SAWS Experiences in Provision of Hazard Information for Risk Analysis

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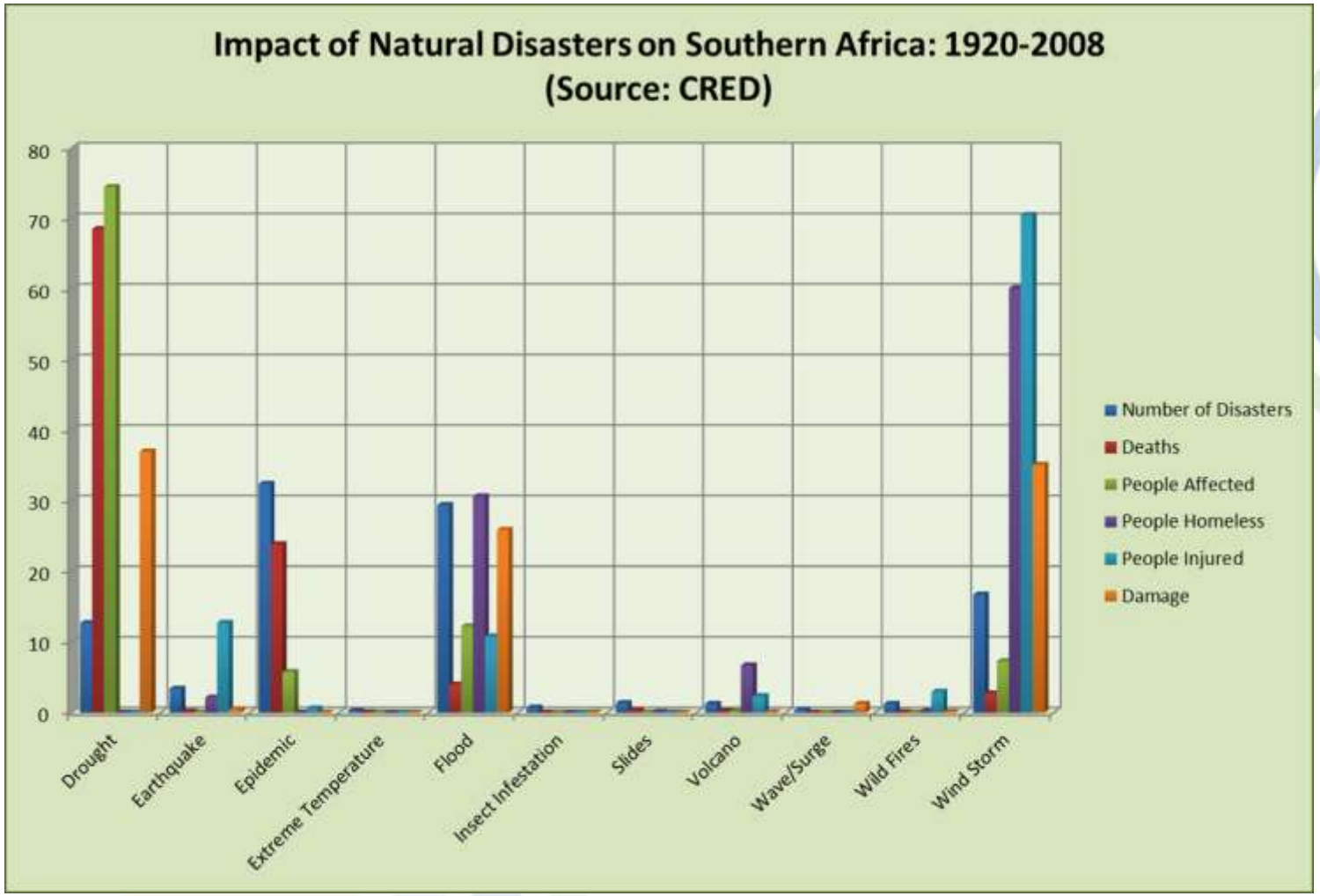
OVERVIEW



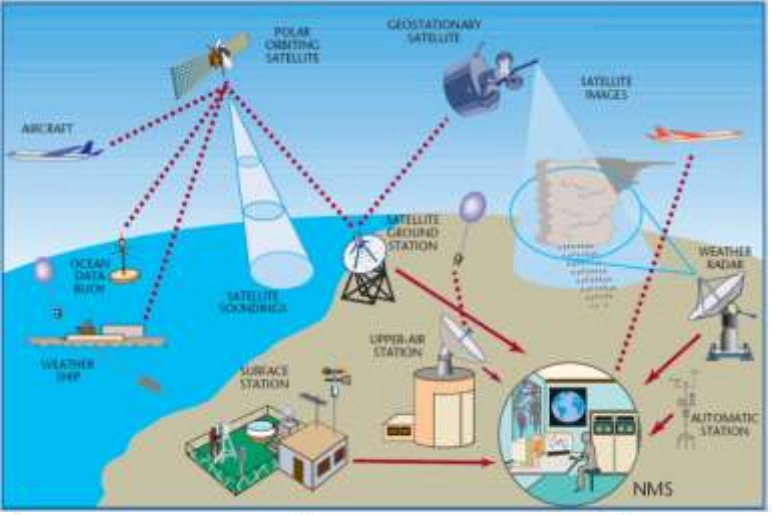
- 95% of Natural Disasters in Southern Africa are weather related (from CRED/EMDAT)
- Most important disasters for Southern Africa is drought, floods, windstorms, epidemics

National Meteorological Services are at the forefront of disaster risk reduction

- Severe weather early warnings
- Climate information and data

- Monitoring
- Forecast and early warnings
- Vulnerability analysis and risk assessment
- Applications (agriculture, water resources, etc)

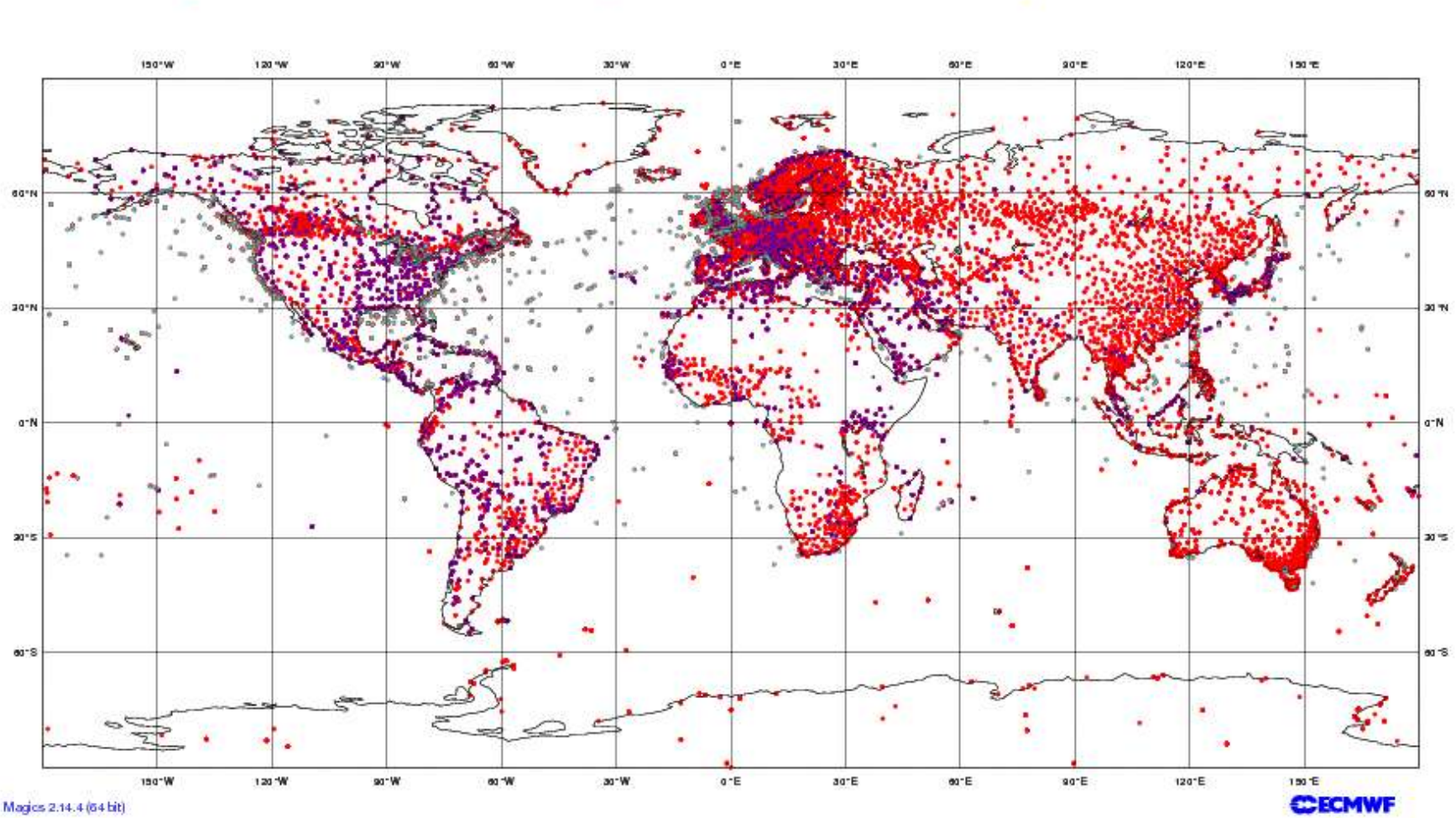
OBSERVING NETWORKS AND DATA



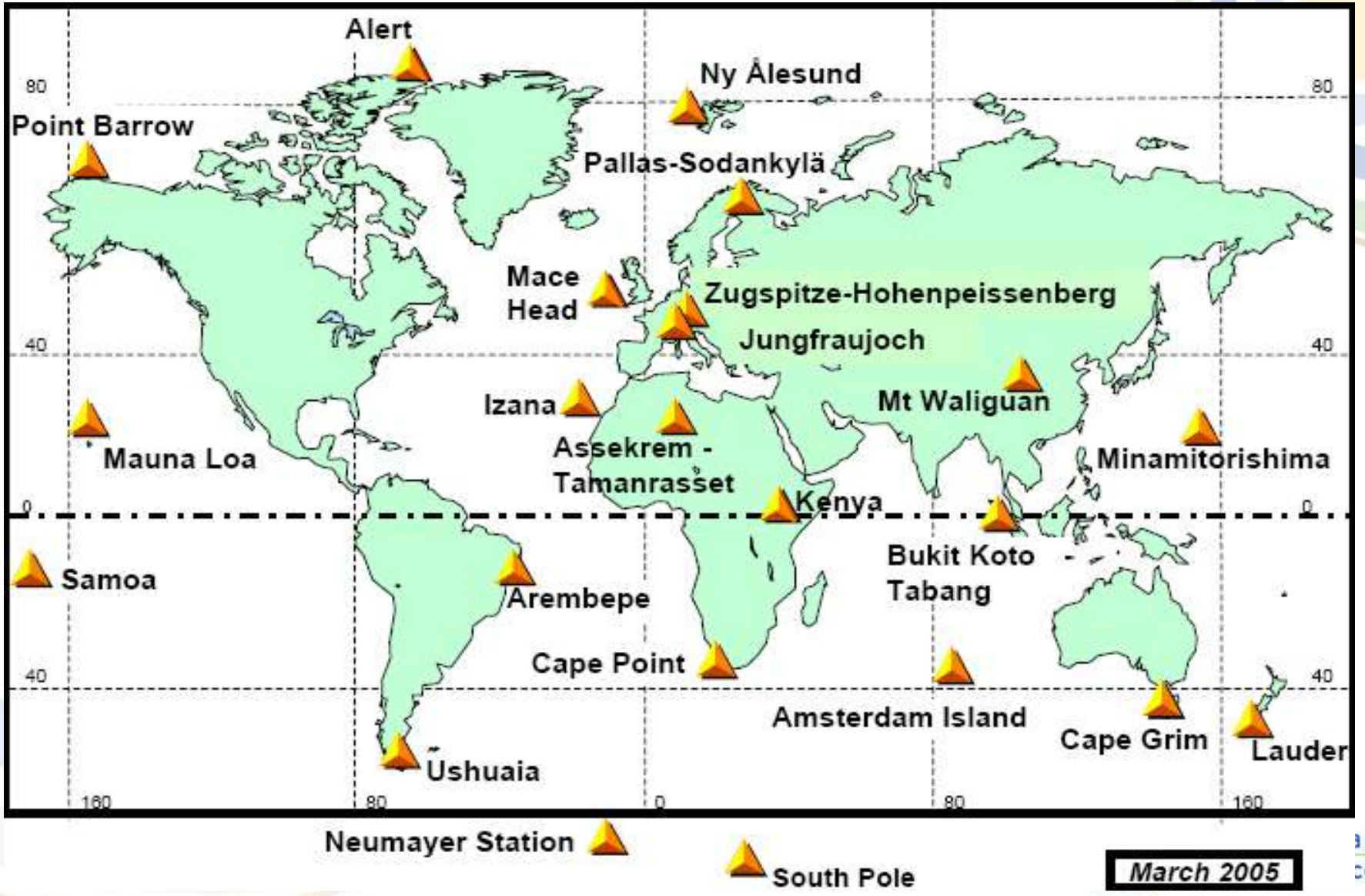
Various Weather Data Types observed by Weather Services as part of WMO GCOS

DOMAIN	ESSENTIAL CLIMATE VARIABLES
Atmospheric (over land, sea and ice)	**Surface[2]:** Air temperature, Wind speed and direction, Water vapour, Pressure, Precipitation, Surface radiation budget. **Upper-air:** Temperature, Wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance). **Composition:** Carbon dioxide, Methane, and other long-lived greenhouse gases; Ozone and Aerosol, supported by their precursors
Oceanic	**Surface[3]:** Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Surface current, Ocean colour (for biological activity), Carbon dioxide partial pressure, Ocean acidity. **Sub-surface:** Temperature, Salinity, Current, Nutrients, Carbon dioxide partial pressure, Ocean acidity, Oxygen, Tracers, Phytoplankton; Marine biodiversity and habitat properties[4]
Terrestrial	River discharge, Water use, Ground water, Lakes, Snow cover, Glaciers and ice caps, Ice sheets, Permafrost, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (fAPAR), Leaf area index (LAI), Above-ground biomass, Soil carbon, Fire disturbance, Soil moisture

ECMWF Data Coverage (All obs DA) - Synop-Ship-Metar
27/Jun/2012; 12 UTC
Total number of obs = 36093



WMO Global Atmosphere Watch Stations

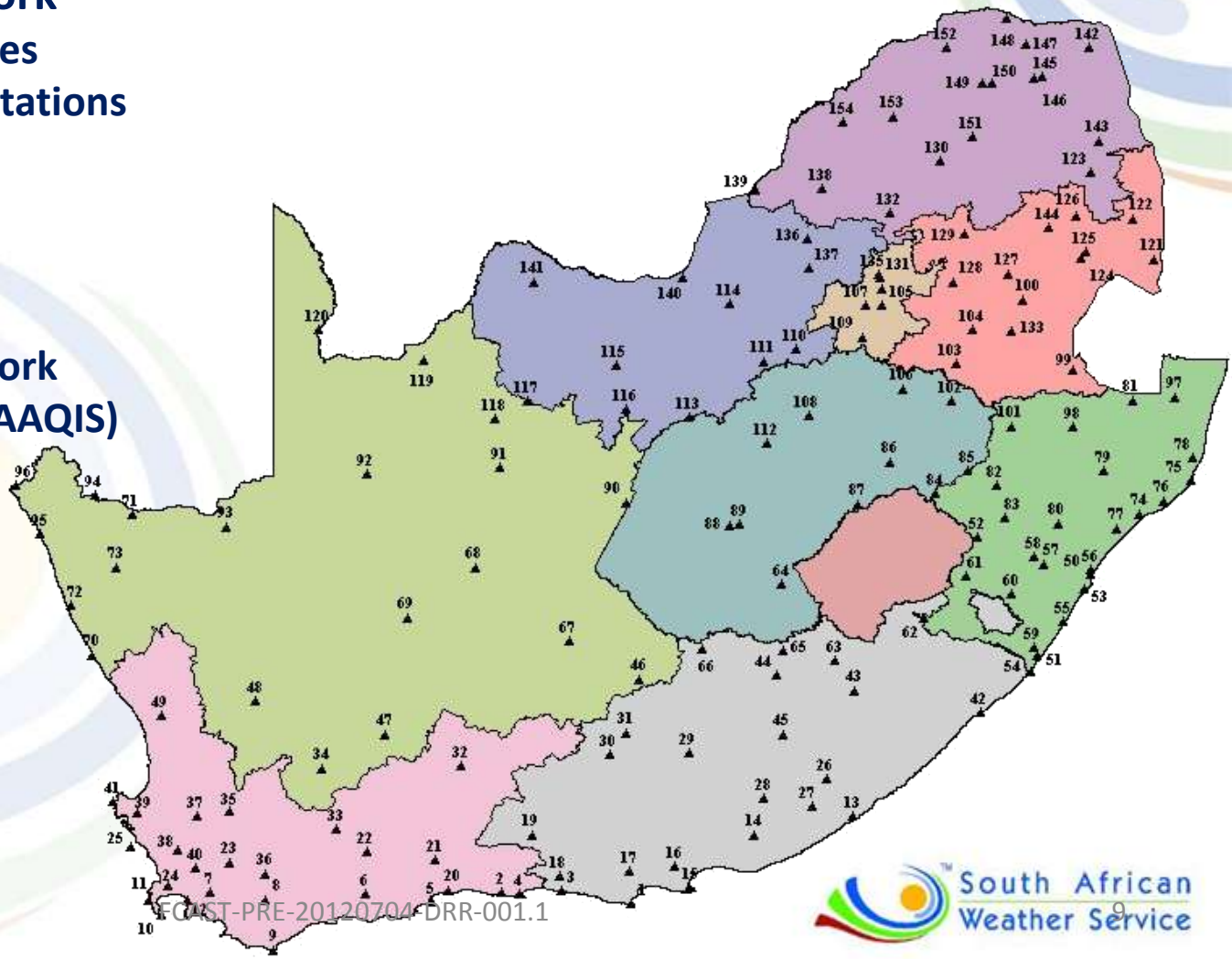


Observations are performed by NMHSs in countries but coordinated through the WMO system

SAWS Observation Network

- **20 Regional weather offices**
- **130 Automatic Weather Stations**
- **112 Climate Stations**
- **1512 Rainfall Stations**

- **Radar network**
- **Lightning Detection Network**
- **Air Quality Monitoring (SAAQIS)**



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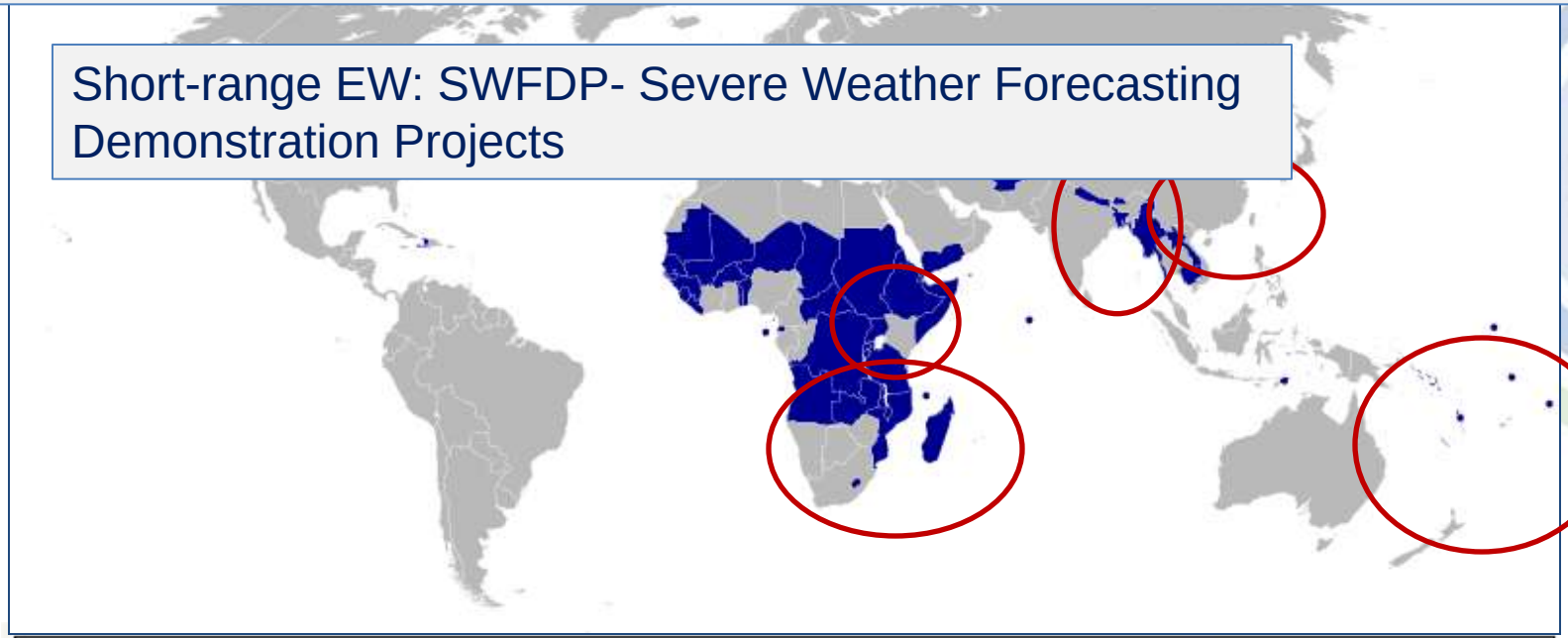
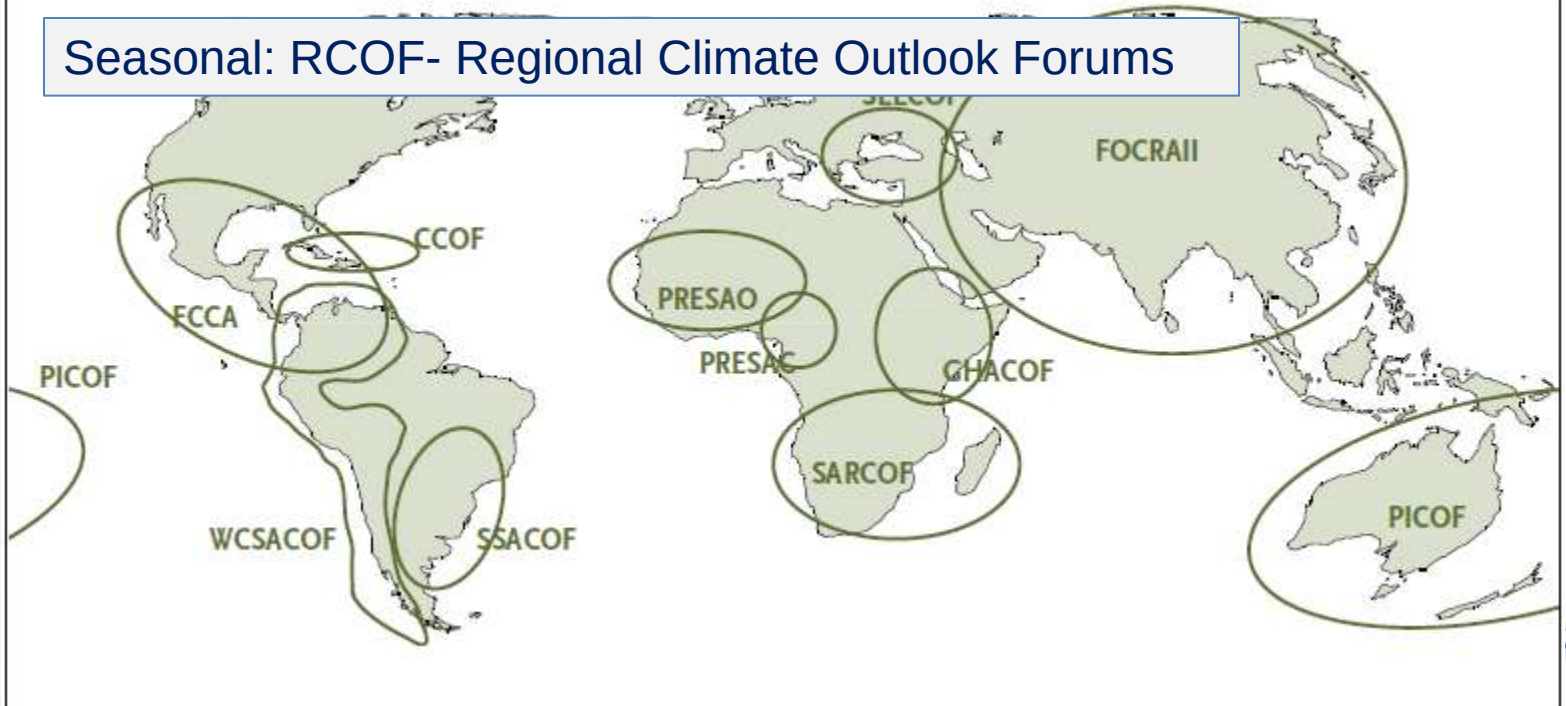
EARLY WARNING SYSTEMS

Regional Collaboration Activities between NMHSs, lead by WMO

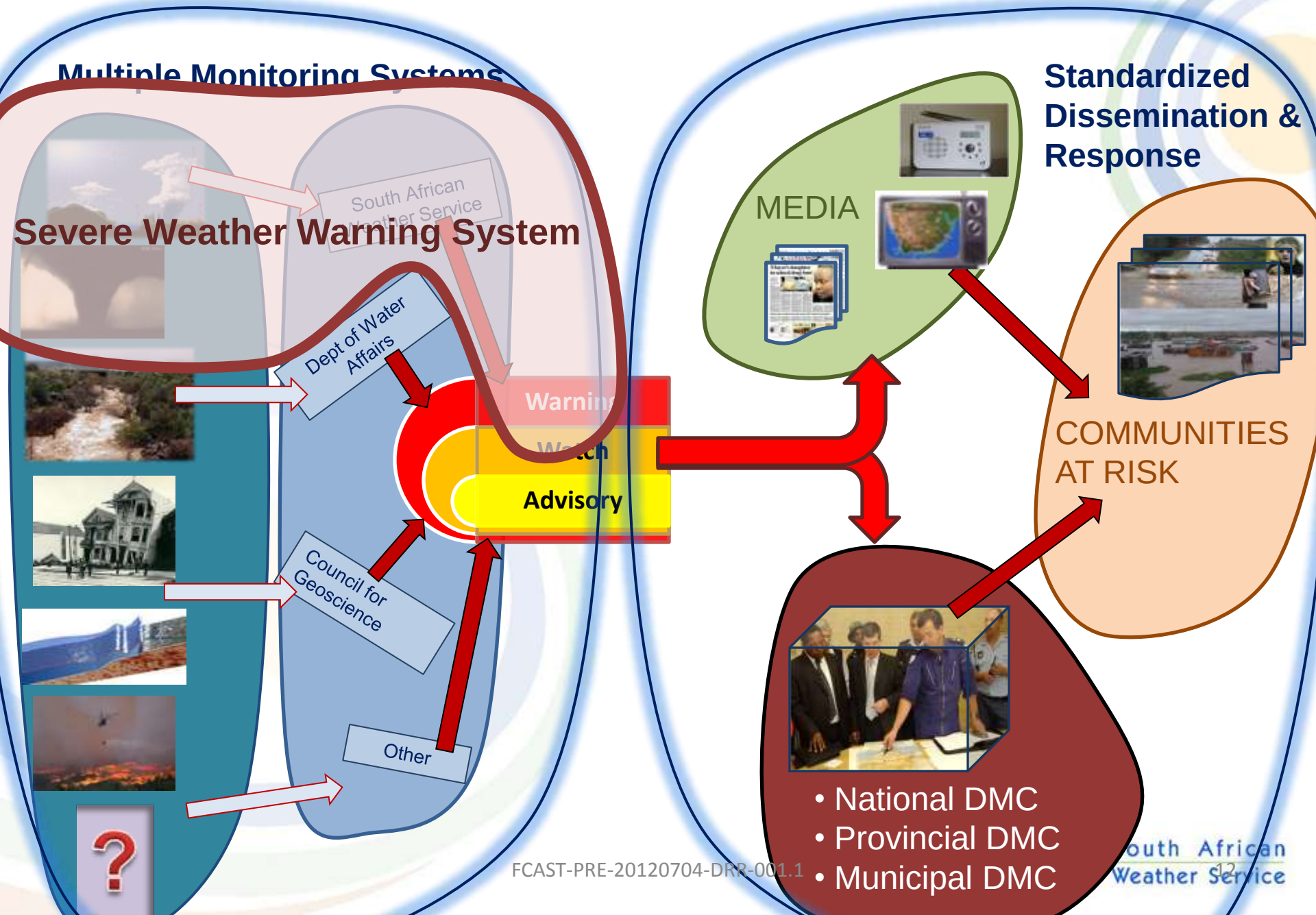
Short-range EW: SWFDP- Severe Weather Forecasting Demonstration Projects



Seasonal: RCOF- Regional Climate Outlook Forums



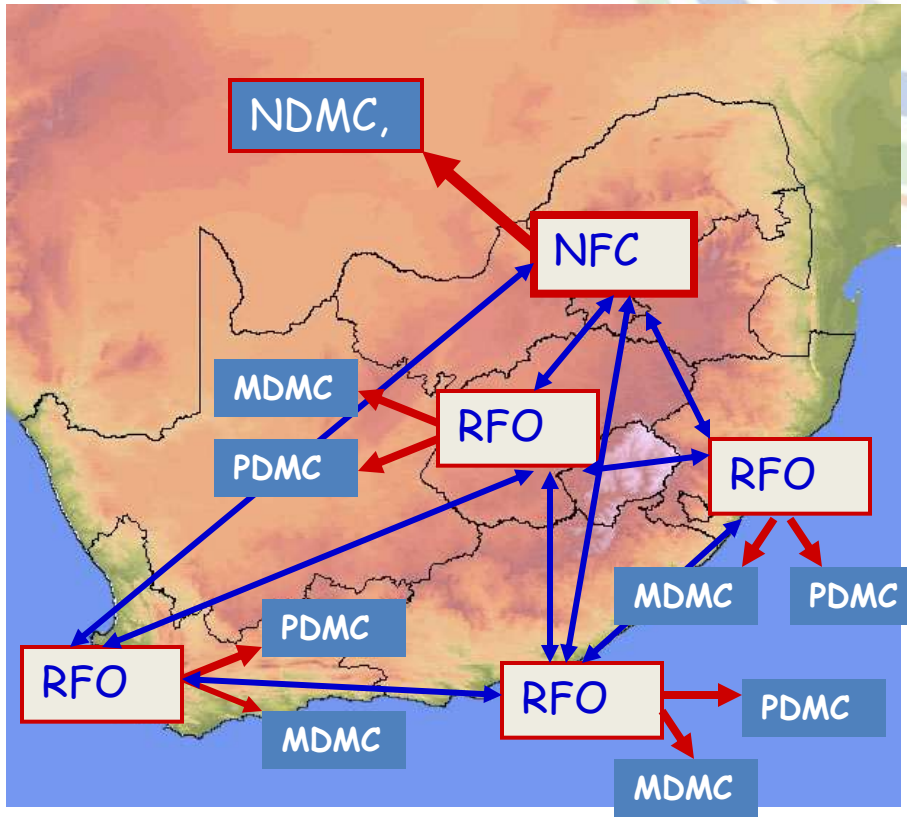
South African Multi-Hazard Early Warning System



COLLABORATION WITH USERS ON HAZARD AND RISK ASSESSMENTS AND MAPPING

Disaster Management Structures

- Collaboration at all levels between SAWS and Disaster Management Centres
- SAWS provides real-time Early Warning information to DMCs, JOCs, etc.
- SAWS provided reports, data and weather and climate related products for hazard- and risk assessments of various DM structures
- Maintain CAELUM weather events database from newspaper reports since 1900



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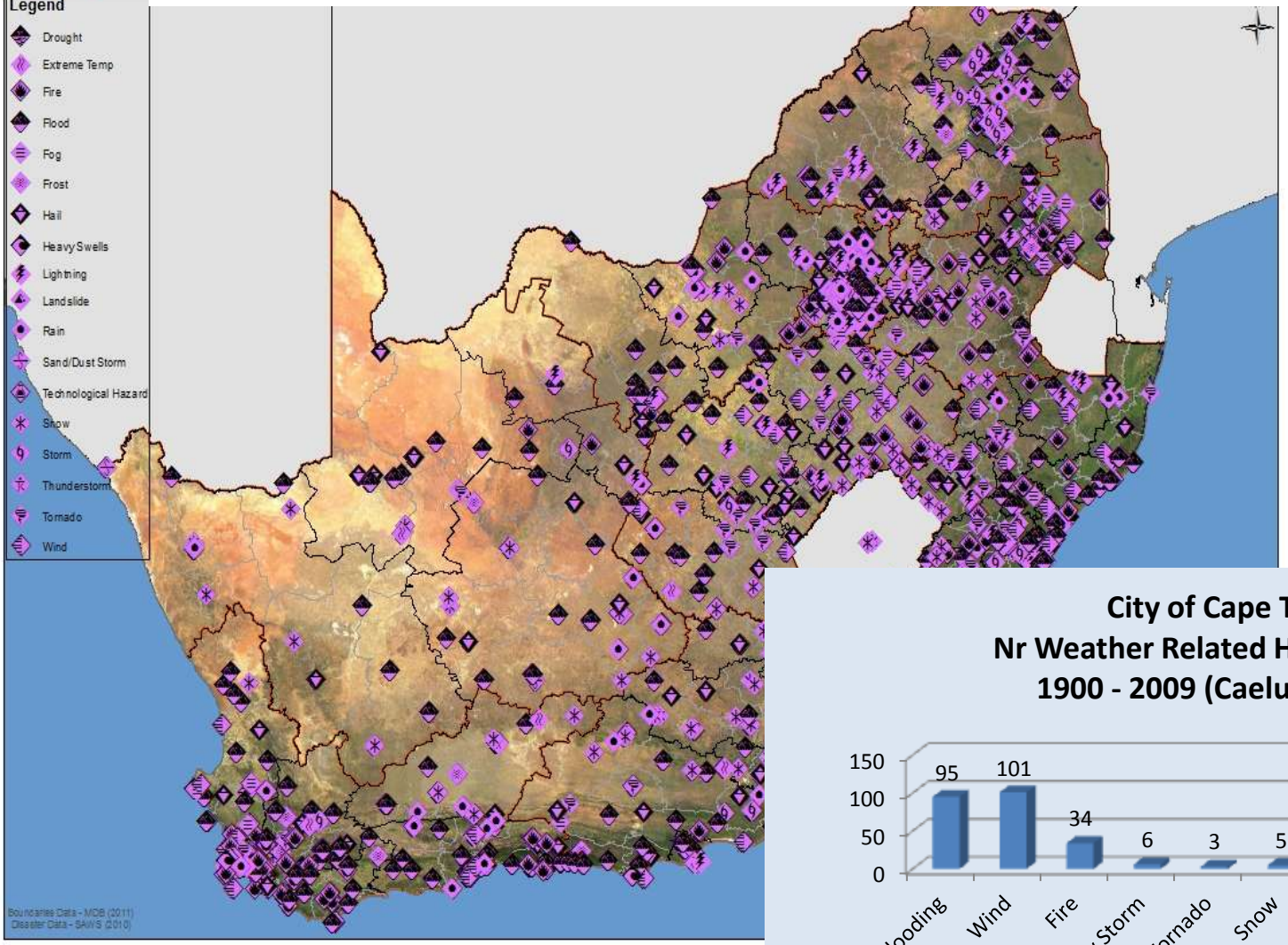
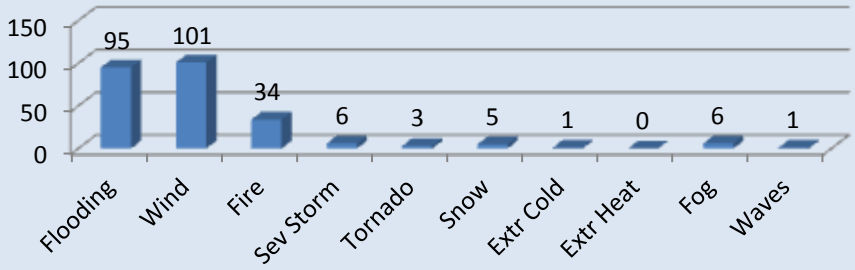
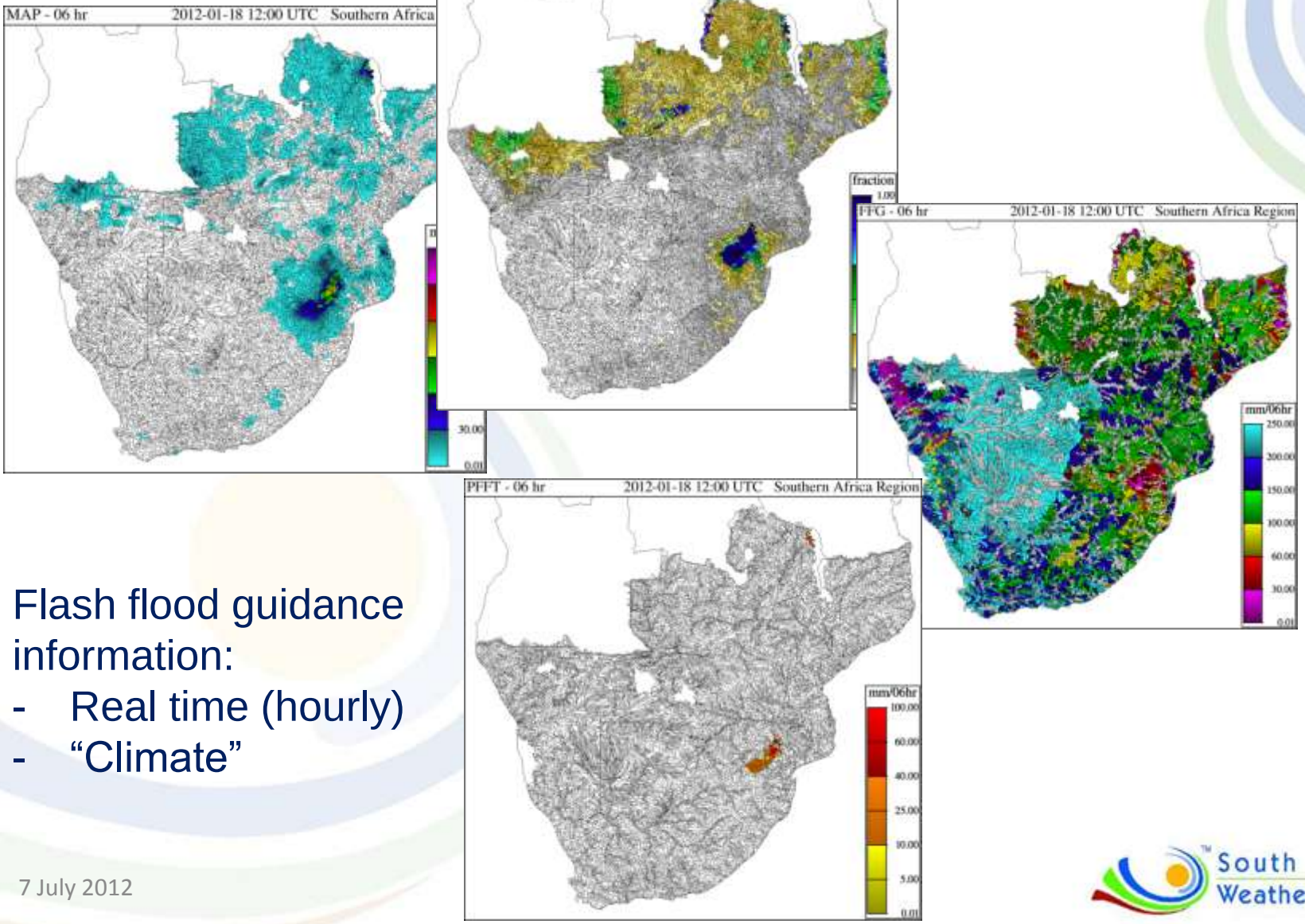
Disaster Management Structures

CAELUM:
Historical Events – Geographical Distribution





Disaster Management & Water Sectors



Flash flood guidance information:

- Real time (hourly)
- "Climate"

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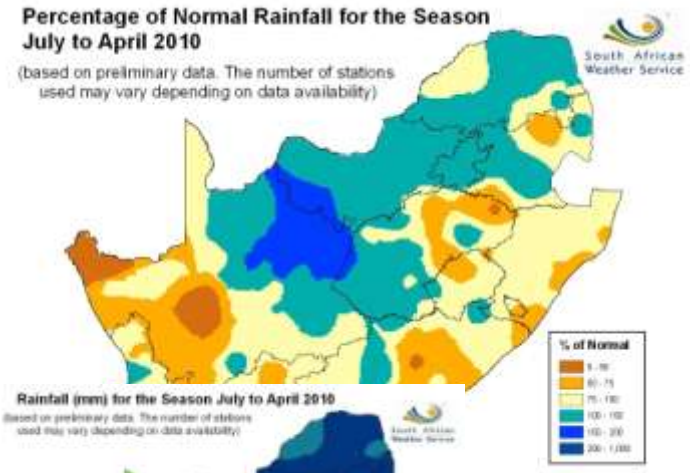
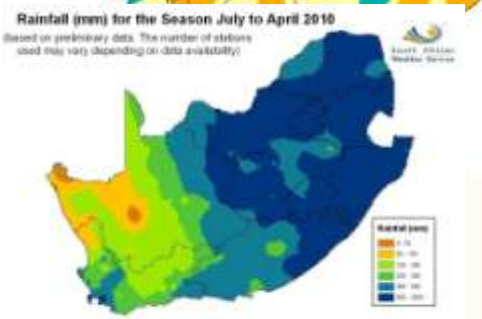
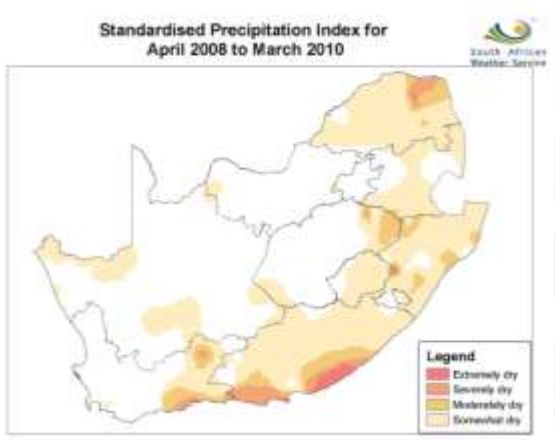
Agriculture



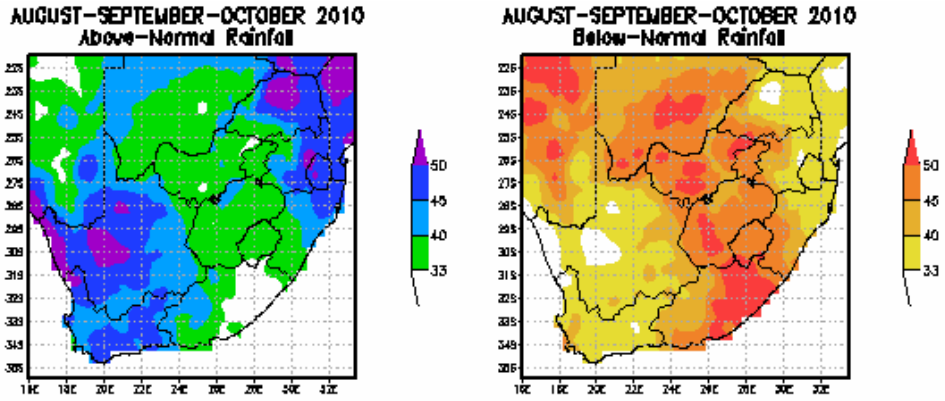




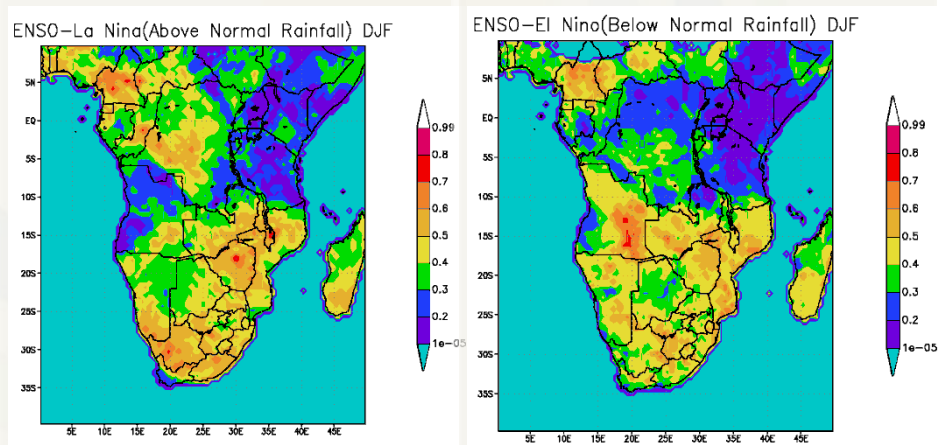
- Various products are used by the Agriculture sector
- Seasonal forecasts to plan for coming seasons
- SPI maps as indicator of potential drought conditions
- Historical rain maps, etc.

Seasonal Forecast and historical products

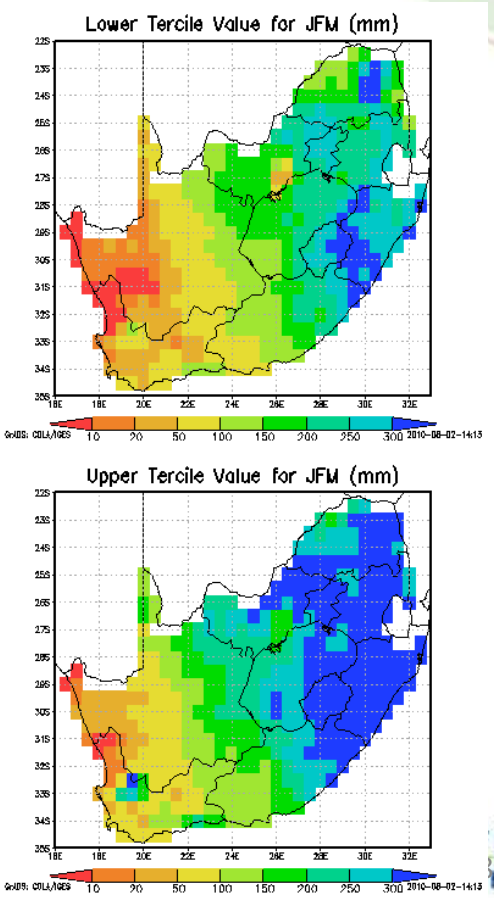
Seasonal forecasts



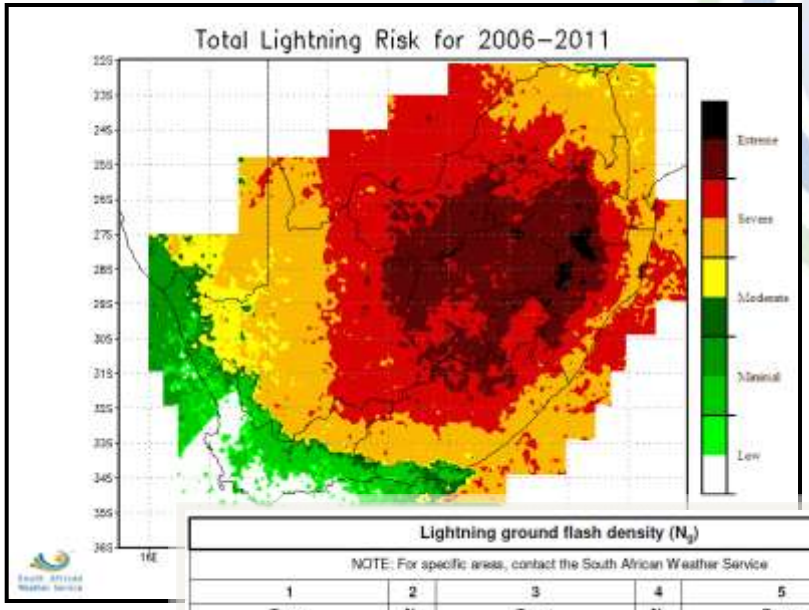
El Nino / La Nina assessments



Historical El Nino / La Nina thresholds of seasonal rainfall



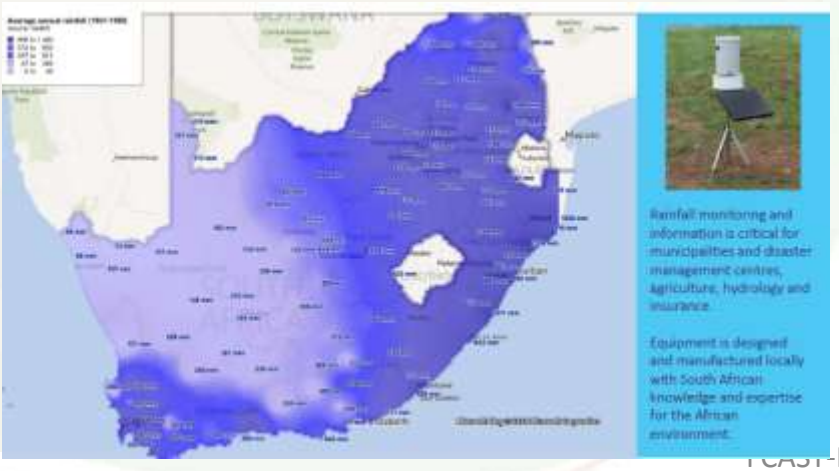
Commerce & Industry, Finance & Insurance

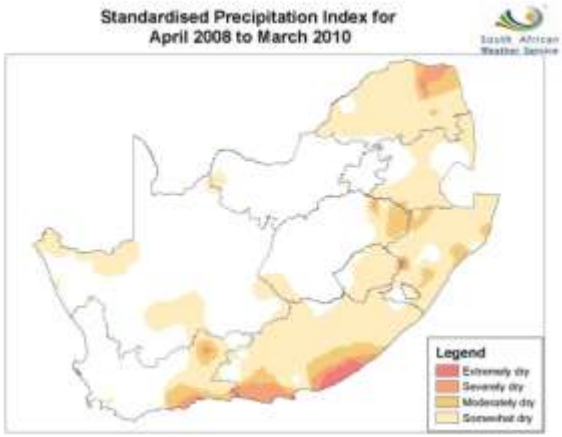


Lightning ground flash density (N_g)

NOTE: For specific areas, contact the South African Weather Service

1	2	3	4	5	6
Town	N_g	Town	N_g	Town	N_g
Aberdeen	2.4	George	0.2	Murraysburg	5.4
Albertinia	0.2	Georgedale	5.3	Nelspruit	8.0
Alexandria	0.7	Germiston	12.2	Nouport	4.4
Alkwal North	6.5	Giant's Castle	8.3	Ohrigstad	5.3
Aranos	0.8	Golden Gate	9.1	Oudshoorn	0.3
Aroab	1.7	Graaff-Reinet	2.4	Paarl	0.1
Barberton					
Beaufort West					
Bela Bela					
Belfast					
Benoni					
Bergville					





CONCLUSIONS

- NMHSs are at the forefront of weather related hazards
- Standards for observations, data exchange and climate databases are set by the WMO
- Weather information for risk assessments generated and maintained at national level
- Various weather and climate related information & products in support of risk assessments