



WCSSP South Africa

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WCSSP South Africa - Background



Underpinning Science Development - to improve high-impact weather prediction through the collaborative evaluation and development of convective scale models.

Strengthening Institutional Capability - to utilise collaboration and exchange to pull through successes achieved at both the Met Office and SAWS, developing data services and analytical skills to ensure the most effective use of model outputs.

User-led Applications - to develop the capacity to support the advancement of user-led weather services and enhance impact-based forecasting in South Africa through the sharing of training and expertise.



Met Office

SA4



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Underpinning Science Development

- Provides the underlying science and weather forecasting model development that is pulled to user impact.
- Focused on maintaining, enhancing and undertaking research on configurations of the UM used for convection permitting weather forecasting
- Underpinning Science development: Evaluate and develop high resolution models to improve the prediction of high-impact weather.

- Regional Model Evaluation & Development (RA3)
- Research with South African universities & CHPC
- Local observation processing / data assimilation capability
- Convective scale ensemble research
- Research into use of 300m models in South Africa







Regional Model Evaluation & Development







Local observation processing / data assimilation capability

Convective scale ensemble research



Research into use of 333 m models in South Africa







Strengthening Institutional Capacity

- Collaboration and Enhancement of Training between SAWS Regional Training College and the Met Office College
- To enhance the portfolios of the Met Office College and SAWS Regional Training Centre by sharing existing materials and developing new courses
- To improve the content of joint ventures to the mutual benefit of SAWS RTC and MOC

- Jointly develop online training materials that may help in the training of both SAWS and UK Met Office Forecasters
- Improve the WMO Aviation Seminar by introducing precourse online material for the delegates ahead of the Aviation Seminar



Strengthening Institutional Capacity Strengthening



- Railway / Transport sector
- Aviation (SIGMET simulator training and aviation forecast seminar)
- Marine Training
- Modernize training for SAWS benefit
- Development of the delivery of training material/scenario on the Moodle platform
- Training Needs Analysis to identify specific training needs with stakeholders
- Train-the-trainer activities to support training opportunities; develop joint training between MO and SAWS
- Support external training development especially with the emphasis on the commercial offering; e.g. workshop with Disaster Management







User-led Applications

- Focus on ancillary services for the Energy Industry, underpinned by the UM for weather forecasting
- Demonstrate SAWS NWP model effectiveness in forecasting solar radiation
- Develop applications from NWP data into services

- Evaluation of site-specific solar forecasts
- · Determine cause of model bias
- Development of impact-based forecasts





User-led Applications



Renewable Energy forecast

- Overall, the SAWS high resolution models are effective in forecasting surface shortwave radiation across South Africa.
- Mean bias behaviour changes with model resolution (1,5 km and 4 km).
- Mean errors are larger around mid-day and during Summer





Impact Based forecasts

wind a

- Development of impact Tables:
 - Rainfall Thunderstorms Wind Snow
- Operational since April 2019

linimal	Minor	Significant	Severe
ss as usual	Business as usual	Short term strain on emergency personnel	Prolonged strain on emergency personnel
(applicable looding, id hail)	General (applicable also to filedoling, which and hail): Localised damage to infrastructure, settlements (informal), property, vehickal, livelihood and livestock Localised and short term disruption to municipal and other setion. Also, Communication and power suppoly Localised toss of agricultural production	General (applicable also to flooding, which and hall): Injuries and danger to life Damage or loss of infrastructure, settlements (formal and informal), property, vehicles, likelihood and livestock Major travel disruptions (ind route ostructions) and incidents Daruption of municipal and deter- essential services (Education, sources rapply) Loss of agricultural production	General (applicable also to flooding, whird and hall; I fujirés and danger to life Widespread danage or loiso of Infrastructure, property, vehicles, Inveithood and livestock Widespread disruption of municipal Widespread disruption of municipal Widespread disruption of municipal Microstree, health Benvices and poer used) Microstree, health Benvices Microstree, health Microstree, health Mic

mpact-Based Forecasting: SEVERE THUNDERSTORMS Impact Table







Purpose:

 To address the challenges associated with environmental climate risks and change in South Africa, including creating capacity towards the aims of the WMO's Global Framework for Climate Services and the United Nations Sustainable Development Goals.

"Climate"

Four Priorities:

Development & Evaluation at **Seamless** (weather and climate) * timescales

Climate Observations and Attribution

Climate Projections and Impacts

Climate Science for Services





GFCS **GLOBAL FRAMEWORK FOR** CLIMATE SERVICES



10 year simulations:

- present-day (1997/03-2007/02)
- future RCP8.5 (2097/03-2107/02)
- CP4A = 4.5km with explicit representation of convection ("convectionpermitting")
- R25 = 25km with convection parameterisation















Socio-economic benefits

- 1. Delivering resilience and preparedness
 - Heavy rain forecast: emergency responders
 - 2. Improved services for the nation
 - Fog forecasting: efficient aviation service
 - 3. Saving lives and livelihoods
 - Severe weather forecasting: public safety
 - 4. Regional and international obligations
 - Severe weather guidance: regional safety
 - 5. Investment and development of human capital



Met Office



South African Weather Service

