

SAWS Experiences in Provision of Hazard Information for Risk Analysis



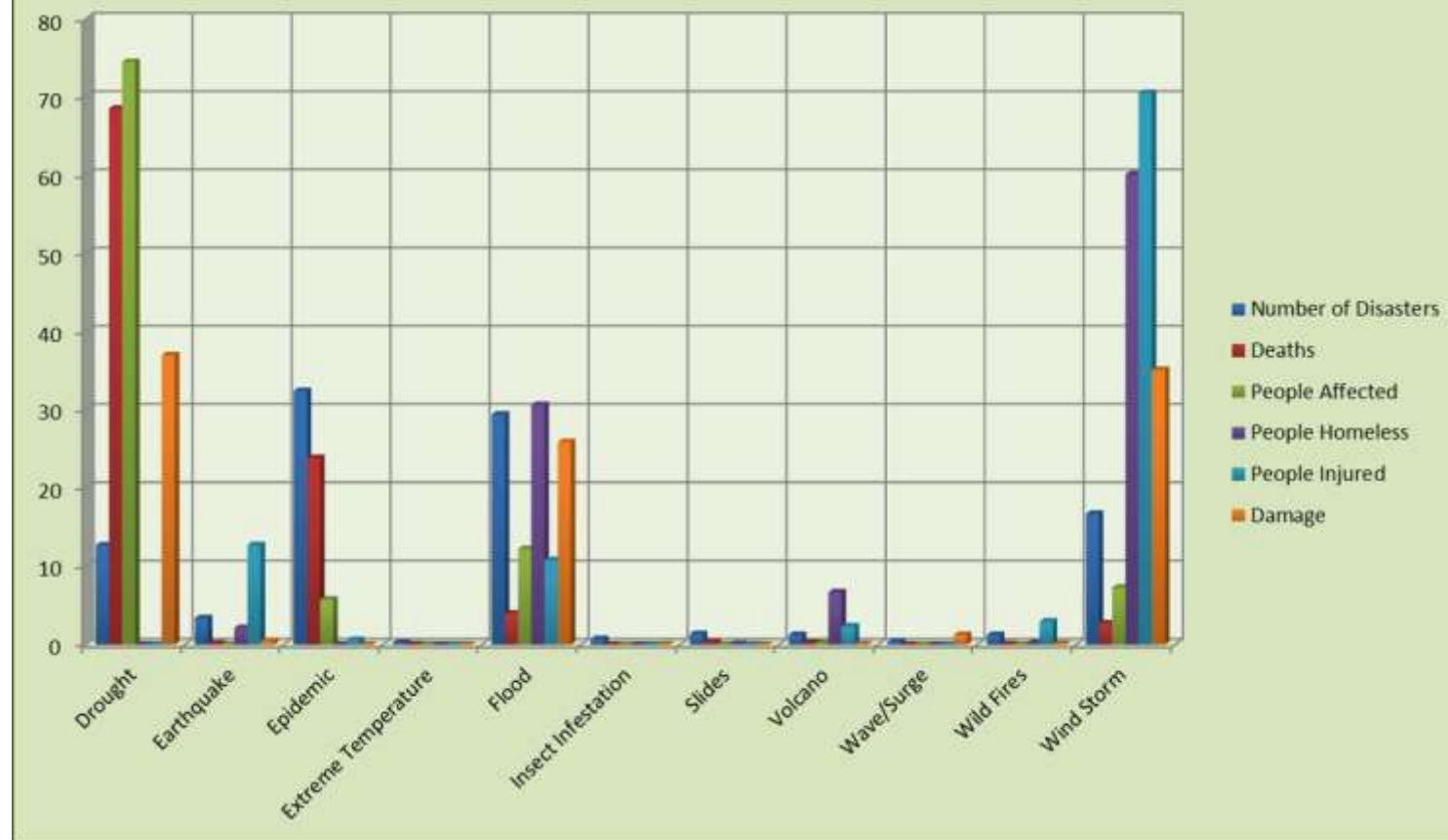
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Chief Forecaster: DRR
South African Weather Service



OVERVIEW

FCAST-PRE-20120704-DRR-001.1

Impact of Natural Disasters on Southern Africa: 1920-2008 (Source: CRED)



- 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

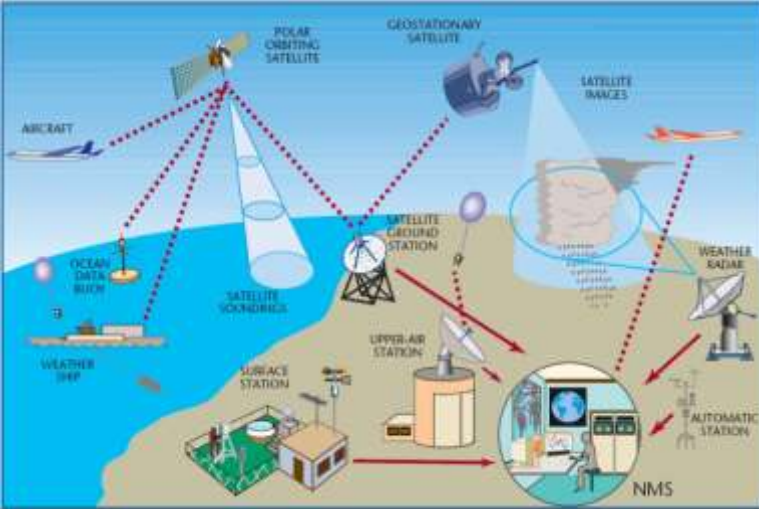





- **Monitoring**
- **Forecast and early warnings**
- **Vulnerability analysis and risk assessment**
- **Applications (agriculture, water resources, etc)**

OBSERVING NETWORKS AND DATA

FCAST-PRE-20120704-DRR-001.1

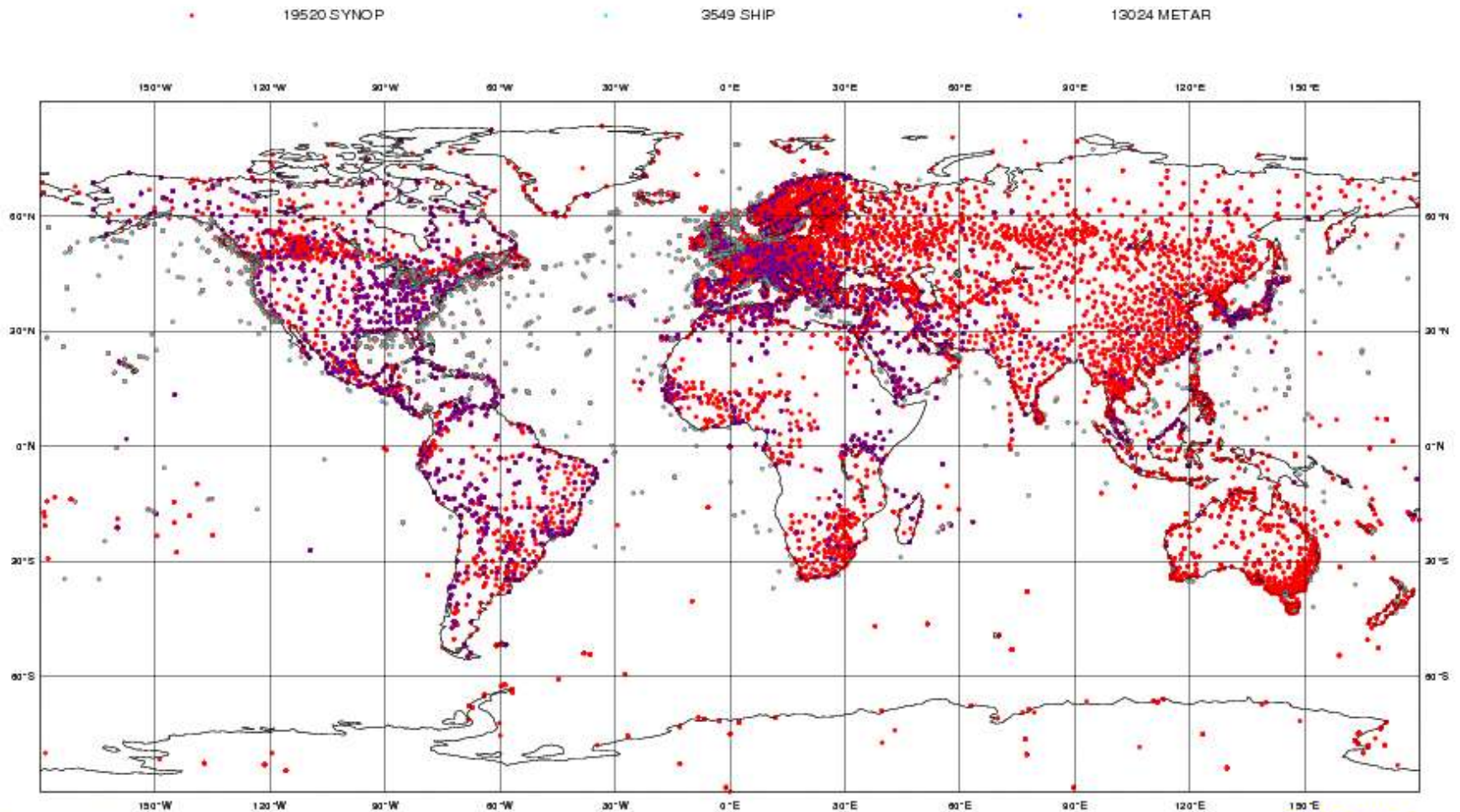
Various Weather Data Types observed by Weather Services as part of WMO GCOS



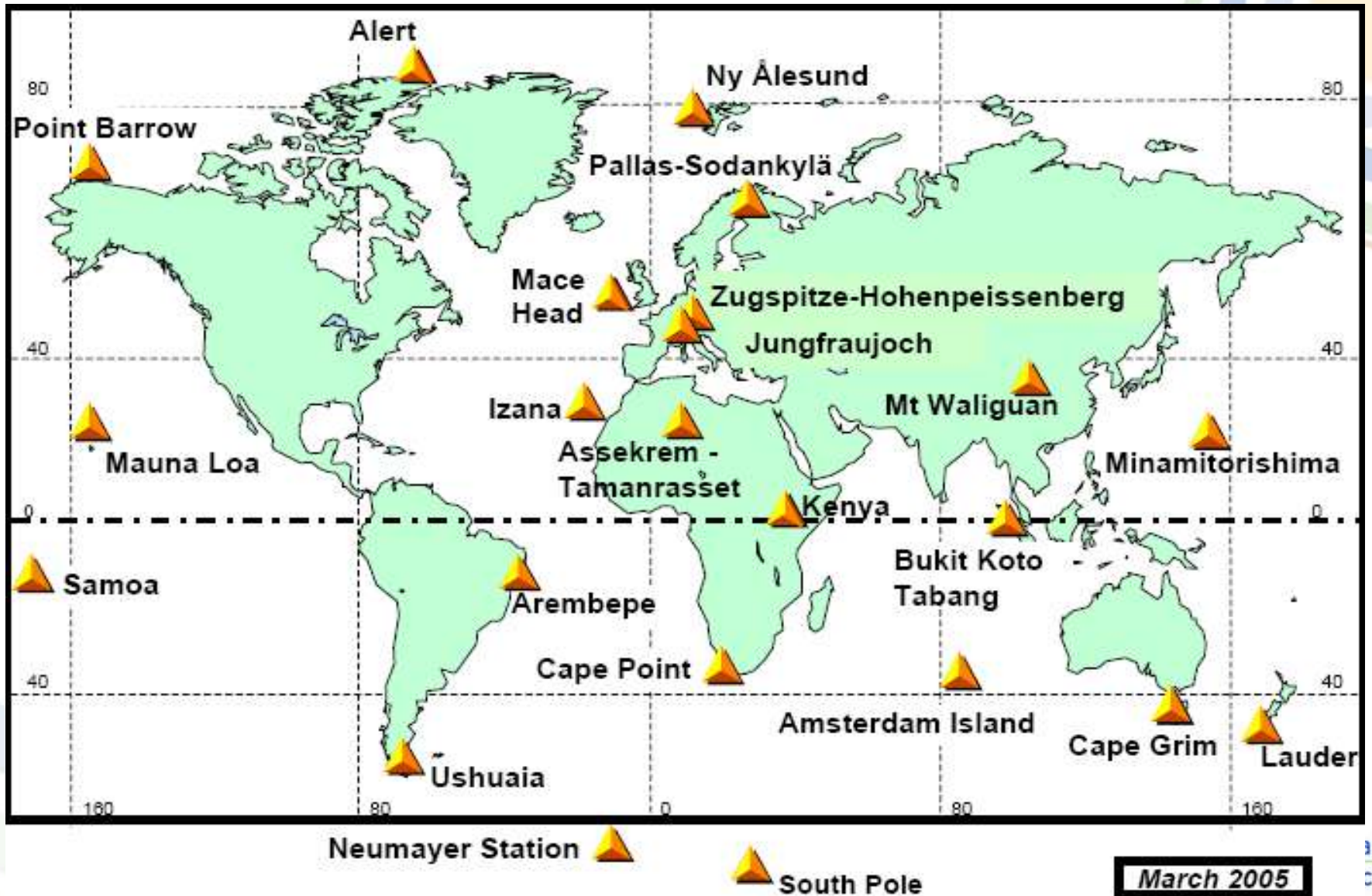
DOMAIN	ESSENTIAL CLIMATE VARIABLES
 <p>Atmospheric (over land, sea and ice)</p>	<p>Surface²: Air temperature, Wind speed and direction, Water vapour, Pressure, Precipitation, Surface radiation budget.</p> <p>Upper-air: Temperature, Wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance).</p> <p>Composition: Carbon dioxide, Methane, and other long-lived greenhouse gases; Ozone and Aerosol, supported by their precursors</p>
 <p>Oceanic</p>	<p>Surface³: 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.</p> <p>Sub-surface: Temperature, Salinity, Current, Nutrients, Carbon dioxide partial pressure, Ocean acidity, Oxygen, Tracers, Phytoplankton; Marine biodiversity and habitat properties⁴</p>
 <p>Terrestrial</p>	<p>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</p>

ECMWF Data Coverage (All obs DA) - Synop-Ship-Metar

27/Jun/2012; 12 UTC
Total number of obs = 36093



WMO Global Atmosphere Watch Stations

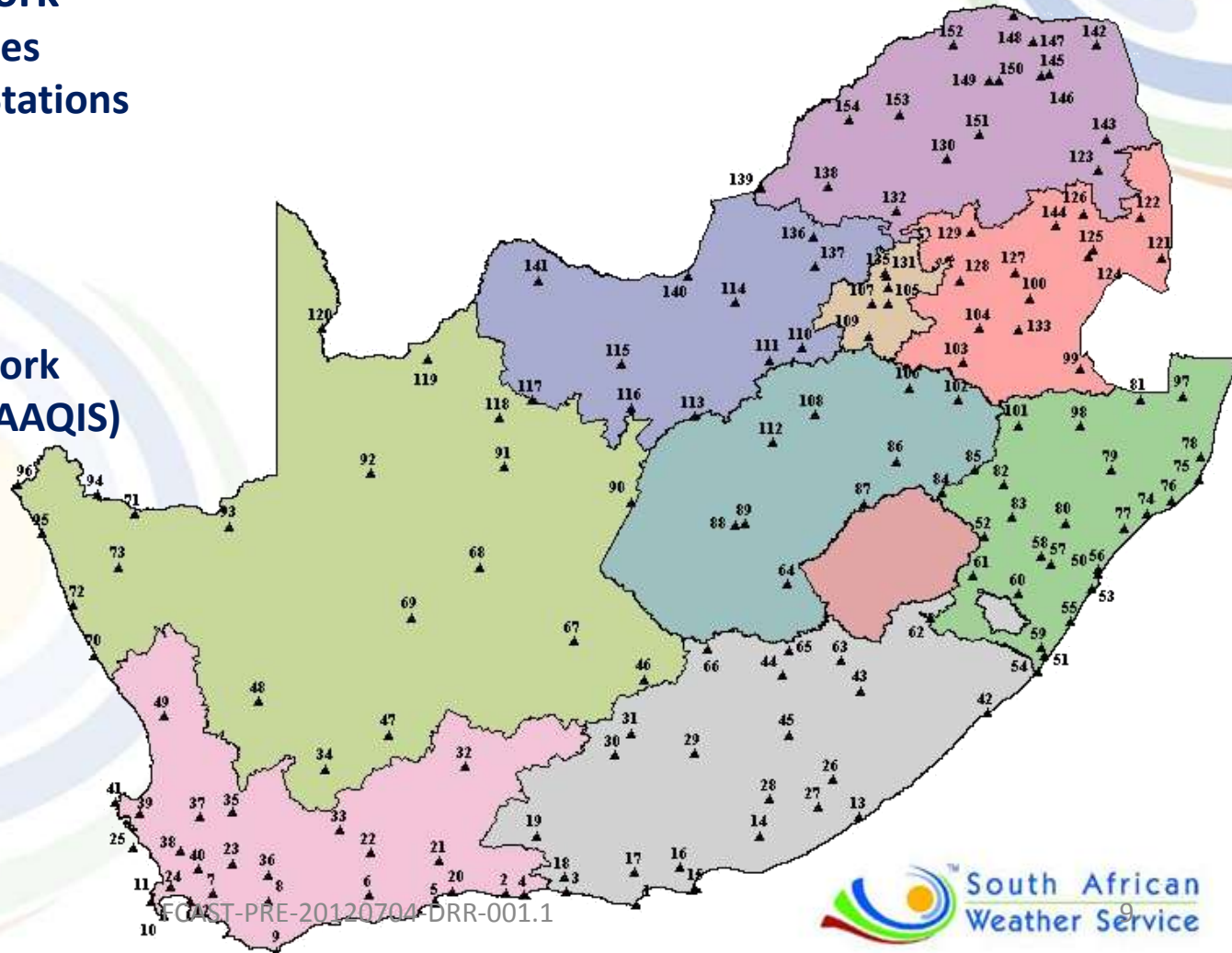


Observations are performed by NMHSs in countries but coordinated through the WMO system

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)

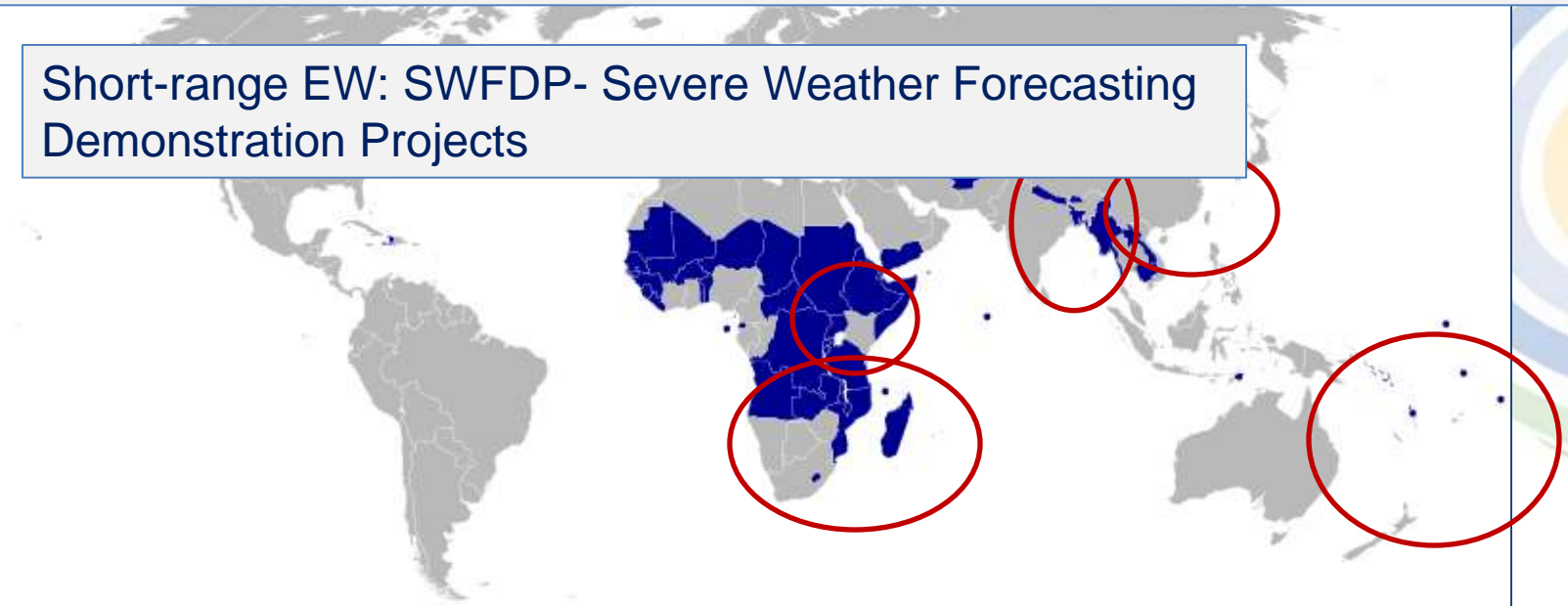


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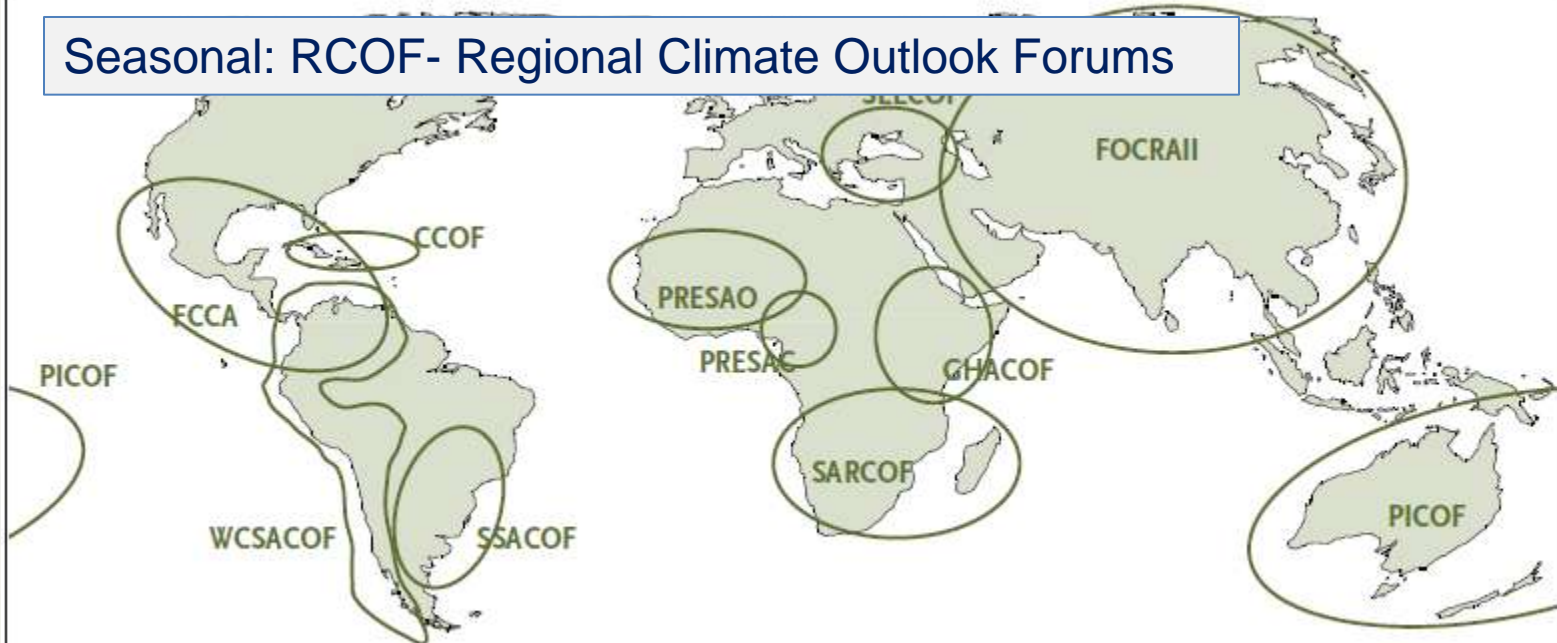
EARLY WARNING SYSTEMS

Regional Collaboration Activities between NMHSs, lead by WMO

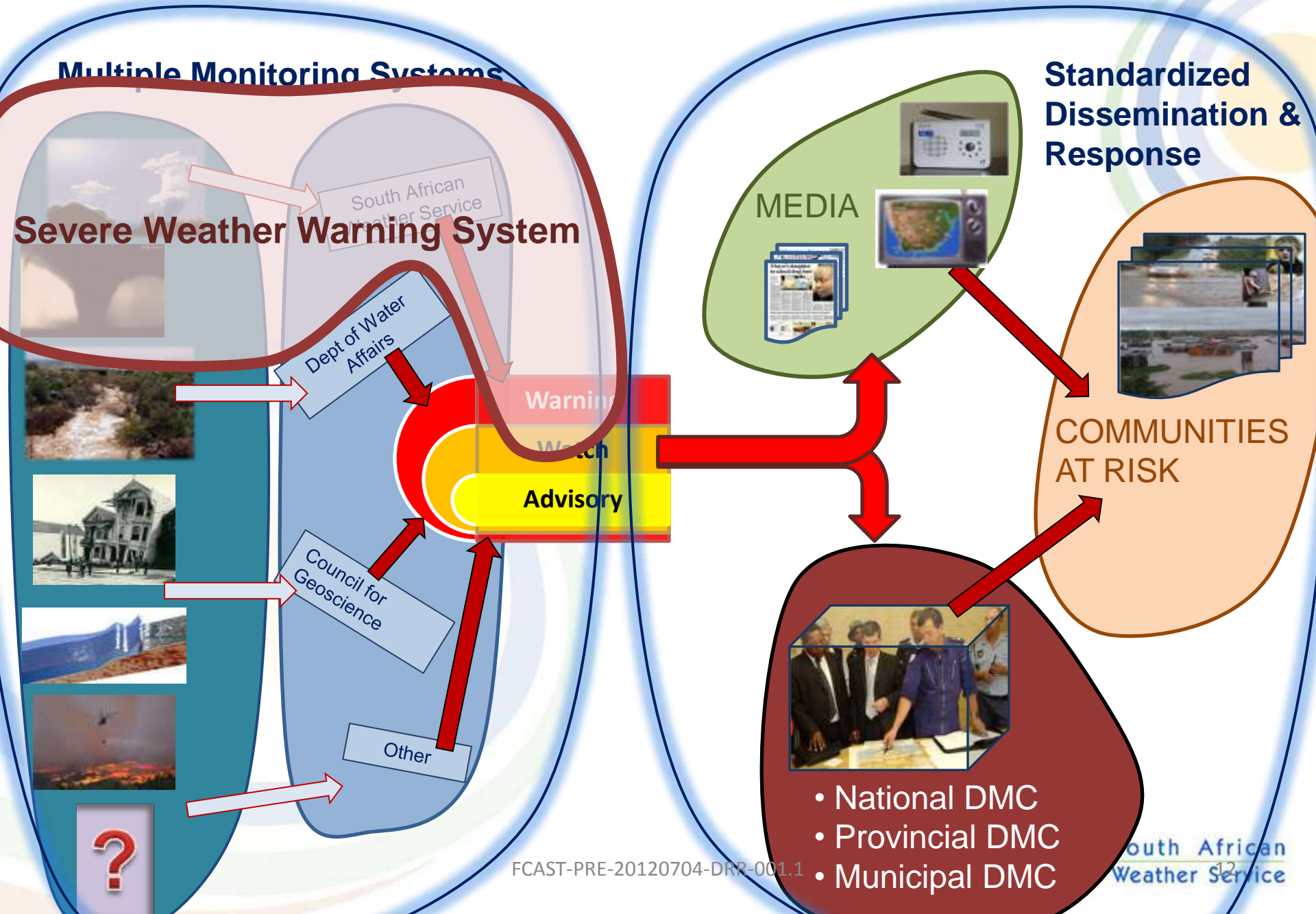
Short-range EW: SWFDP- Severe Weather Forecasting Demonstration Projects



Seasonal: RCOF- Regional Climate Outlook Forums



South African Multi-Hazard Early Warning System



COLLABORATION WITH USERS ON HAZARD AND RISK ASSESSMENTS AND MAPPING

FCAST-PRE-20120704-DRR-001.1

Disaster Management Structures

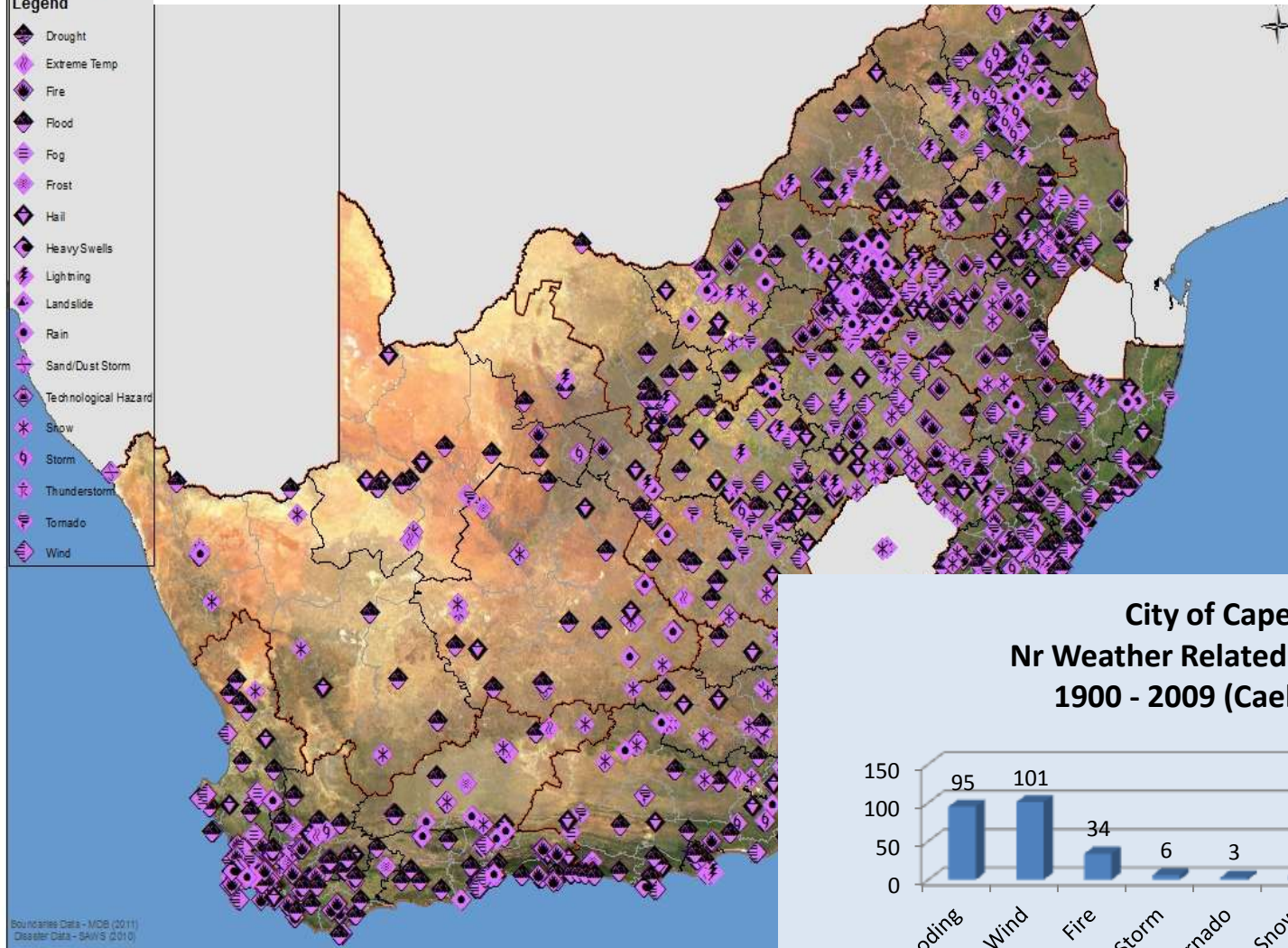


CAELUM: Historical Events – Geographical Distribution

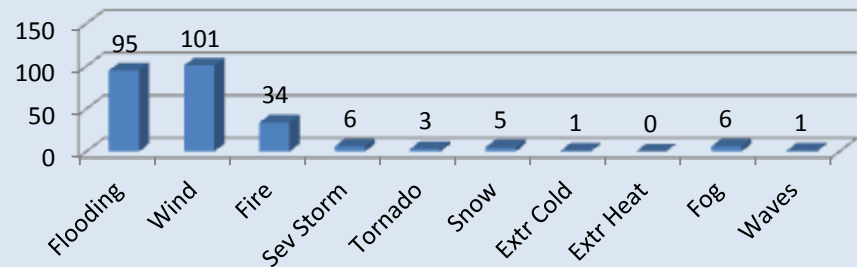


Legend

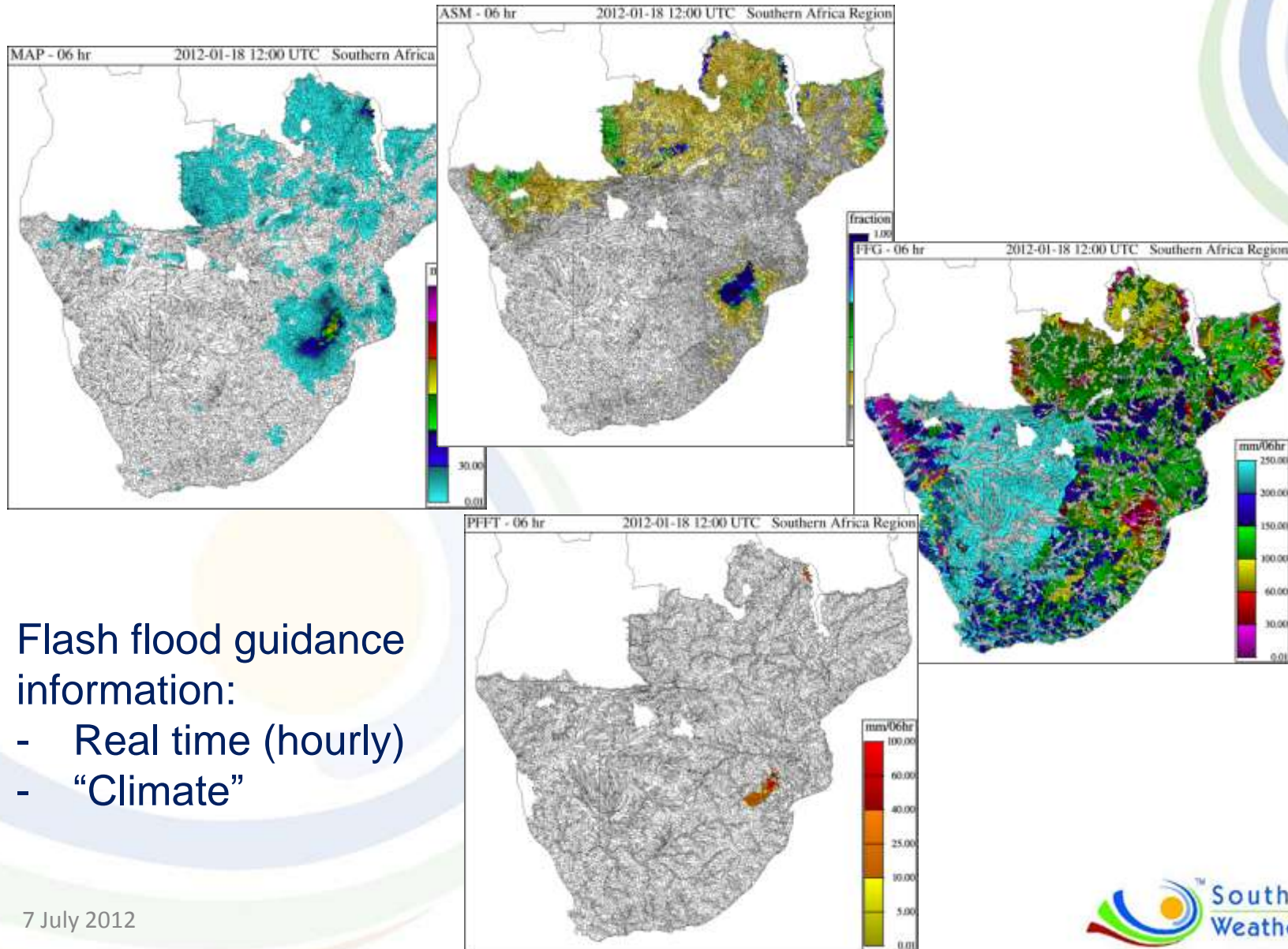
- Drought
- Extreme Temp
- Fire
- Flood
- Fog
- Frost
- Hail
- Heavy Swells
- Lightning
- Landslide
- Rain
- Sand/Dust Storm
- Technological Hazard
- Snow
- Storm
- Thunderstorm
- Tornado
- Wind



City of Cape Town
Nr Weather Related Hazard Events
1900 - 2009 (Caelum, SAWS)



Disaster Management & Water Sectors



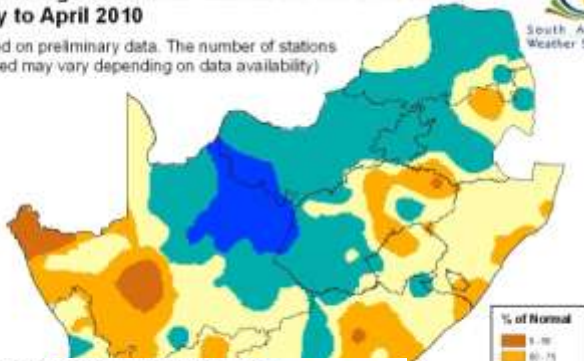
Flash flood guidance information:

- Real time (hourly)
- “Climate”

Agriculture

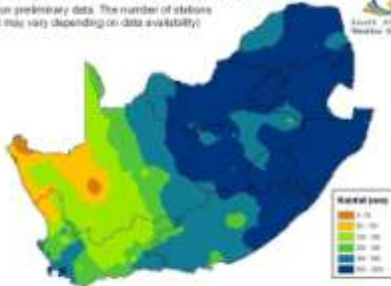
Percentage of Normal Rainfall for the Season July to April 2010

(based on preliminary data. The number of stations used may vary depending on data availability)

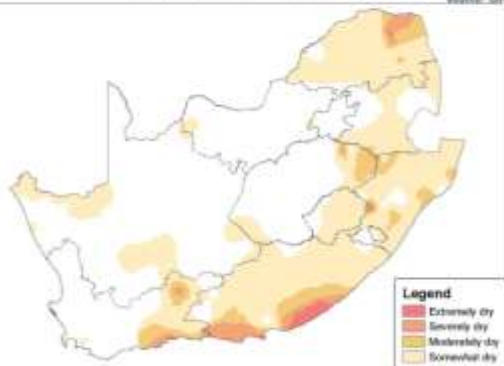


Rainfall (mm) for the Season July to April 2010

(based on preliminary data. The number of stations used may vary depending on data availability)



Standardised Precipitation Index for April 2008 to March 2010

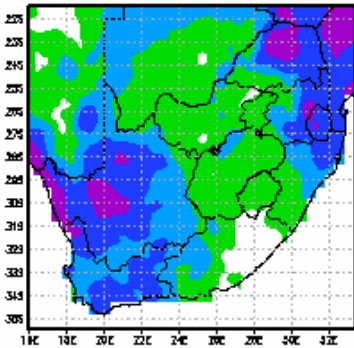


- Various products are used by the Agriculture sector
- Seasonal forecasts to plan for coming seasons
- SPI maps as indicator of potential drought conditions
- Historical rain maps, etc.

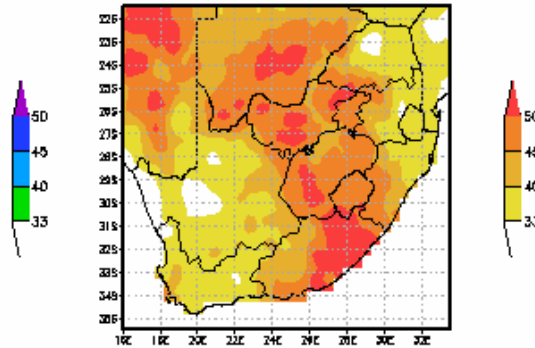
Seasonal Forecast and historical products

Seasonal forecasts

AUGUST-SEPTEMBER-OCTOBER 2010
Above-Normal Rainfall

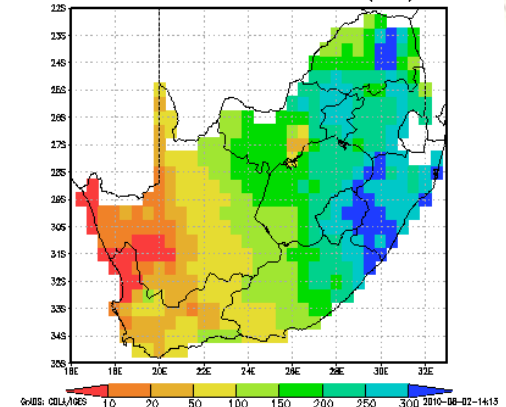


AUGUST-SEPTEMBER-OCTOBER 2010
Below-Normal Rainfall



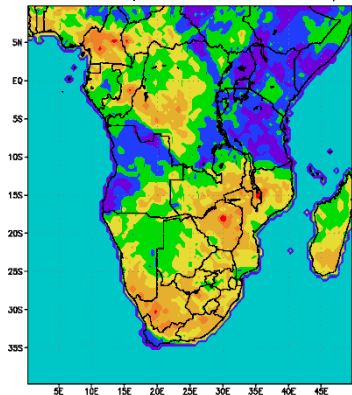
Historical El Nino / La Nina thresholds of seasonal rainfall

Lower Tercile Value for JFM (mm)

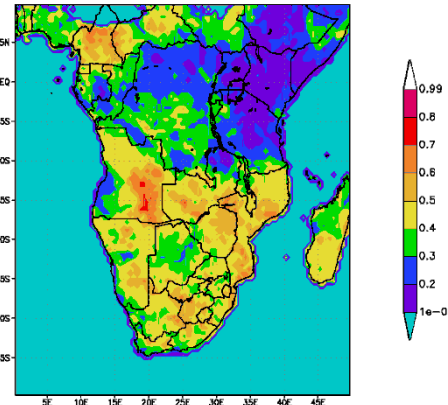


El Nino / La Nina assessments

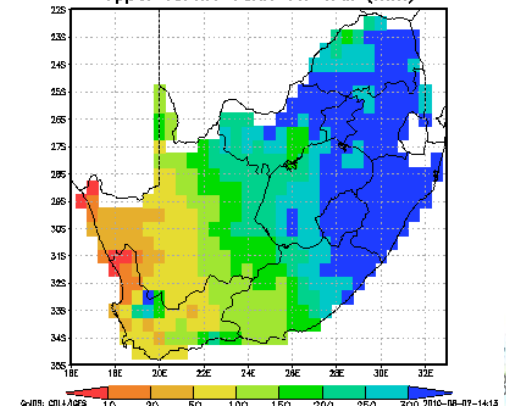
ENSO-La Nina(Above Normal Rainfall) DJF



ENSO-El Nino(Below Normal Rainfall) DJF



Upper Tercile Value for JFM (mm)



Commerce & Industry, Finance & Insurance

Location Intelligence Solutions
 Connectivity Inter-operability
 Mobile Technology
 Asset Management Resource Management

South African Climate Info A 30-year comparison

Climate is the average condition of the atmosphere at a place or in a region as observed over a period of at least 30 years. This average condition, or the climate, is usually described in terms of temperature, precipitation and wind.

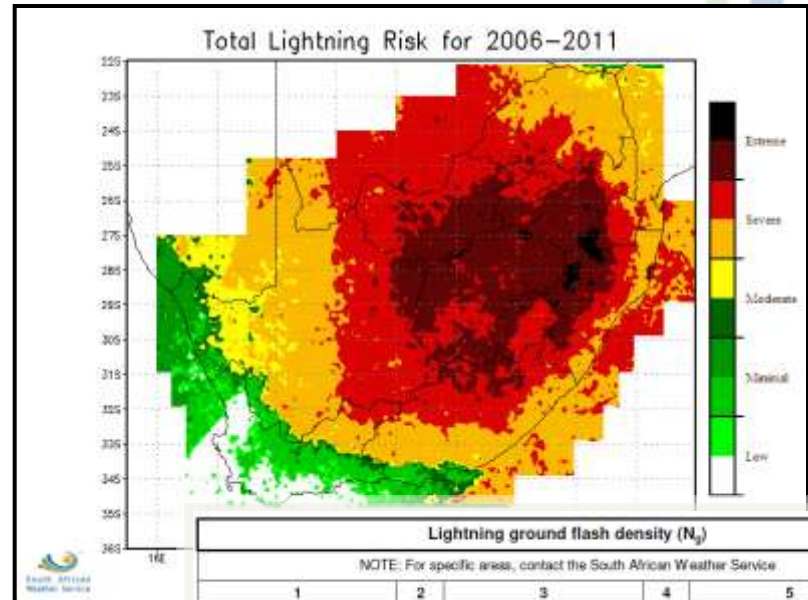
In conjunction with the South African Weather Service (SAWS), ST Group is able to provide the following climate data dating between 1961 & 1990:

- Average monthly and average annual hail days
- Average monthly and average annual rainfall
- Lightning ground flash density (2006 – 2010)
- Daily maximum rainfall



Rainfall monitoring and information is critical for municipalities and disaster management centres, agriculture, hydrology and insurance.

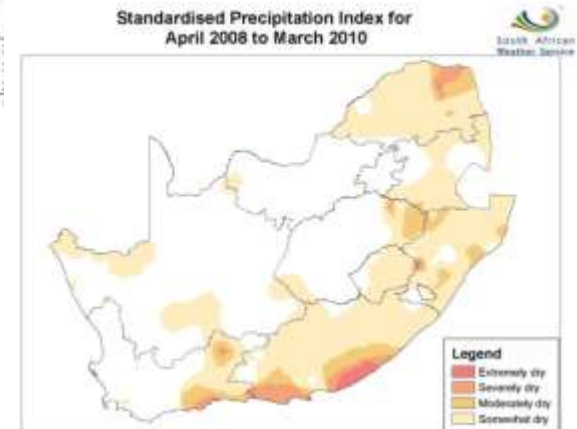
Equipment is designed and manufactured locally with South African knowledge and expertise for the African environment.



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	3.4
Albertinia	0.2	Georgedale	5.3	Nelspruit	8.0
Alexandria	0.7	Germiston	32.2	Noupoort	4.8
Alwal North	0.5	Giant's Castle	8.3	Ohrigstad	5.3
Araris	0.8	Golden Gate	9.1	Oudtshoorn	0.3
Aroob	1.7	Graaff-Reinet	2.4	Paarl	0.1
Barberton					
Beaufort West					
Bela Bela					
Belfast					
Bengoni					
Bergville					
Bethulie					



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