Application in the UM-SA12 in Southern Africa

Stephanie Landman

South African Weather Service
ISO 9001 Certified Organisation

Operational Aspects of the UM SA12 LAM

- The SAWS run a regional version of the UM in-house

- Operational on a SX-8 high performance computer

- The domain covers the whole of southern Africa as well as surrounding oceans

- The UM SA12 has been operational sunce October 2006.

South African Weather Service
ISO 9001 Certified Organisation

Operational Aspects of the UM SA12 LAM

Configuration of UM

- 12km horizontal resolution
- 38 vertical levels
- Domain:

20W-50E; 45S-0S (SADC)

- Provides hourly numerical forecasts for up to two days ahead (48 hours).

South African Weather Service
ISO 9001 Certified Organisation
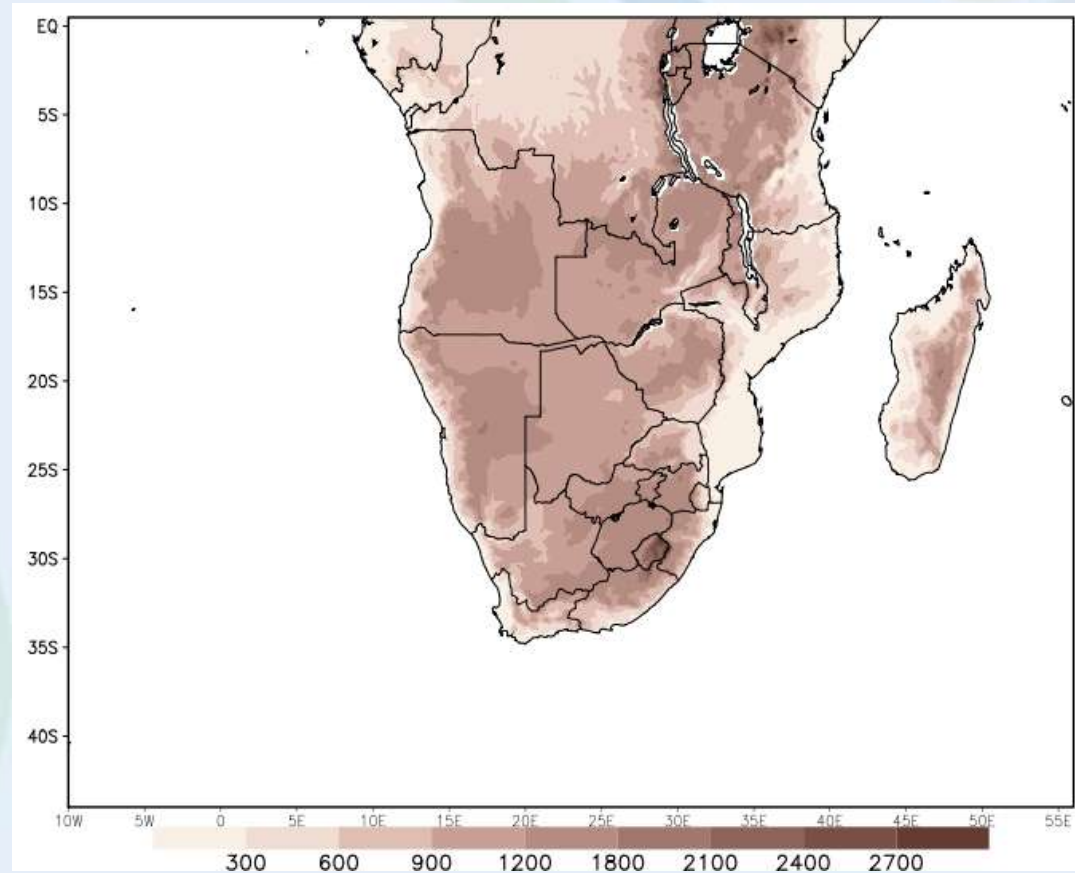
Operational Aspects of the UM SA12 LAM

- NEC sx8 single node (8 CPUs)
- 648 x 480 grid points
- 38 levels
- 128GB memory, 1.2TB disk-space
- Speed: 42 minutes per 24 hr forecast for SA12: 648x480L38
- 5 Operational runs daily

Configurations of the UM SA LAM

- UM SA12: main model run
- Initialised daily at 00UTC
- Initial conditions & lateral boundary conditions from Global UM
- 18 UTC 6hr forecast
- 48 hr forecast
- Updates daily ~ 5:00 SAST (03 UTC)

South African Weather Service
ISO 9001 Certified Organisation
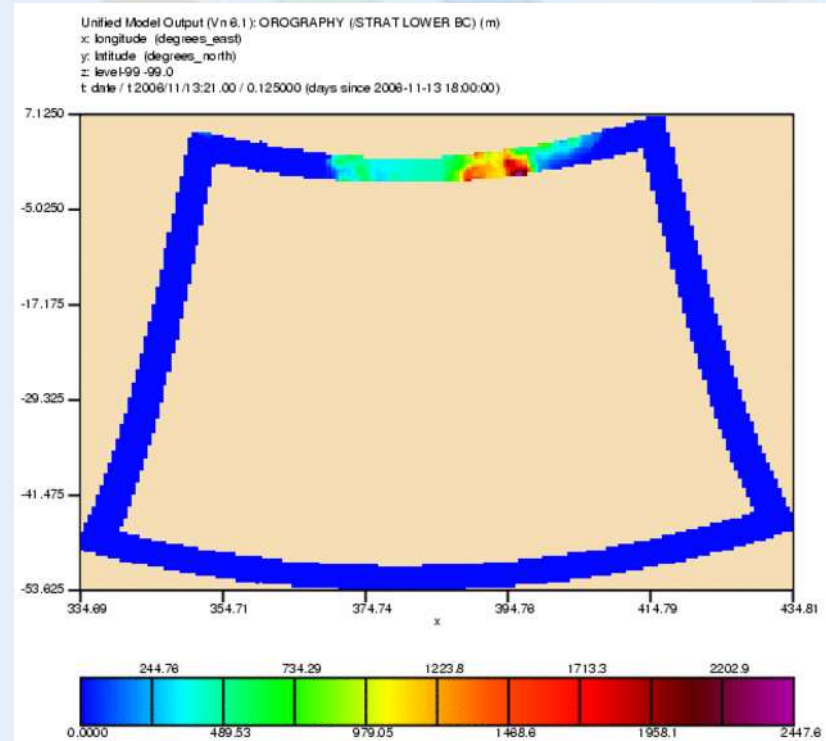
Diurnal Cycle of Rainfall UM SA12 LAM

- Known problem of convection starting too early is strongly evident in S Africa

- Subsequent stratiform rain lingers too long

- Second morning of simulation a lot wetter than first morning
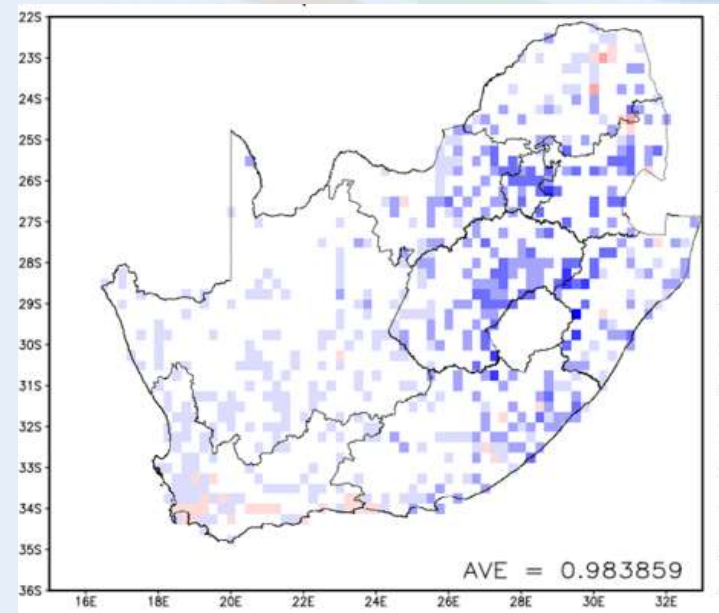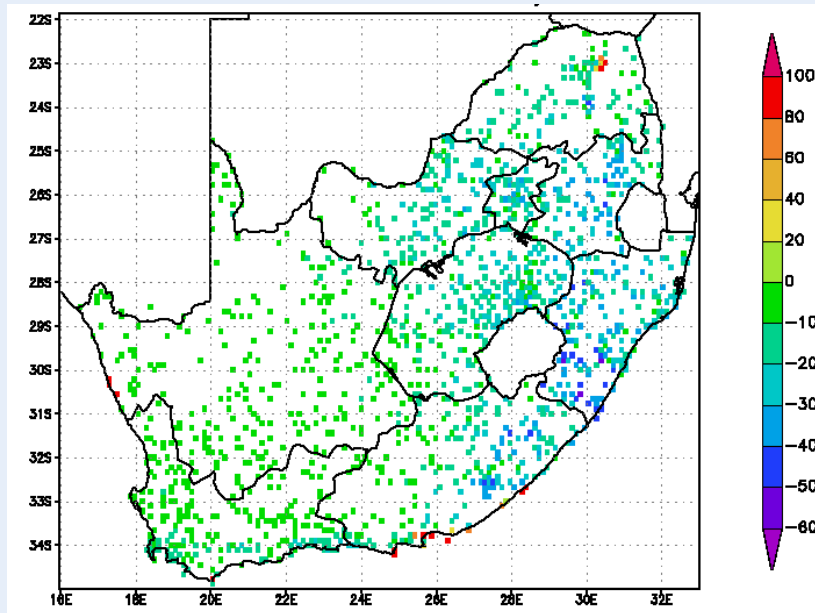
- Convection has a wet bias in this region

Tennant & Wesson, 2007

Diurnal Cycle of Rainfall

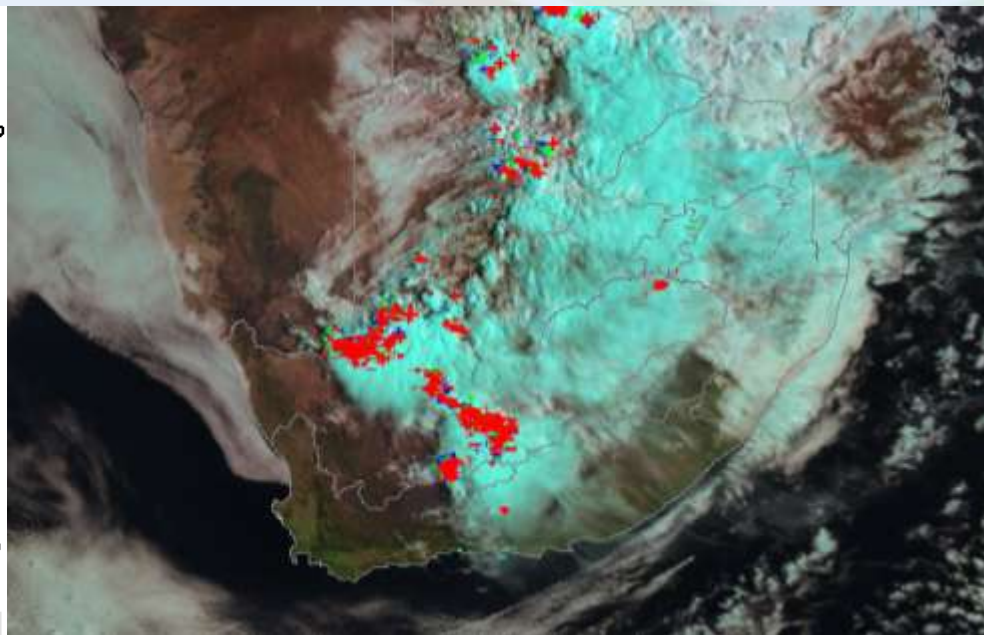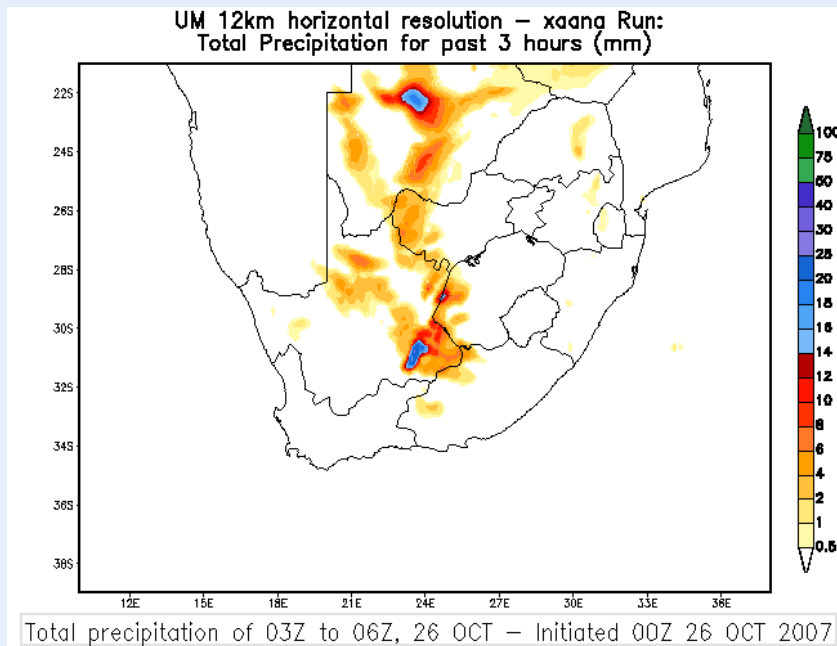**Diurnal Cycle of Rainfall (Hour 1-48)**

xaana   xaang
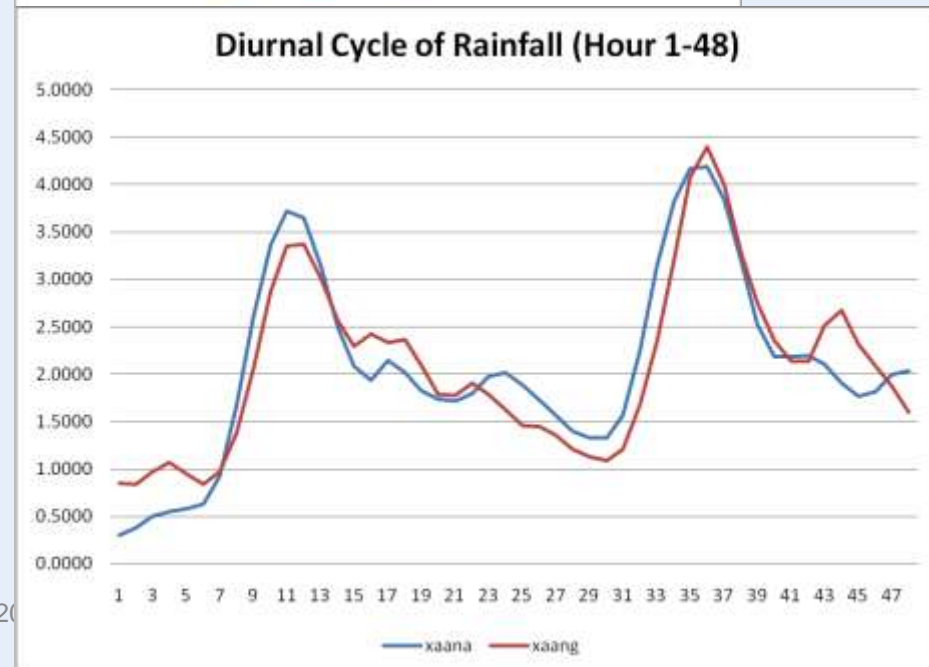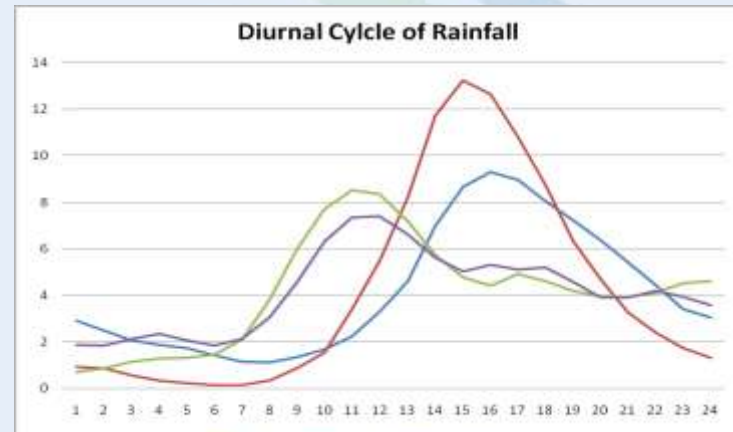
Diurnal Cycle of Rainfall
UM SA12 LAM

MODEL SIMULATES RAIN TOO OFTEN – NUMBER OF RAINY DAYS TOO HIGH

Tennant & Wesson, 2007; Landman, 2012
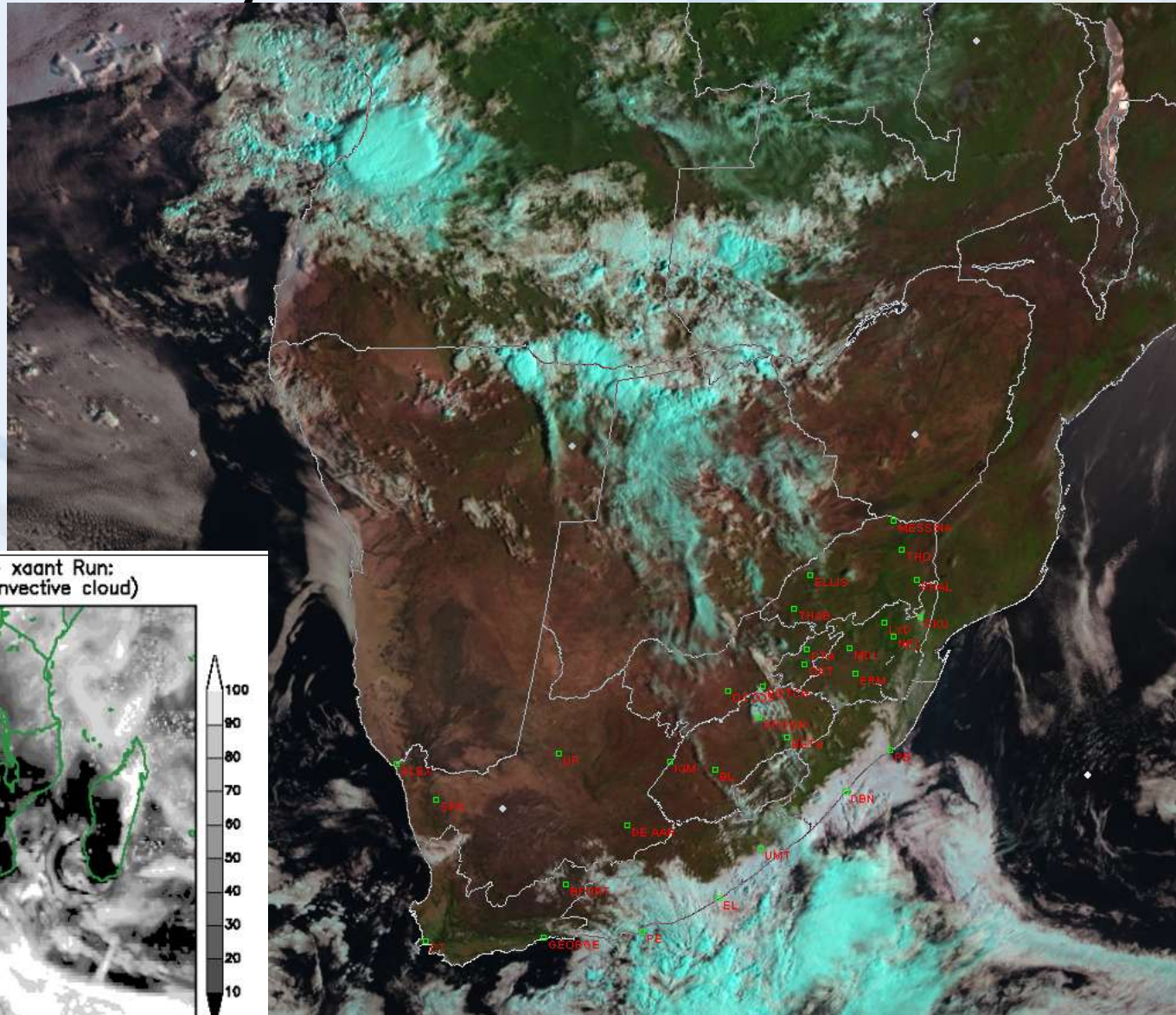
Diurnal Cycle of Rainfall
UM SA12 LAM

UM 12km horizontal resolution — xaang Run:
Total Precipitation for past 3 hours (mm)

Total precipitation of 03Z to 06Z, 26 OCT — Initiated 00Z 26 OCT 2007

Tennant, 2007

South African Weather Service
ISO 9001 Certified Organisation

Diurnal Cycle of Rainfall

UM 12km horizontal resolution – xaant Run:
Total cloud cover (% layer and convective cloud)

_UM12_20121113-LAN002.1
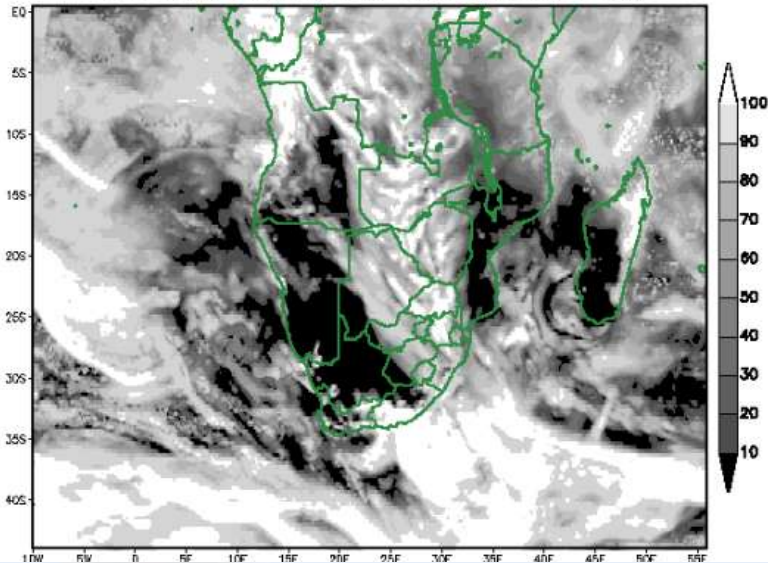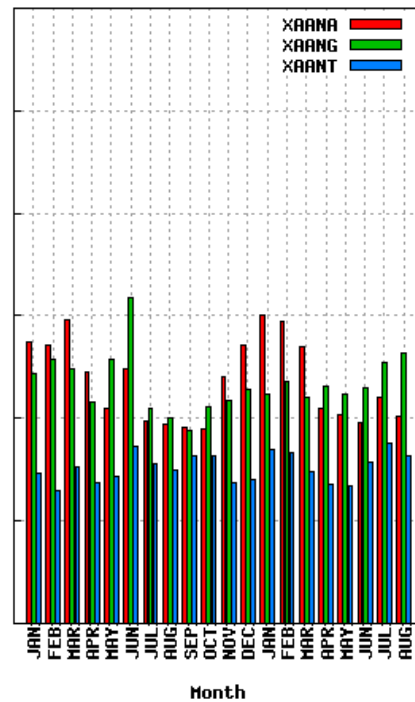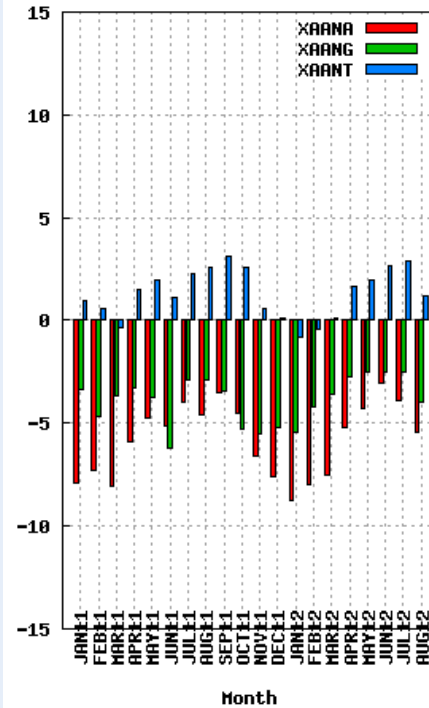
Verification of the UM SA12 LAM
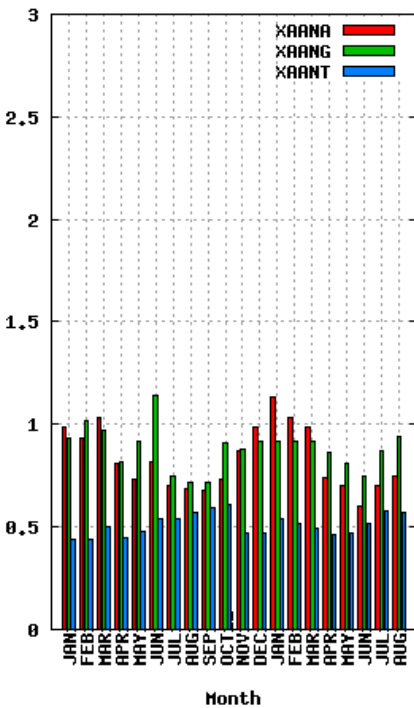
SAWS internal report
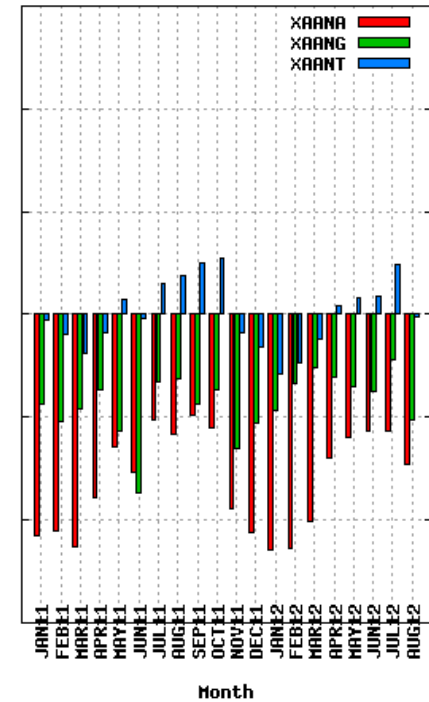
Future of the UM SA LAM

- Resolution – 4 km:
  - Convection / turbulence explicitly resolved
  - Increase in computer power
- Regional models:
  - Address forecast uncertainty
  - Drive forecast applications

South African Weather Service
ISO 9001 Certified Organisation

Applications of the UM SA LAM

- Regional responsibilities (RSMC / SWFDP)
- Training (www.eumetrain.org)
- Flash Flood Guidance (SARFFG)
- Client specific forecasts (i.e. ESKOM)

South African
Weather Service
ISO 9001 Certified Organisation