all MSG users outside the discipline of meteorology. This software is a cost-effective method of displaying, manipulating and generating customised products to meet individual user needs. It also contains predetermined products such as Sea Surface Temperatures (SST), Cold Cloud Duration (CCD) and Normalised Difference Vegetation Index (NDVI).

A new satellite rainfall scheme was developed using the MSG multi-spectral capabilities and showed marked improvements related to resolution. However, more studies are needed to further improve the real-time rainfall measurement capabilities of MSG.

### **Special Observation Research**

Utilising the unique aircraft infrastructure of SAWS, a pollution monitoring project co-funded by DEAT and the Norwegian government was conducted during 2005-2006. This involved seven flying campaigns covering the highly industrialised areas of the Eastern Highveld, Gauteng, Durban, Cape Town and the Eastern Cape. The results of these campaigns are being compiled into an extensive report.

As part of modernising services, SAWS also embarked on an intensive aircraft upgrade campaign with the acquisition of aircraft rated inverters and a cloud condensation nuclei (CCN) counter that will be delivered early in the 2006-2007 financial year.

The highlight of the year was the award for the best scientific contribution to the science of rainfall enhancement research received by the South African research team, consisting of SAWS, Unisa, Stellenbosch University and Cloud Quest. This award was presented to the South African team at the annual meeting of the WMO Commission for Atmospheric Sciences (CAS) in February 2006 in Cape Town.

The South African researchers were hailed as worthy winners for their contribution to hygroscopic seeding technology, the implementation of the TITAN software in cloud seeding operations as well as the development of a scientific evaluation technique for operational rainfall enhancement programmes. The researchers are also investigating the utilisation of unmanned aerial vehicles (UAVs) to more effectively deliver seeding material at cloud base in collaboration with an industry partner.

### **TRACM – Trace Gas Research and Atmosphere Change Monitoring**

Hosting the WMO Commission for Atmospheric Sciences in Cape Town, February 2006, SAWS included a visit by the delegates to its Cape Point Global Atmosphere Watch (GAW) station. This station is one of 24 global stations and the research and monitoring work is of the highest international standards through maintaining the trace gas measurements to detect and monitor climate change signals within the atmosphere.



**Dr Jonas Mphepya, SAWS Acting CEO, visiting the Cape Point station with Dr M Jarraud, WMO Secretary-General, and Mrs Jarraud**

### **Aerosol measurements**

The establishment of the Cape Point aerosol measurement project (a new addition to the GAW laboratory suite of climate change detection parameter measurements) progressed with the installation of the main equipment namely a nephelometer - the first aerosol measurements were made in October 2005. Resulting from Cape Point's high international recognition, the first expansion focusing on carbonaceous aerosol measurements can materialise in 2006 with French collaboration.

The primary sets of atmospheric trace gas measurements (long-term trends and data analyses) were supplied to DEAT for uptake in the National Statement of Environment Report (NSOE). This is in fulfilment of South Africa's obligatory reporting under the Framework Convention on Climate Change.

Not only are we interested in the long-term trend of aerosol characterisation, but the information gathered also relates to fynbos burning events in the Western Cape vicinity. The aerosol

programme is being run in collaboration with the National Oceanic and Atmospheric Administration (NOAA), USA.

### **Ozone measurement programme**

As required by the Vienna Convention, a National Ozone Report was submitted to the United Nations Environmental Program (UNEP) on behalf of DEAT in preparation for the Montreal Protocol meetings and reviews concerning the status of ozone monitoring and research around the globe. Ozone measurements at the South African Antarctic base were resumed.

International commitments were also met through participation in an expert meeting on CO<sub>2</sub> and greenhouse gases (GHG) with the NOAA, Boulder, USA and an expert meeting with the WMO on GAW's (Global Atmosphere Watch) long-term strategic planning events in Geneva.

The WMO GAW stations round-robin intercomparison for CO, CH<sub>4</sub> and CO<sub>2</sub> has started during early December 2005 which required the Cape Point Laboratory to undergo a major maintenance exercise to comply with the international certification process.

The SAOZ (Système d'Analyse par Observation Zenitale) ozone measurement instrument has been re-established at SANAE, Antarctica during the annual December/January take over as run up to International Polar Year in 2007. In support of South Africa's international obligations, SAWS has provided trace gas analyses to DEAT for inclusion in the National Statement of Environment (NSOE) Report.

Negotiations with the UK Met Office to obtain the use of their spare Dobson Ozone spectrophotometer to complement our own ozone monitoring network proceeded well. The instrument is expected to be located at Marion Island Weather Station during 2006/07.

### **METEOROLOGICAL TRAINING**

- **Forecaster Training**

During the past five years, 30 forecasters were trained at SAWS Meteorological Training business unit. During 2005, five of the six forecasting students passed their final examinations and eight of the ten bridging course students passed in December 2005. Ten students have enrolled for forecasting training in 2006.



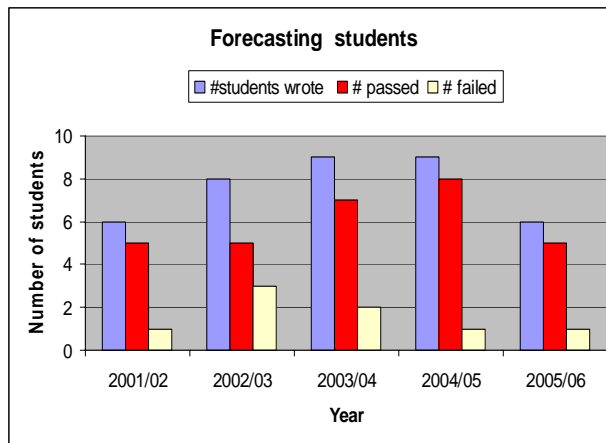


Table 6: Analysis of performance of forecasting students 2001/02 to 2005/06

- **Observer Training**

The ten students who started the course in 2005 completed it successfully and were employed by SAWS. The observing refresher courses planned for 2005 did not materialise due to a lack of human resources in the training business unit. An additional trainer was appointed in January 2006 and a new round of observer refresher courses will be scheduled for 2006. Eleven new students have started their observer training course.

- **MSG International Training**

Three national and two international training sessions for the MSG project were conducted. The MSG training rooms were officially opened by the Deputy Minister.

The Meteorological Training business unit is now also part of the EUMETSAT ASMET5 project, which uses satellite imagery to create computer aided learning (CAL) modules, making use of local case studies. A paper on MSG training in South Africa was presented at the EUMETSAT Conference in Croatia.

- **Short Courses**

A few basic meteorological courses were presented to staff in the provinces and at Bolepi House, the Head Office in Pretoria. Training courses were held for officials from the weather services of Lesotho (instrumentation) and Tanzania (Metcap).

## PUBLICATIONS

The following peer reviewed articles were published in journals by researchers at SAWS:

JOURNAL OF CLIMATE VOLUME 18, 2005. Associations between the Global Energy Cycle and Regional Rainfall in South Africa and Southwest Australia. Tennant WJ and Reason JC

WATER SA VOLUME 31 NO 3, 2005. The South African rainfall enhancement programme. Terblanche DE, Mittermaier MJ, Burger RP, Nciphax XG

ATMOSPHERIC ENVIRONMENT VOL. 40, 2006. Long-term changes in tropospheric ozone. S.J. Oltmans, A.S. Lefohn, J.M. Harris, I. Galbally, H.E. Scheel, G. Bodeker, E. Brunke, H. Claude, D. Tarasick, B.J. Johnson, P. Simmonds, D. Shadwick, K. Anlauf, K. Hayden, F. Schmidlin, T. Fujimoto, K. Akagi, C. Meyer, S. Nichol, J. Davies, A. Redondas and E. Cuevas

CLIMATIC CHANGE, 2006. **Seasonal climate forecasts – potential agricultural-risk management tools?** Klopper, E., Vogel, C.H. and Landman, W.A.

GEOPHYSICAL RESEARCH LETTERS, VOL 32 2005. **Predicting southern African summer rainfall using a combination of MOS and perfect prognosis.** Landman, W.A. and Goddard, L.

JOURNAL OF CLIMATE, 18 2005. **The effect of regional climate model domain choice on the simulation of tropical cyclone-like vortices in the south-western Indian Ocean.** Landman, W.A., Seth, A. and Camargo, S.J.

GEOPHYSICAL RESEARCH LETTERS, 32 2005. **Assessing the predictability of extreme rainfall seasons over southern Africa.** Landman, W.A., Botes, S., Goddard, L., and Shongwe, M.

## CLIENT SERVICES

To deliver on our public good and commercial mandate to clients, it is critical that the core and support business operations of SAWS put the interest of the clients first. Delivery on our mandate includes understanding and fulfilment of client needs which require all SAWS business units to work together to refine our processes, products and services to best serve the needs of our clients. The Client Services unit plays a critical role in eliciting customer needs and co-ordinating internal process to ensure that customer needs are addressed.



### Corporate Marketing Initiatives

In an effort to raise the profile of SAWS among the aviation community, the general public and other commercial customers, the organisation participated in several corporate marketing initiatives:

- As service provider and exhibitor at air shows at Wonderboom, Bethlehem, Durban, Polokwane, Mafikeng and Vereeniging as well as at the President's Trophy Air Race in Bloemfontein;
- As exhibitor at the "Airport Industry Showcase", held in Sandton during October 2005; and
- At the Million Dollar Golf Tournament showcasing its new lightning detection system that is likely to play a major role in future outdoor sporting events.

A client's golf day was held in Cape Town in April 2005 to create a networking environment, awareness of SAWS services and thank commercial clients for their continued support throughout the past year. During the prize giving dinner an auction of rare wine bottles was held. The funds raised were matched rand for rand and augmented by SAWS resulting in a donation of R20,000 made to Lizo Nobanda, an AIDS Hospice in Khayelitsha township on the Cape flats.

World Meteorological Day 2006 was held in Polokwane, Limpopo Province, where Deputy Minister Rejoice Mabudafhasi addressed weather information users about the hazards of severe weather. The event was followed by a two-day exhibition on technology used in weather forecasting. Educational talks about the forecasting process and weather awareness were given to learners.

SAWS also participated in several science-related exhibitions, and as always, these were a huge source of attraction to visiting learners, educators and the general public. These events included the SciBono exhibition in Newtown, Johannesburg, the Vodacom/ABH Chatsworth Fair, the Sasol TechnoX exhibition in Sasolburg, and the national Climate Change Conference at Gallagher Estate. The 2005 Sasol SciFest in Grahamstown was visited by 40,300 learners. SAWS conducted 4 talk shops and 22 workshops at the festival and won the award for the best workshop in the innovations category.

### Advertisements

Several SAWS advertisements and advertorials were placed in selected user-specific publications, which include the Go See Expo brochure, the African Pilot Service Guide, the Sasol SciFest brochure, the SABC Careers exhibition brochure and The Journey ZA.

## **Media events**

In an effort to effectively reach the broadcast and print media, SAWS has presented seasonal forecasts at media-events around the country since 2004. The winter seasonal forecast was shared with the media at an event in Durban on 9 July 2005 and was widely disseminated to all relevant users throughout the country. The seasonal forecast proved to be accurate, especially in as far as it predicted a warmer than normal winter over the north-eastern parts and interior of the country. This initiative was further continued at the World Meteorological Day celebrations in Polokwane in March 2006, where the winter seasonal forecast for 2006 was presented to the media.

## **Media monitoring**

The media coverage of SAWS was monitored since July 2005 and the organisation was mentioned in a total of 1,023 reports covered in print and electronic media. Most of the media coverage was generated in response to adverse weather phenomena, interviews with meteorologists, advance warnings and media releases sent to the media or published on SAWS website. Our brand identity received much exposure by being shown after each weather bulletin broadcast on national television.

## **Launch of the Meteosat Second Generation (MSG) Training Centre**

On 11 July 2005 the new Meteosat Second Generation (MSG) Training Centre was launched. This training centre, supported by funding from EUMETSAT and the UK Met Office, is the third of its kind in Africa. South Africa was chosen based on availability of technological infrastructure and to alleviate the pressure on the existing training centres in Africa. The Deputy Minister of Environmental Affairs and Tourism officially opened the centre.

## **BUSINESS SERVICE AGREEMENT**

The efficient provision of commercial services is the only option to generate revenue to ensure the long-term survival of the organisation. In this financial year, SAWS signed new service contracts with the following companies/ organisations:

- Swaziland National Meteorological Service to supply ten Automatic Weather Stations;
- I-Net Bridge and Exact mobile to supply weather forecasting products and services;
- and
- Eskom to supply Lightning Detection Data.

Existing contracts with the following organisations were renewed:

- SASOL
- Cointel
- Multichoice Africa
- Gauteng Tourism Authority
- AfriGIS
- The SALT Foundation (Pty) Ltd

The following companies subscribed to live weather data feed:

- Southern Sun (Pty) Ltd
- FCB South Africa
- Virtual Turtle
- Algoa FM
- Global Sense Internet
- Handmade Connections
- Mammoth Solutions
- Newsclip Media Monitoring

## CLIMATE DATA SALES

From 1 April 2005, the answering of requests for climate information and data was decentralised to the five regional offices. The areas of jurisdiction are as follows:

- Bloemfontein Weather Office: Northwest Province and the Free State
- Cape Town Weather Office: Northern Cape and Western Cape
- Durban Weather Office: Kwazulu-Natal and Mpumalanga
- Port Elizabeth Weather Office: Eastern Cape
- Pretoria Head Office: Gauteng and Limpopo, as well as requests for large amounts of data for research and specialist projects that encompass the entire country

A total of 7,598 climate data enquiries were answered by SAWS in the reporting period. This total includes both public good and commercial enquiries.

Some of the highlights in the Climate Information Office were:

- The completion of the project report for the Square Kilometre Array Based Network, potentially the largest radio telescope array in the world;
- The introduction of the operational use of Crystal Reports in the Information Office, with two staff member being trained to write these reports and to extract data from the database in formats that better serve the needs of the clients;
- The introduction of the use of the preliminary lightning detection network data in the generation of daily lightning ground stroke maps for lightning verification purposes;
- The generation of more than 2,000 products for the e-Commerce platform, which will become operational in the new financial year; and
- Presentations of the lightning detection network at two client functions held in Port Elizabeth and Durban respectively.

## PUBLICATIONS

The publication, *Climate Summary of South Africa*, is now available electronically in full colour. This publication and the *Daily Weather Bulletin* are published on a monthly basis. *Sunshine and*

*Cloudiness* was also published which is the fourth in the series that revises the WB28 publication, *Climate of South Africa Part 8, General Survey*.

Two posters were also produced for distribution to schools - one for World Meteorological Day on tornadoes and tropical cyclones and another on cloud types.

## **LIBRARY SERVICES**

SAWS's library continued to serve its users through the relevant selection and acquisition of material. More than 100 new books were purchased. The content of new books and journals were brought to the attention of relevant users through the electronic routing system. Marketing of the library's services and collection were done through exhibitions and information sessions during the year, including the South African library week, 13-17 March 2006, in accordance to the national theme of Libraries: 'Partners in learning, nation building & development'. International and national partnerships with relevant libraries were maintained, including a fact finding visit from the librarian of the Namibian meteorological service.

## CORPORATE SERVICES

Corporate Services unit is made up of Information Communication Technology (ICT), Human Capital Management (HCM) and Facilities Administration. Well managed human capital is a driving force behind all SAWS operations and enables the organisation to deliver on its mandate. ICT supports all SAWS business operations as a process enabler and a vehicle to deliver inputs to production processes e.g. observations and outputs from production processes such as aviation weather forecasts for the aviation industry. The roof over our heads and other building related facilities to house all business operations nationally is taken care of by Facilities and Administration section.



### User support

ICT commenced the year by aligning its internal processes and procedures with international standards such as the Information and Technology Infrastructure Library (ITIL) and the IT governance and security standards (COBIT). To implement ITIL standard support processes, an automated helpdesk system called 'HEAT', was purchased and installed in December 2005. For the period since inception (three months) we have received a total of 1,240 logged calls, or an average of 413 calls per month. The majority of calls were resolved within preset time limits by five System Administrators working 24/7 shifts. Most queries raised were on e-mail matters, which could be mitigated by extensive training on MS Outlook.

### National and International Data Communications

ICT is responsible for the Wide Area Network (WAN), monitoring twenty regional offices and international lines for seven neighbouring countries. During December 2005 and January 2006 there were no major interruptions to SAWS timely delivery of data, despite the heavy rains. SAWS obtained an uptime of 99.5%. Our WAN was extended to also provide the connection for nineteen Lightning Detection Sensors. The acquisition of this new capability will provide a comprehensive new area of commercial and public good activity within SAWS, and position us as a modern organisation at the cutting edge of 21<sup>st</sup> Century innovations.

### System development

A leasing tender for a High Performance Computer was awarded to NEC Corporation. This enhanced computing capability will be implemented in April 2006 together with a regional Unified Model obtained from the UK Met Office. This new computer is 8 times faster than the current Cray Computer which will enable us to run far higher resolution models in the same time.

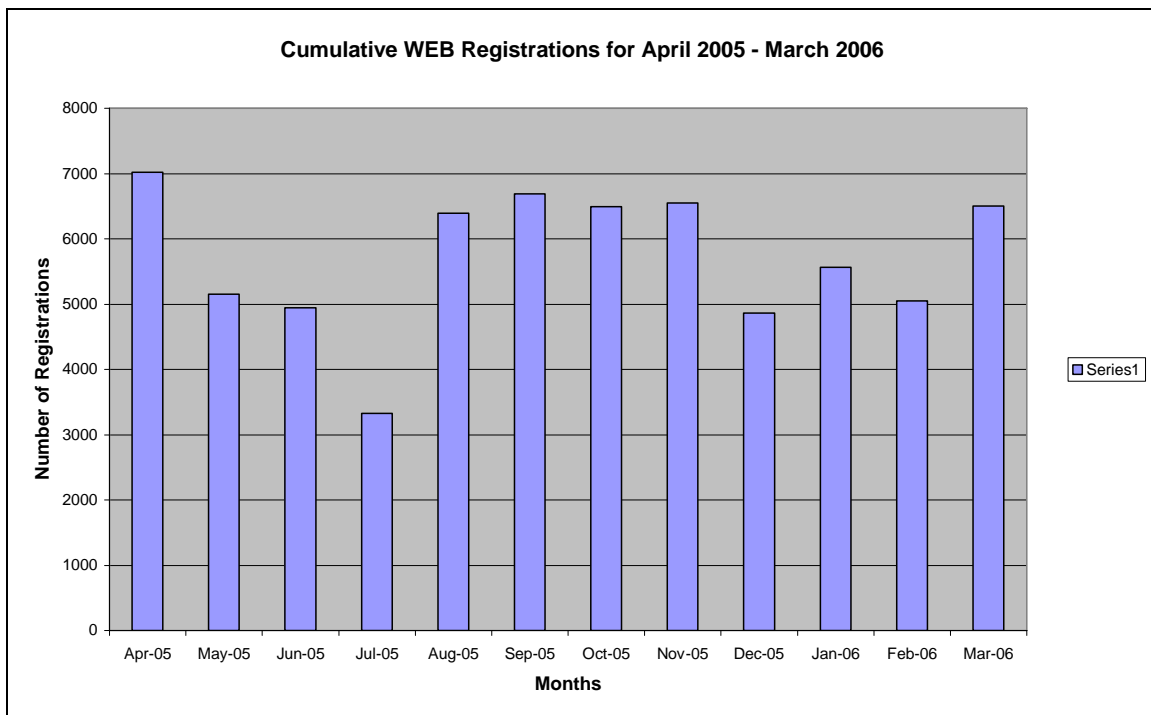
A contract agreement was reached between MWEB Business Solutions and SAWS for the implementation of an online web-based electronic payment system. The system will be implemented in April 2006 after completion of the product development. The second phase of web development will be done later in 2006. All information is currently freely available on SAWS website, which received an average of 71 000 page views and hits per day during the last quarter

of 2005. This increased to an average of 77 000 page views and hits per day during January and February 2006.

The graph below outlines the cumulative monthly web registrations for the period under review. The total for 2004-2005 is 71,965 and for 2005-2006 is 68,556 due to major peak that has occurred in the first three months of operating our new dynamic website in the 2004-2005 fiscal. The accumulative total of web registrations is 140 521.

### Disaster Recovery Plan (DRP)

As a first step towards the completion of a SAWS DRP we have completed a Business Impact Analysis, analysing all the high and low business risks should we not have a business continuity plan. We are finalising the DRP strategy for Business Continuity Planning; these are the two critical first stages of a Disaster Recovery Plan. The detailed recovery action plans and implementation plans will be completed in June 2006.



### HUMAN RESOURCE MANAGEMENT

The Human Resource Management business unit is responsible for management and support provision to the entire organisation. As a people-centric organisation, SAWS's achievement of its goals is solely dependent on the effort and support of our professional staff. It is in this regard that staff motivation, continuous learning and growth, performance management and employment equity are critical ingredients for the sustainable success of SAWS.



This business unit comprises the following sub units:

- Recruitment and Selection
- Employee Relations
- Human Resource Development
- Performance and Compensation Management

### Recruitment and Selection

This sub-business unit is responsible for talent management, recruitment, employment equity and the revision of our outdated Equate salary system through streamlining of all Human Capital Management (HCM) processes suited to our dual scientific and management roles. A project commonly known as Reward and Remuneration was undertaken. This process will result in a proposal to the Board on the way forward. The following processes have been completed to inform this proposal.

- A drafted organogram for the organisation utilising the available reports from consultants;
- Skills and competences for each job;
- Jobs graded;
- Pay scale per grade per job family;
- Benchmarking each job nationally;
- International benchmark science jobs against six selected countries; and
- All jobs evaluated.

In the current structure a total number of ten vacancies were job evaluated using the equate job evaluation system during this reporting period resulting in a total of 32 new employees recruited during the period under review. Of this number 88% were historically disadvantage individuals.

### *Employment Equity*

Employment Equity is important to create an environment in which SAWS consistently provides equitable career opportunities to all staff. There is a need to improve on target setting in order to ensure appropriate planning. Targets were set using 2004 national figures to be realised in 2009. The annual targets were not specific; hence the final results could not be effectively tabulated.

## WORKFORCE PROFILE

**Table 1: Race and Gender**

Occupational category	Black Male		Black Female		White Male		White Female		Coloured
	Male	Coloured	Male	Female	Male	Female	Male	Female	
<b>Female</b>									
Legislators, senior officials and managers	5		2	3	1		-	1	-
	<b>12</b>								
Professionals	8	1	34	8	2	0	2	0	55
Technicians and associate professionals	12		3	17	4	0	0	2	0
	<b>38</b>								
Clerks	77	42	32	31	20	5	4	5	216
Plant, machine operators and assemblers	1		-	1	-	1	-	-	-
	<b>3</b>								
Elementary occupations	22	10	0	0	8	1	-	-	41

TOTAL	125	58	87	44	31	7	8	5	365
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**Table 2: Staff Movements**

	Discipline		Black Male		Black Female		White Male		White Female		Coloured	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Asian	Coloured	TOTAL									
Male	Asian Female											
New Appointment	10	11	2	2	2	1	3	1	32			
Promotions*	6	5	4	0	1	2	-	-	18			
Terminations	1	1	-	-	-	-	-	-	2			
Retirements	2	-	2	1	-	-	-	-	5			
Resignations	8	7	4	3	-	-	-	-	22			
Deaths	3	-	1	-	1	-	-	-	5			

\* Vacant posts are advertised both internally and externally. Interviews are conducted and the best candidate is appointed to the position.

### Employee Relations

All disciplinary matters in the organisation are dealt with in accordance with prescribed legislation and approved policies. A Grievance Policy is in place to enable staff to raise their grievances without fear of victimisation. SAWS has also developed sufficient and relevant policies which are on the intranet and which have been effectively communicated to all staff members.

Over the reporting period HR has dealt with the following cases as indicated in the table below:

Nature of Cases	Black		White		Coloured		Asian		Outstanding Cases
	Male	Female	Male	Female	Male	Female	Male	Female	
CCMA Cases	1	1	0	0	0	0	0	0	1
Grievances	1	1	2	2	1	0	0	0	2
DC Enquiries	3	0	1	0	0	0	0	0	3
Total	5	2	3	2	1	0	0	0	6

**Table 3: Employee Relations Statistics**

### Human Resource Development

The sub-business unit Human Resource Development is responsible for skills development and capacity building of staff as well as the Employee Assistance Programme.

In skills development and capacity building, the unit profile staff skills by arranging in-house and external training. On employee well being, the unit is responsible for the management of the Employee Assistance Programme (EAP) related matters and the HIV and AIDS programme.

During this reporting period a total of 184 staff members attended training courses in different fields. This figure is broken down as follows:

- 141 staff members attended short courses by service providers;
- 31 staff members attended the in-house Management Development Programme (MAP); 17 candidates attended from August 2005 to February 2006, and 16 staff members started with effect from February 2006; and
- 12 staff members attended the Adult Basic Education Training Programme (ABET).

The total number of days spent on training staff for this reporting period equals to 2,161 days. The budgeted amount for training was R4,462,949 and the total amount spent was R4,262,956.

### **Employee Assistance Programme (EAP)**

During 2005-2006 the Internal EAP Management Programme was outsourced. The EAP assists employees and their family members to cope with the psychological challenges in their daily lives, whether at work or at home.

Employees of this organisation are seen as the foundation of organisational success. However, within the present day working world, work related stress is on the increase. Employees are faced with the demands of adjusting to rapidly changing technology, a context of greater job insecurity, constant change, increased workloads and extended working hours.

In response to the potentially detrimental impact of personal and work-related stress on job performance, organisational effectiveness and employee well-being, the Employee Assistance Programme aims to provide support and assistance to employees and their families through 24 hour access to confidential and professional support services.

In this reporting period, there were 67 cases generating a total of 118 services with no repeat users. The utilisation percentage is 19%. This rate is on the upper quartile of the average international EAP utilisation rate as well as the Independent Counselling and Advisory Services (ICAS) EAP utilisation rate of between 10% and 20%.

### **Performance and Compensation Management**

- **Performance Management**

For this reporting period, SAWS implemented the Performance Management System (PMS) based on the Balanced Scorecard. The performance appraisal process was conducted at the end of the financial year (31 March 2006) and the performance bonus payout was implemented during the month of May 2006.

The implementation of the Performance Management System had both advantages and disadvantages, but it has been successfully implemented.

- **Compensation Management**

Leave statistics are produced on a monthly and quarterly basis and presented to management for review and follow up. This ensures that all leave taken by employees is properly recorded and accounted for. For this reporting period, the statistics indicates that in all leave is utilised with policy limits.

- **Capped leave liability**

In February 2005 there were 17 285.20 and these were reduced to 2396 by March 2006. This represents a cash value of R1 695 027.65. It is hoped that this will be liquidated within the next financial year.

- **Reward & Remuneration**

During the reporting period some remarkable progress was realised on both salaries and other benefits. Staff salaries went up by 6% and shift workers were given a shift allowance of R1 800.

Although there is still a lot to be done the organisation seems to be in the right direction in taking care of its employees.

## INTERNATIONAL LIAISON

In support of the adage that says 'Weather knows no political boundaries' the International Liaison function ensures that as an organisation we stay informed about global meteorological issues. We further network with World Meteorological Organisation (WMO), various National Meteorological Authorities and other international bodies that influence meteorological sciences.



During this reporting period, International Liaison took place on a number of fronts; the successful hosting of the historical World Meteorological Organization (WMO) Commission for Atmospheric Science (CAS -XIV); the facilitation and lobbying of donor funds for training of SAWS scientists; and radar data exchange between SAWS and Mozambique are the highlights.

The CAS-XIV conference took place in Cape Town from 16–24 February 2006. This was the first opportunity ever for the African region to host a WMO technical commission gathering of this nature and as a result there was great African participation. The meeting was opened by the Department of Environmental Affairs and Tourism Minister, Marthinus van Scalkwyk.

A lot of atmospheric research initiatives, particularly for the benefit of vulnerable regions in the developing world were adopted. This inevitably addressed some of the key environmental concerns in the New Plan for Africa's Development (NEPAD) and the Millennium Development Goals (MDGs). During this historical conference, the South African team of researchers working on weather modification was announced as the winners of the United Arab Emirates Prize for Weather Modification. Dr. Deon Terblanche, a SAWS staff member is part of the scientific team awarded. The award included a US\$200 000 prize money which was presented during a function of the CAS Session to be spent on further research and training.



A number of SAWS scientific personnel participated in numerous international meetings, workshops and training programmes. The funding for the majority of these international visits was sourced from international organisations such as the WMO. These exchange visits and conferences have promoted international collaboration, standardisation and joint development programmes towards the enhancement of national meteorological services.

The sharing of meteorological data between neighbouring national weather services has expanded into radar data. The excellent relations and collaboration between the Mozambique Weather Service and SAWS has ensured real-time sharing of radar data. This is important for monitoring extreme weather and the passage of severe weather systems between countries. The expansion of the regional network to include Botswana using the Gaborone weather radar is being investigated.

SAWS has furthermore lobbied the WMO Voluntary Cooperation Programme to hold its next informal planning meeting in South Africa. The aim is to direct the focus of this programme on the plight of weather services in developing countries. The programme is important for promoting technical development in national meteorological services of developing countries. The provision of quality weather services in developing countries is of even greater benefit than in developed countries, as this is where the greatest environmental risks are being experienced.

## Audit reports, financial statements and other financial information

Report of the Risk and Audit Committee

Report of the Auditor-General

Approval by the Board

Accounting Authority's report

Balance sheet

Income statement

Statement of changes in equity

Cash flow statement

Notes to the annual financial statements

Materiality framework statement



## Acronyms



Notes

Notes

## Contact details

Pretoria National Forecasting Centre	082 233 9800
Aviation Weather Centre, Jhb	082 233 9600
Bloemfontein Weather Office	082 233 9100
Cape Town Weather Office	082 233 9900
Durban Weather Office	082 233 9500
Port Elizabeth Weather Office	082 233 9700
Climate Information Data	082 233 8484
Forecasts longer than 7 days	082 233 9000
Chairperson of the Board	+27(0) 12 367 6078
Chief Executive Officer	+27(0) 12 367 1111

Weatherline **082 162**

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