

# South African participation in Seventh Framework Programme (FP7) Theme 6 Environment (including Climate Change)

*Mr Laurie Barwell*

*South Africa's FP7 ANCP for Environment  
Research*



# Layout of the Presentation

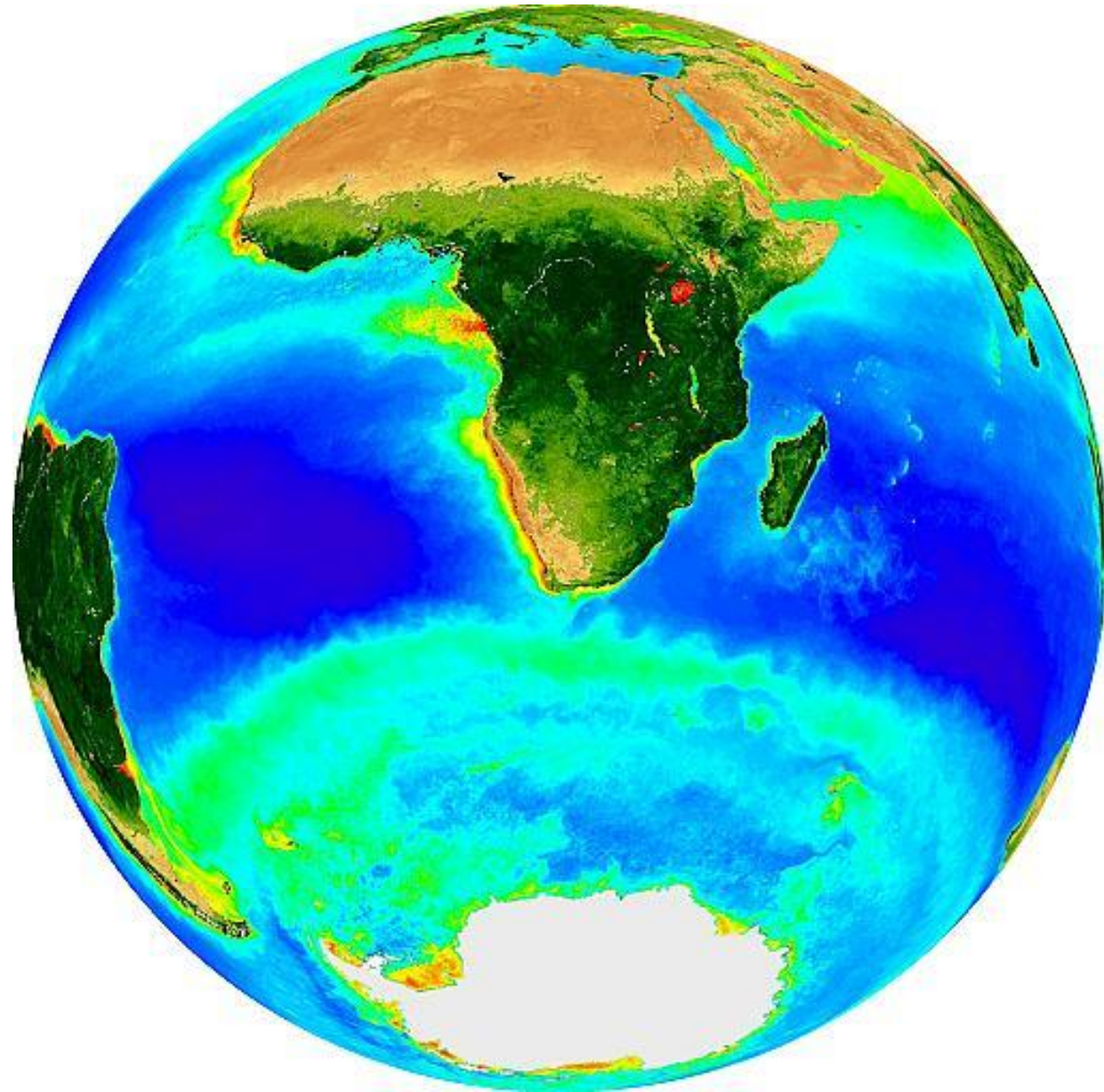
- Collaborative Advantage
- Examples of collaborative research issues
- Alignment with FP7 Theme 6

- 1. A diverse “Living Laboratory”**
- 2. Aligned research agenda**
- 3. Willing and able people & their “tools”**



**ESASTAP**

European - South African Science and Technology  
Advancement Programme

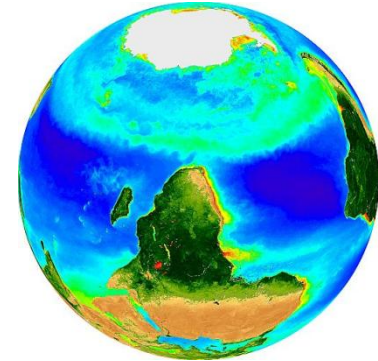


## A TRULY SPECIAL PLACE:

- Cradle of Humankind
- Fossil Park (Langebaan)
- “Fairest Cape”
- Kirstenbosch Botanical Gardens
- Table Mountain
- Cape Point
- Kruger National Park
- Cape Agulhas (2 Oceans)
- Southern Ocean
- .....

# Collaborative Advantage (1)

- At tip of the African continent
- Size and diversity (1,2 million km<sup>2</sup>)
- Climatically & topographically varied
- Wide variety of ecosystems
  - Savannas
  - Grasslands
  - Arid shrublands
  - Mediterranean shrublands
  - Deserts
  - Forests
  - Perennial, seasonal and ephemeral rivers
  - Estuaries & coastal lagoons
  - Warm and cold water coastal systems
  - Offshore islands
- Southern Ocean: the global climate driver



# Collaborative Advantage (2)

- Social composition
  - Microcosm of the world (ratio of rich & poor approximates the world average)
- Solid scientific knowledge base
  - Internationally recognised scientists
  - Sophisticated scientific infrastructure
- Pressing problems requiring innovation
  - Applicable to many other countries

**A living laboratory!**

# 4 CROSS-CUTTING KNOWLEDGE CHALLENGES

**A** Understanding a changing planet

**B** Reducing the human footprint

**C** Adapting the way we live

**D** Innovation for sustainability



<b>A</b> Understanding a changing planet	<b>B</b> Reducing the human footprint	<b>C</b> Adapting the way we live	<b>D</b> Innovation for sustainability
<ol style="list-style-type: none"><li>1 Observation and monitoring</li><li>2 Dynamics of the oceans around southern Africa</li><li>3 Dynamics of the complex internal earth system</li><li>4 Linking the land, air and sea</li><li>5 Improving model predictions at different scales</li></ol>	<ol style="list-style-type: none"><li>1 Waste-minimisation methods and technologies</li><li>2 Conserving biodiversity and ecosystem services</li><li>3 Institutional integration to manage ecosystems and ecosystem services</li><li>4 Doing more with less</li></ol>	<ol style="list-style-type: none"><li>1 Preparing for rapid change and extreme events</li><li>2 Planning for sustainable urban development in a South African context</li><li>3 Water security for South Africa</li><li>4 Food and fibre security for South Africa</li></ol>	<ol style="list-style-type: none"><li>1 Dynamics of transition at different scales – mechanisms of innovation and learning</li><li>2 Resilience and capability</li><li>3 Options for greening the developmental state</li><li>4 Technological innovation for sustainable social-ecological systems</li><li>5 Social Learning for sustainability, adaptation, innovation and resilience</li></ol>

*The Global Change Research Plan identifies four major cross-cutting knowledge challenges and 18 key research themes.*



# Understanding a changing planet

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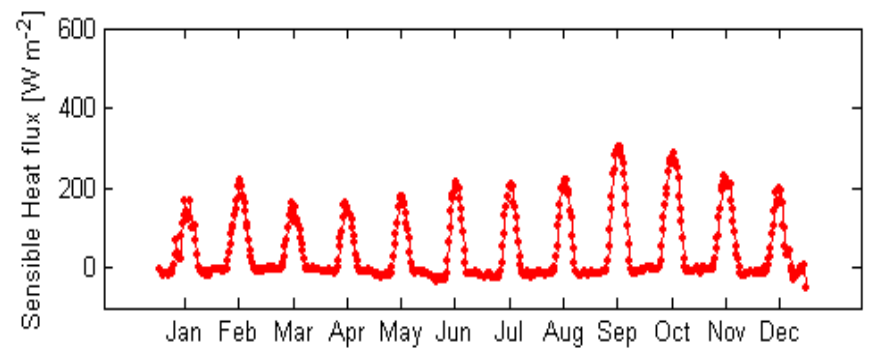
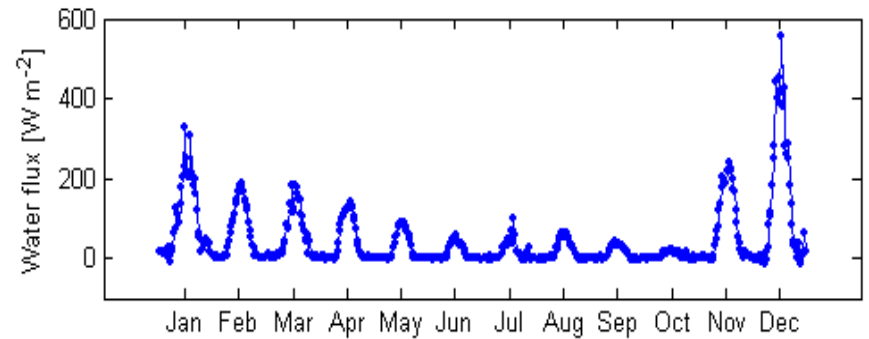
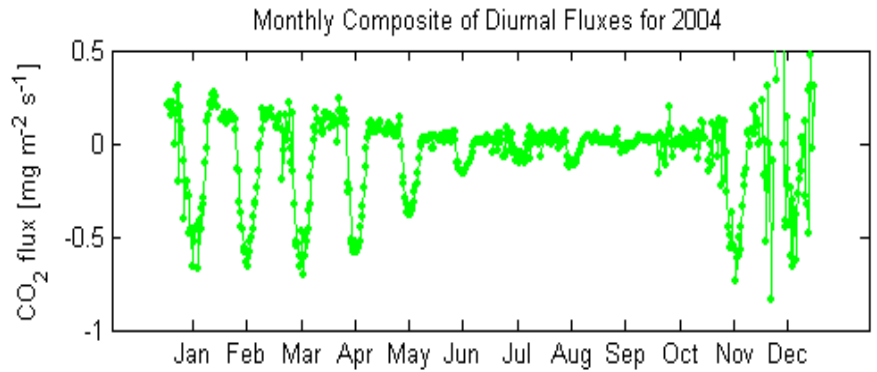
## **1. Observation and monitoring**

2. Dynamics of the oceans around southern Africa
3. Dynamics of the complex internal earth system
4. Linking the land, air and sea
5. Improving model predictions at different scales

# CarboAfrica:



## the Skukuza flux tower

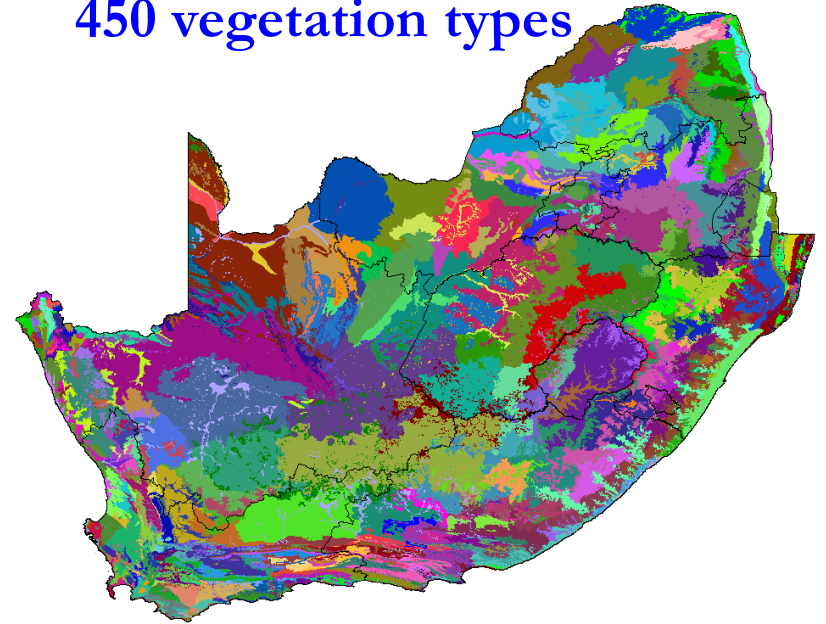




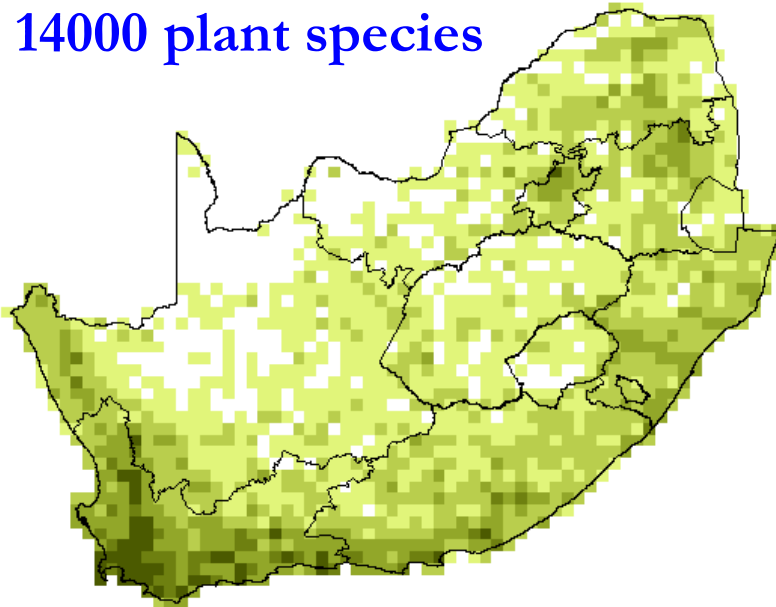
# GEOBENE

South Africa has  
better-than-average  
biodiversity data

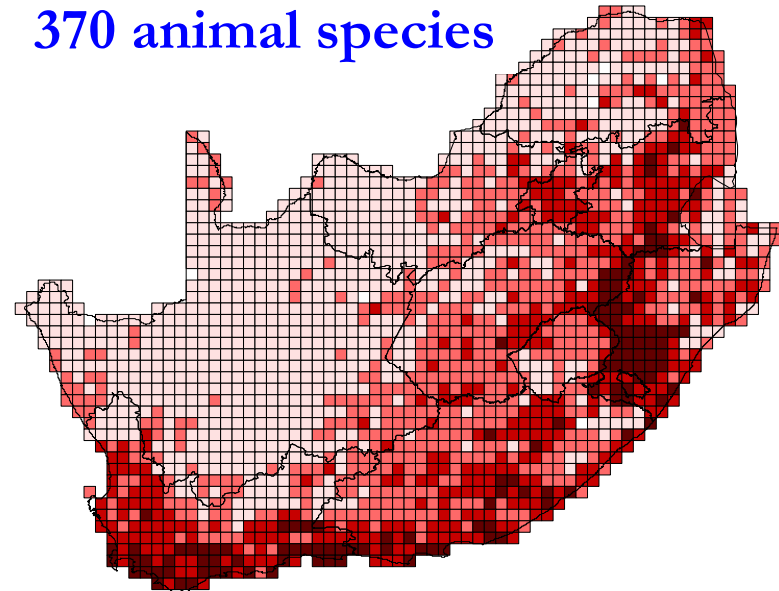
450 vegetation types



14000 plant species



370 animal species



# A

## Understanding a changing planet

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1. Observation and monitoring

## **2. Dynamics of the oceans around southern Africa**

3. Dynamics of the complex internal earth system

## **4. Linking the land, air and sea**

## **5. Improving model predictions at different scales**

# Southern Ocean Carbon – Climate Observatory programme

South Africa's Southern Hemisphere Scale  
Carbon – Climate Science



CSIR

*our future through science*

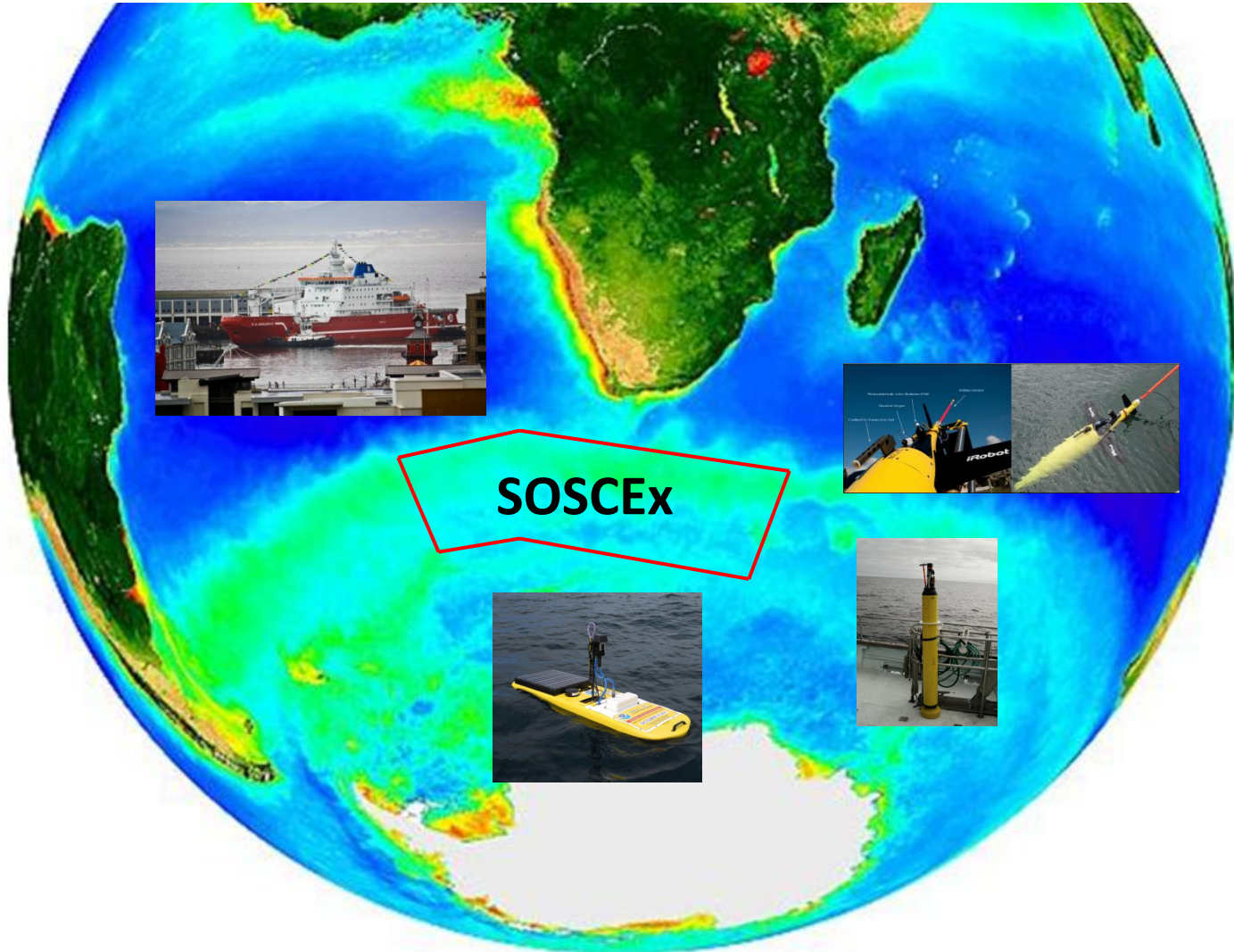
SOCCO

Southern Ocean **Carbon** and Climate Observatory

# SA Agulhas II



# Southern Ocean Seasonal Cycle Experiment (SOSCEx) September 2012 – May 2013



# Collaborative Strengths

## Southern Oceans Research

1. Expertise base on Southern Ocean science
2. Observation capability / state of the art research platform
3. Modeling (Global and regional high resolution modeling)
4. Remote Sensing capabilities



SOCCO

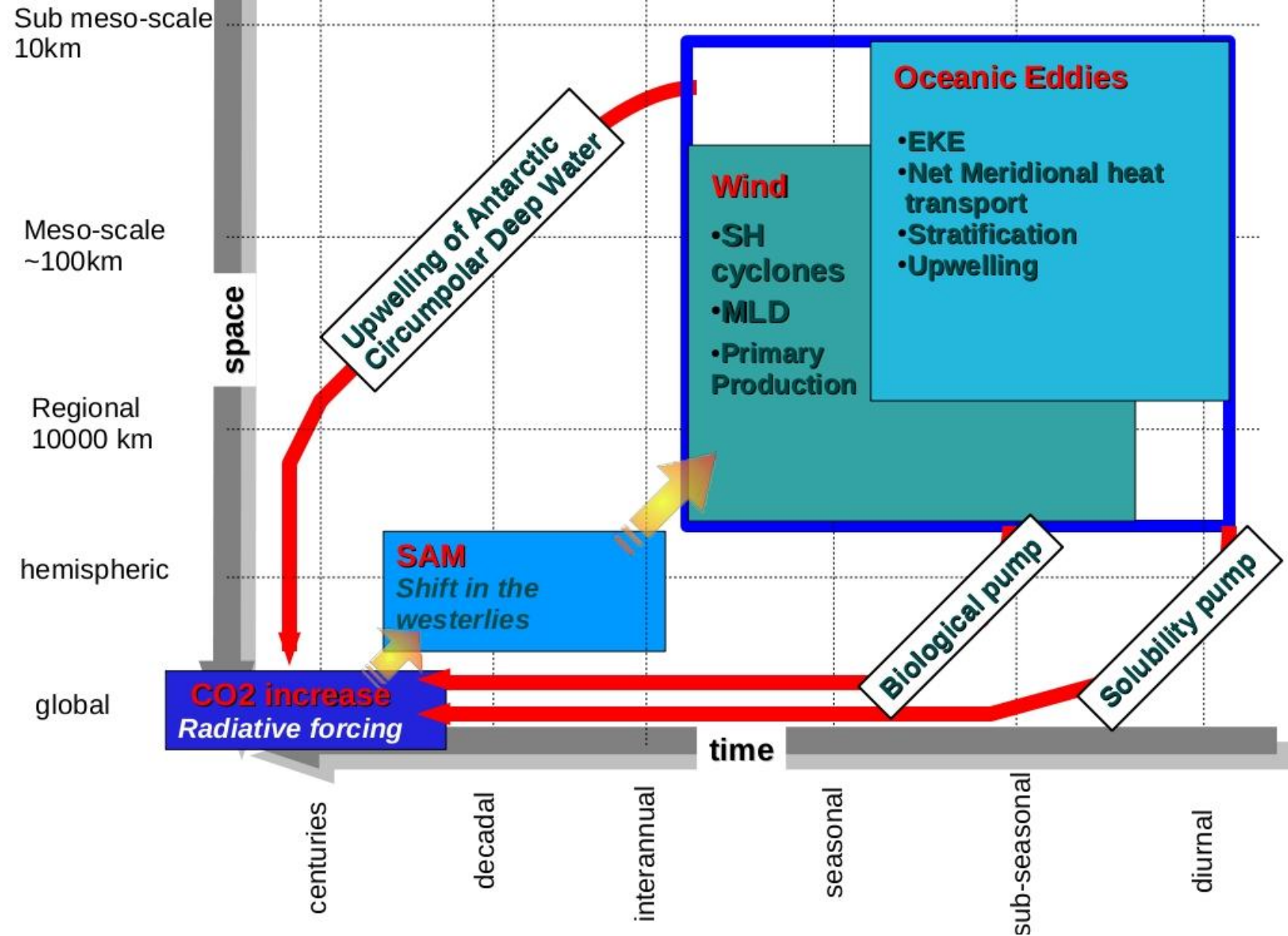
Southern Ocean Carbon and Climate Observatory

**SOCCO Research Niche:  
Carbon – Climate Feedback  
in the Southern Ocean and  
the role of eddies and the  
seasonal cycle**

# Research Focus Areas

1. Advance understanding of the drivers of change
  - Research Niche: Sub-seasonal & sub-mesoscale processes
  - Large scale experimental observations and high resolution numerical modelling
2. Advance low uncertainty CO<sub>2</sub> flux estimates
  - Long term observations
  - Development and use of empirical modelling techniques
3. International partner in ocean observations platform and sensor R&D

# SOCCO Research Niche - Carbon – Climate Feedback in the Southern Ocean and the role of eddies and the seasonal cycle





# Southern Ocean Observational and Engineering R&D Capabilities

## DEA Polar Research Ship Platform

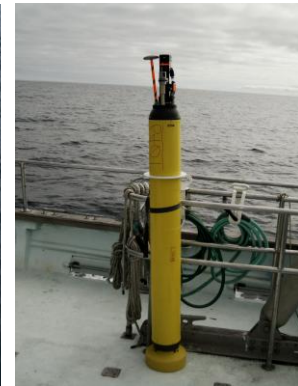


Physics: CTDs, underway CTDs

Biogeochemistry:

- pCO<sub>2</sub>, TA, DIC
- Bio-optics (AOP & IOP)
- Iron Chemistry
- Ocean Pigments
- Remote Sensing

## CSIR Ocean Robotics and Autonomous Platforms



CTD, O<sub>2</sub>, pCO<sub>2</sub>, pH-ISFET, Bio-optics,

# Partners in South Africa

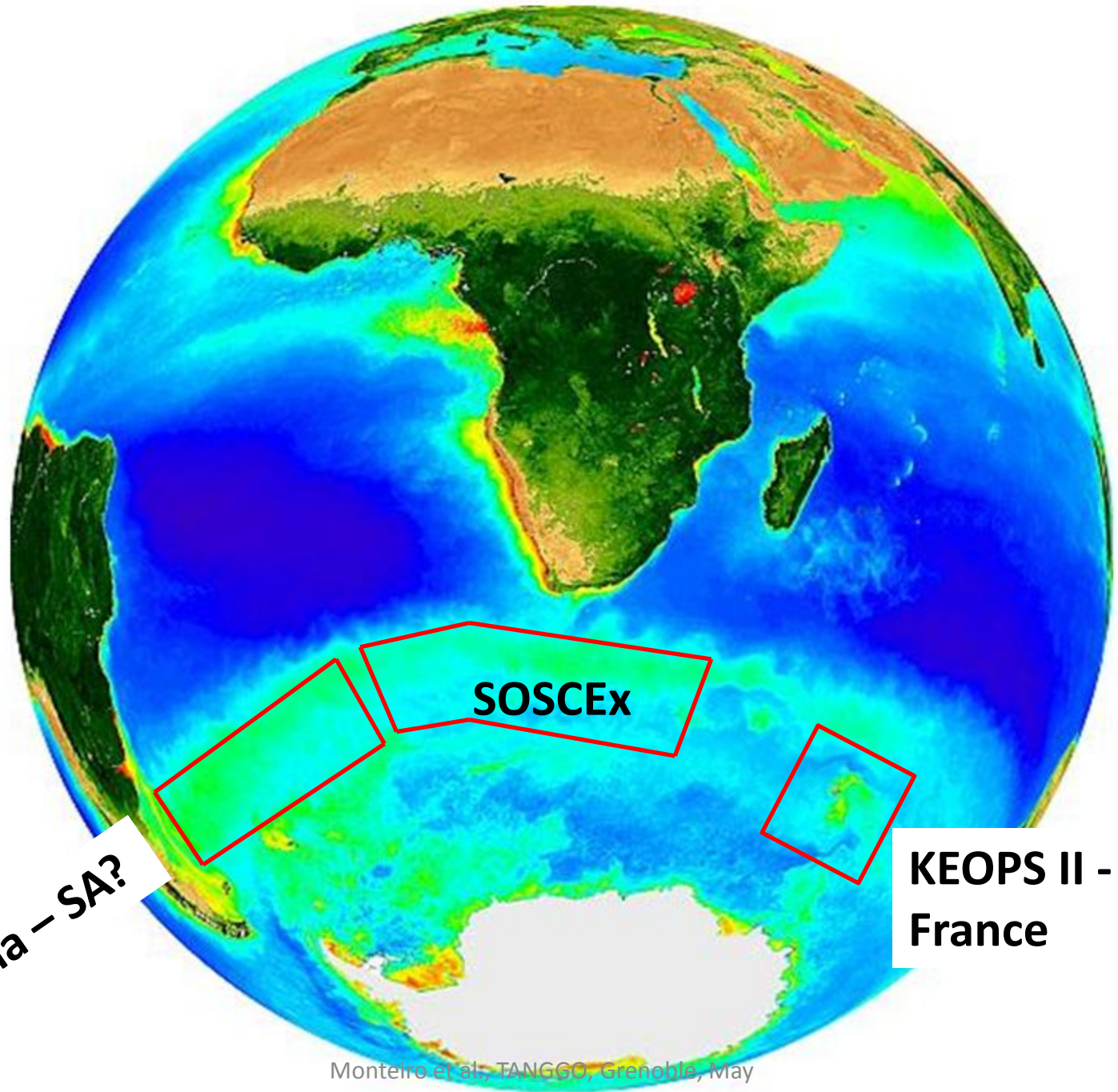
- Department of Science and Technology
  - Science infrastructure (observations and high performance computing) and research co-funding (ACCESS)
- Department of Environment Affairs
  - Polar research ship
- Universities of Cape Town, Western Cape, and Stellenbosch

# EU – FP7 Project Partner

- CARBOCHANGE – (2<sup>nd</sup> Year)
- GREENSEAS (2<sup>nd</sup> year)
- SOCCLI - Marie Curie – IRSES (Being finalised)

# International Partners

- University of Paris VI (LOCEAN & LSCE)
- University of Grenoble (LEGI)
- Bjerknes Centre for Climate Research, Norway
- Princeton University, USA
- NOAA, USA
- IBSA (development stage)
- Argentina (potential partner – South Atlantic)



Argentina – SA?

SOSCEX

KEOPS II -  
France

# Contact

- Head: Ocean Systems and Climate
  - Dr Pedro M.S Monteiro
    - [pmonteir@csir.co.za](mailto:pmonteir@csir.co.za)

# B

## Reducing the human footprint

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1. Waste-minimisation methods and technologies
- 2. Conserving biodiversity and ecosystem services**
3. Institutional integration to manage ecosystems and ecosystem services
4. Doing more with less

# Theme B2: Conserving biodiversity and ecosystem services

- Biodiversity supports formal and informal economy
  - Tourism; fisheries; medicinal plant trade; etc
- Basis for “ecosystem services”
  - Food & fibre; fresh water; clean air; decomposition of waste; recreational and spiritual wellbeing.

**Under threat from land transformation and degradation, overexploitation and pollution**



# Theme B2: Research Focus Areas

- Understanding ecosystems and their services
  - Evolvment of the region's ecosystems & the dependent societies;
  - The socio-ecological system (links);
  - Impact of future changes.
- Managing for sustainability;
- Governance models for ensuring ongoing benefits (includes collaborative governance)

# Example 1

## **National Freshwater Ecosystem Priority Areas (the NFEPA project)**

# National Freshwater Ecosystem Priority Areas (the NFEPA project)

- Responds to the unprecedented degradation of freshwater ecosystems
  - A world-wide problem; not just in South Africa
- AIMS
  1. To identify **N**ational **F**reshwater **E**cosystem **P**riority **A**reas
  2. To develop an institutional basis to enable effective implementation
    - National component - aligning conservation & water sector policy mechanisms
    - Sub-national component - building capacity to use products at local levels

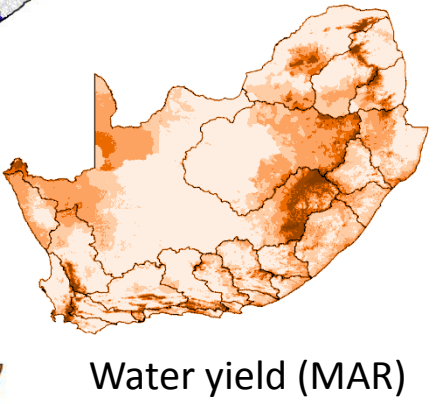
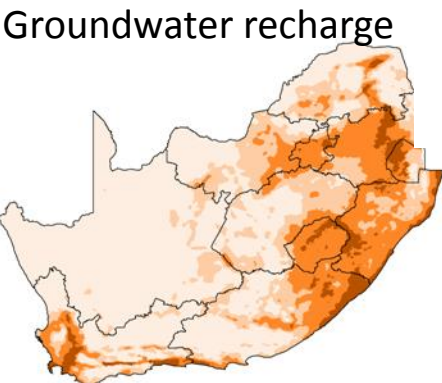
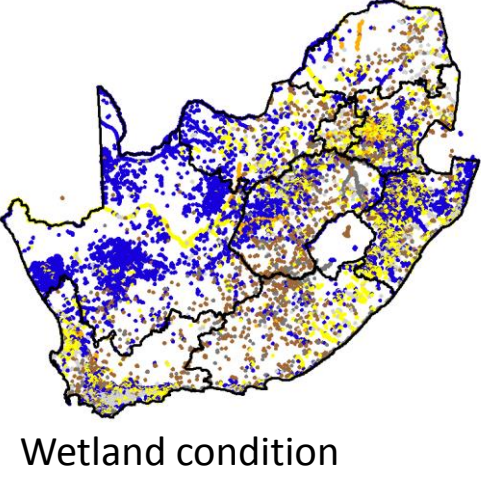
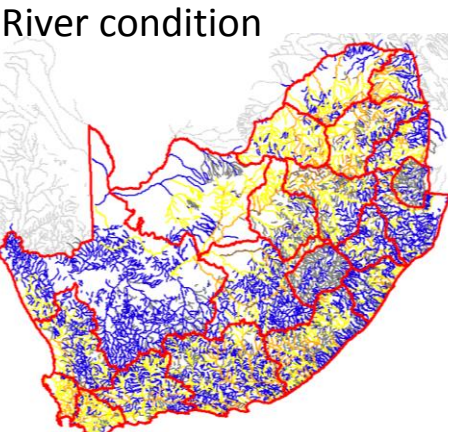
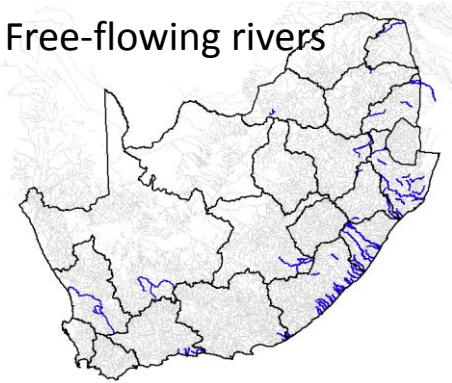
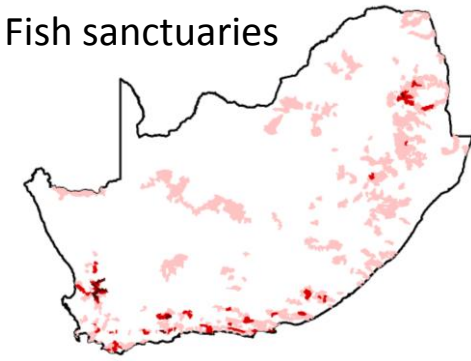
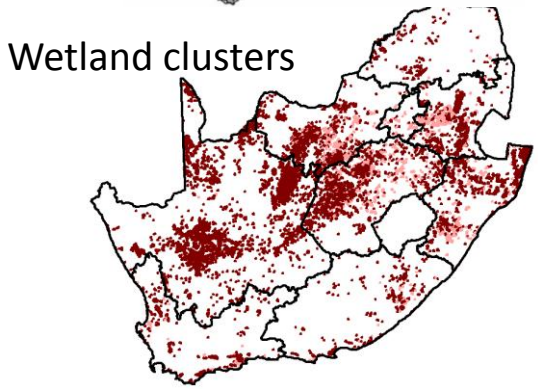
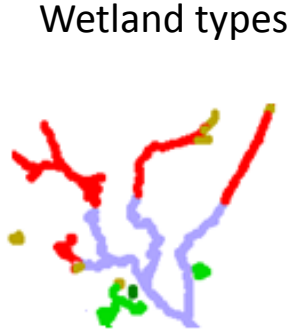
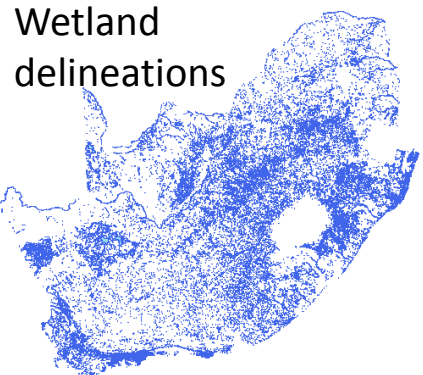
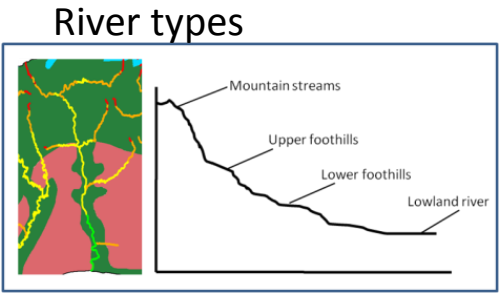
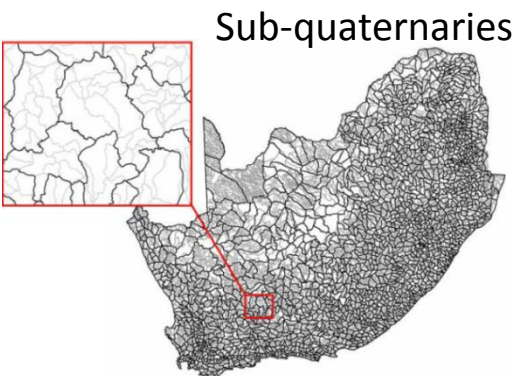




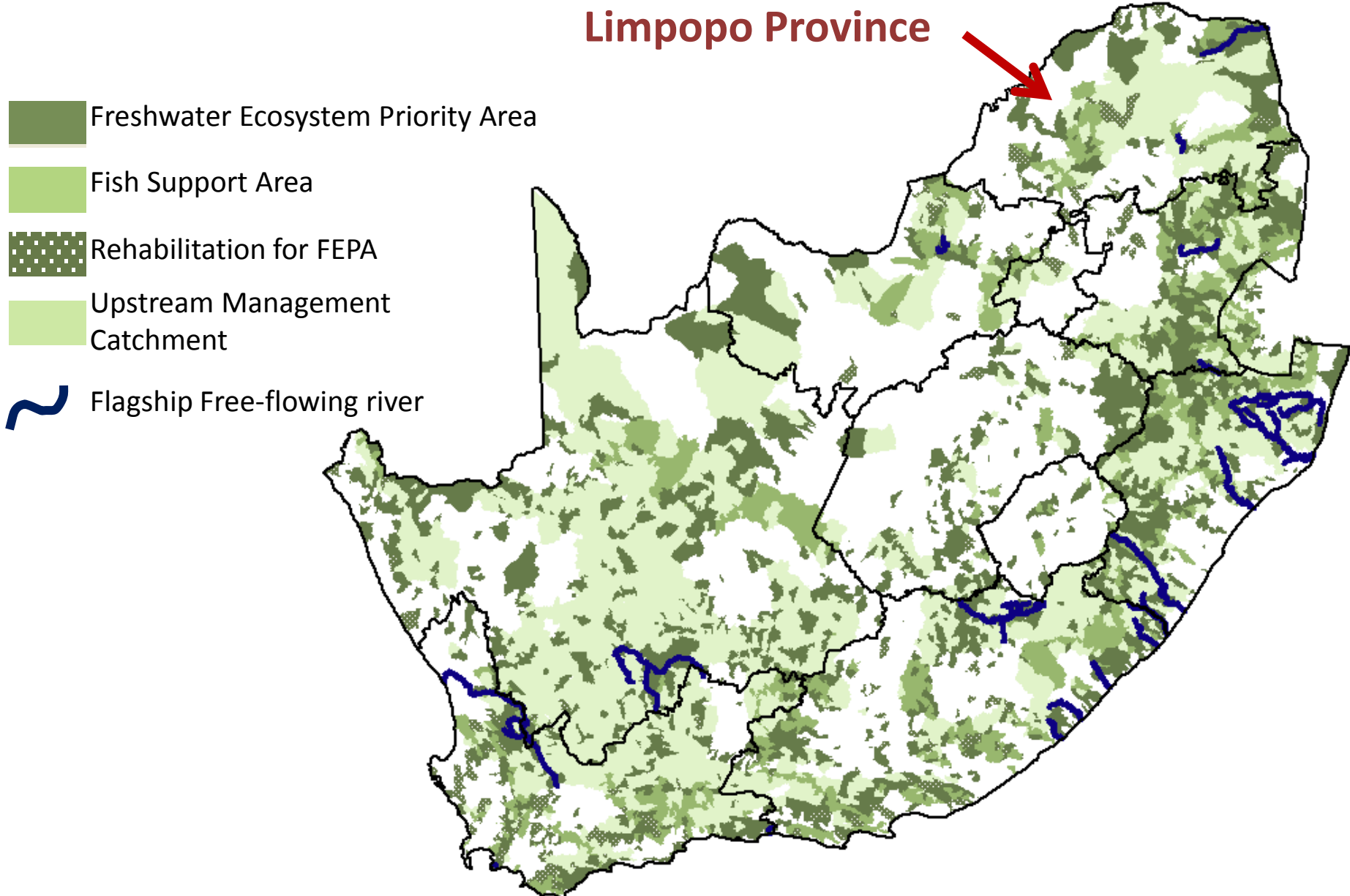
**Co-production of knowledge**  
Collective experience of almost 1000 years!



# Input data



# Priority map with free-flowing rivers



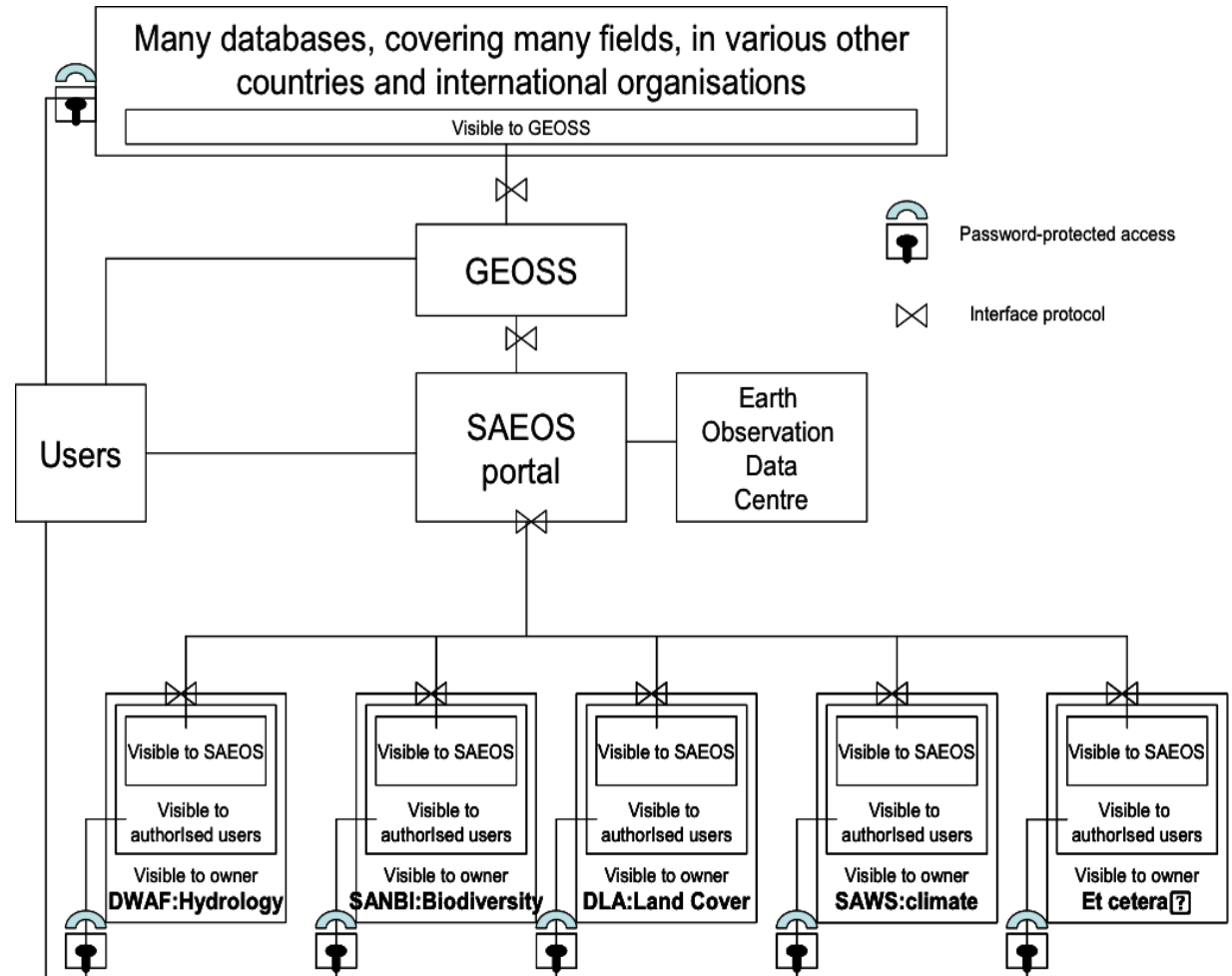
# Example 2



SA- GEO & SAEOS

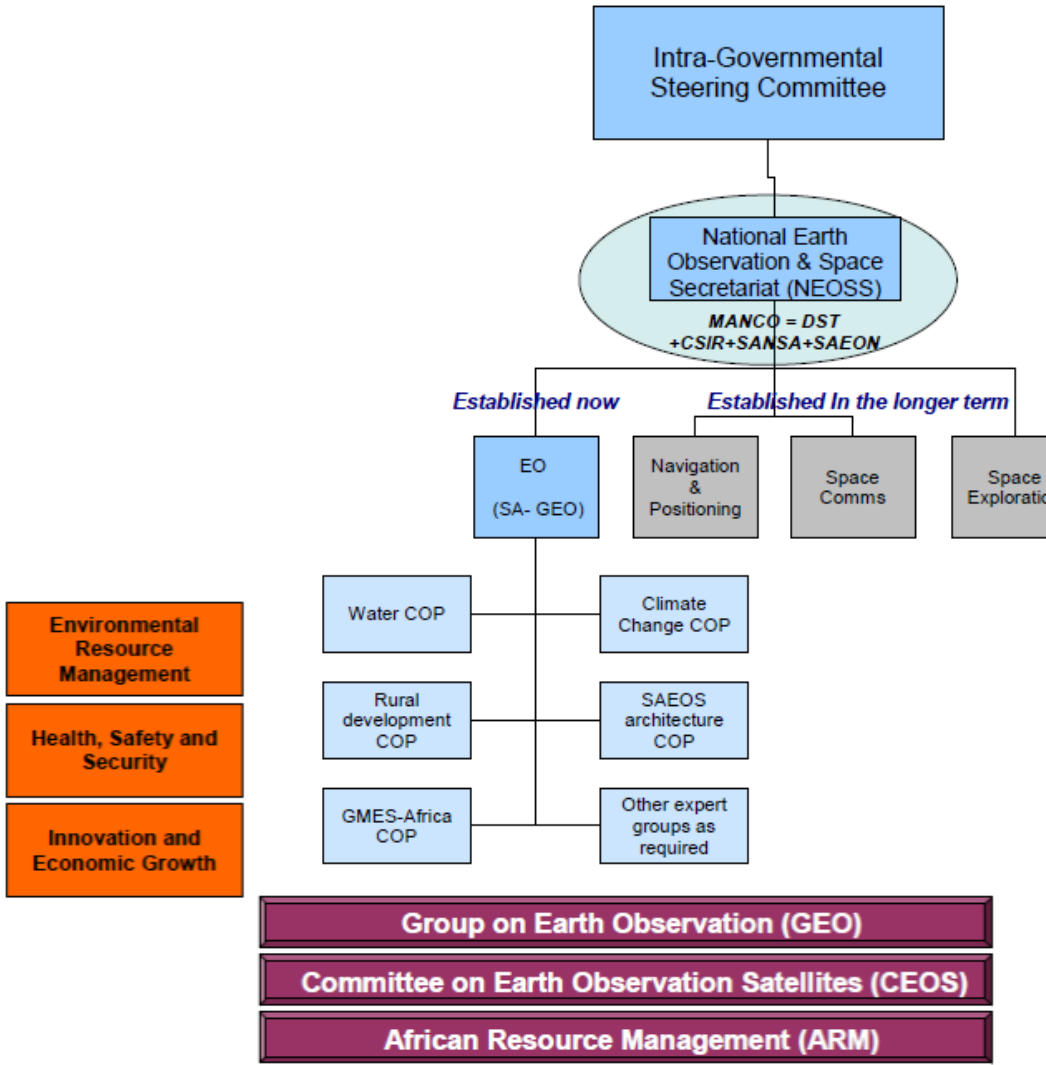
# South African Earth Observation Strategy

- maximises SA EO investments through coordination of South Africa's EO capacities
- fosters application development
- links them to complementary capabilities globally e.g. through GEO
- “system of systems” drawing on GEOSS interoperability and data sharing standards and principles





# SA-GEO



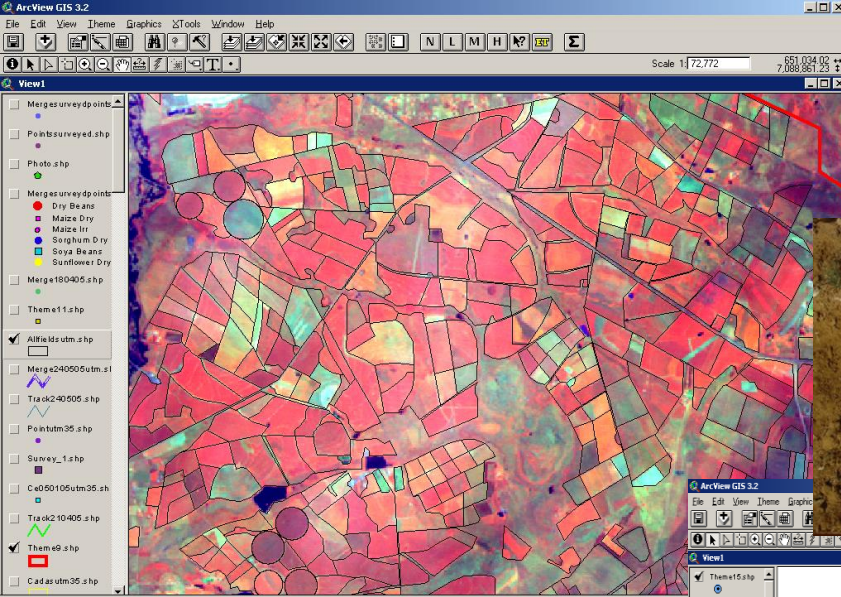
science & technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

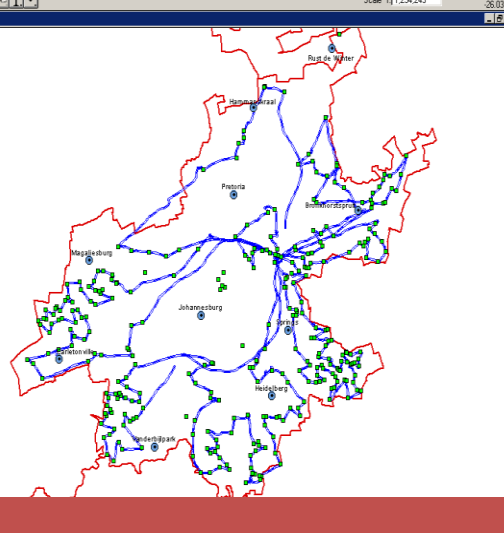
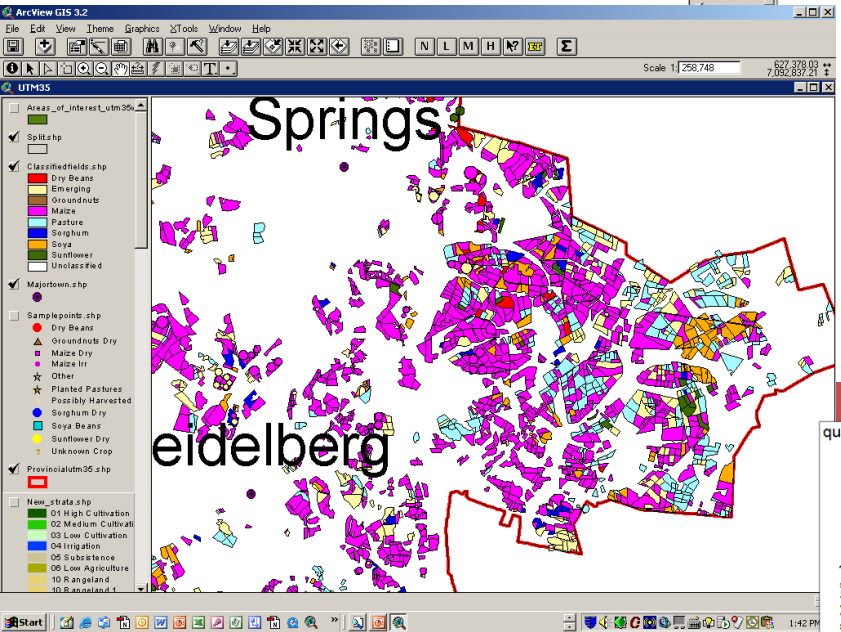
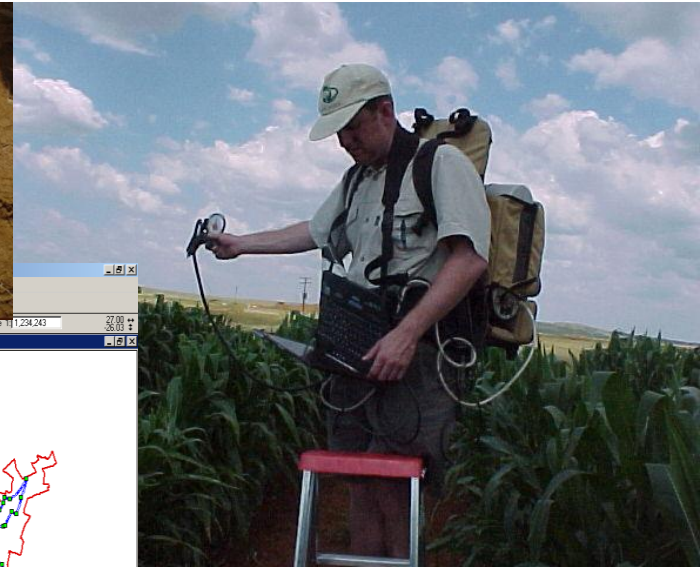
# AREAS of COLLABORATION

- GEO Agriculture SBA

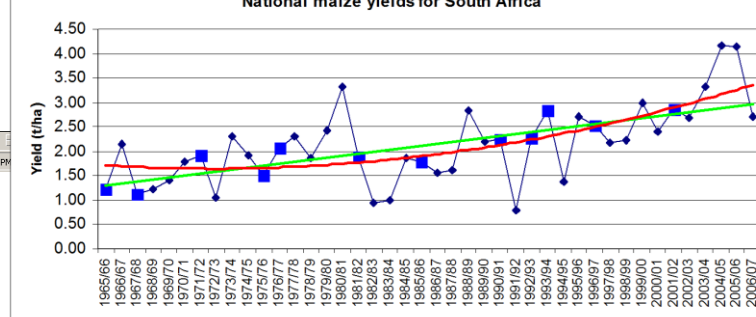
- JECAM Site in SA is Free State Province (see [www.jecam.org](http://www.jecam.org))
- SA has an operational Crop estimation system based on imagery & VLA observations
- Crop Modelling using image data is an opportunity for collaboration
- Keen interest for involvement in G20 GEO GLAM initiative
- Other Areas – Invader vegetation, Drought, Land cover, etc



# National Crop Estimation System (Consortium: ARC, SIQ, GTI)



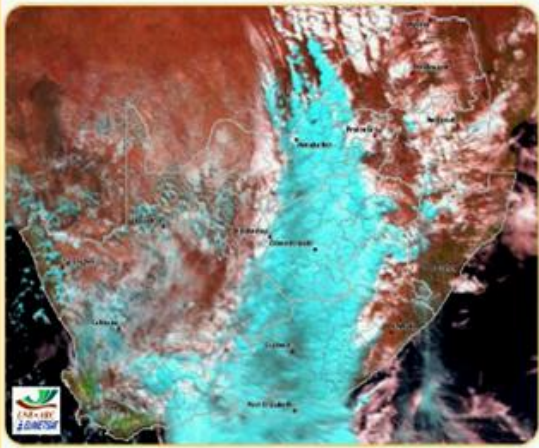
quadratic:  $y = 0.0018x^2 - 0.034x + 1.8001$   $R^2 = 0.4616$       linear:  $y = 0.041x + 1.2627$   $R^2 = 0.3807$





- Latest vegetation conditions as deduced from SPOT VEGETATION data
- Rainfall for July

**Image of the Month**



**Meteosat Second Generation (MSG) colour composite image for 1 August 2006 at 13:00 SAST**  
A well developed low system can be seen over the western part of the country, extensive cloudiness over the interior Africa, and haze along the Cape coast.

**CONTENTS:**

Snow Covered Drakensburg Mountains	2
Lesotho Highlands Water Project	3
Vegetation Conditions	4
Climate Information for July	6
Agrometeorology	8
Remote Sensing	9
Remote Sensing & Applications	10
Contact Details	10

**ARCeagle**



The ARCeagle is resolution airborne multi-spectral camera with interchar filters. This system is proudly South African search instrument developed by the ARC based in Pretoria. The camera system is in a Jabiru J1601 craft ensuring cost image acquisition

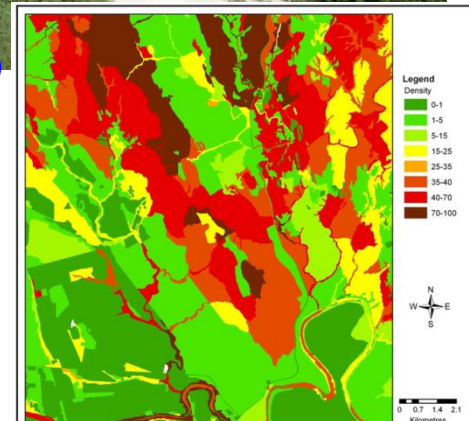
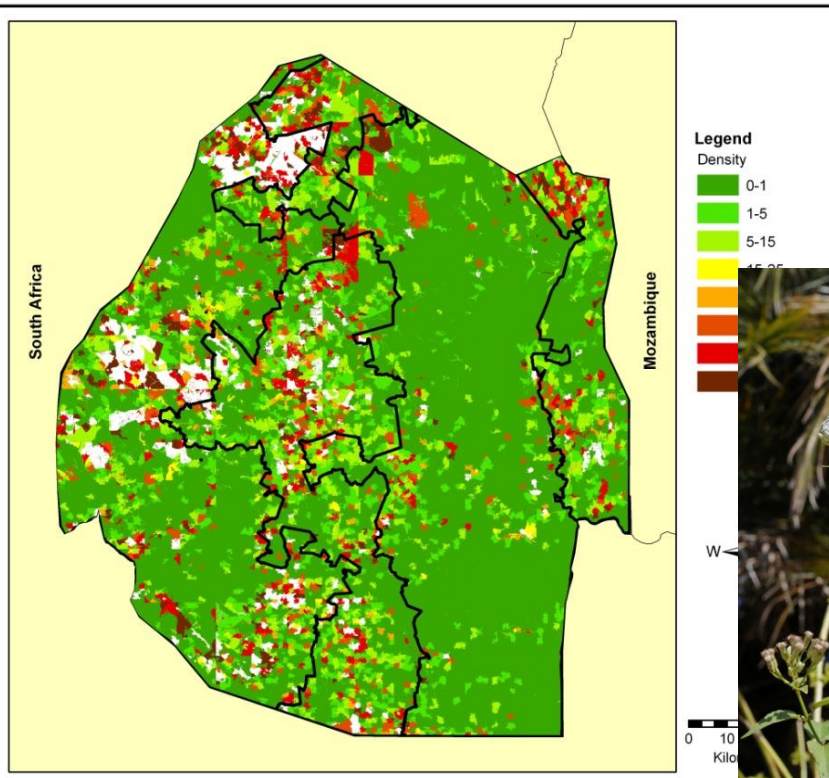
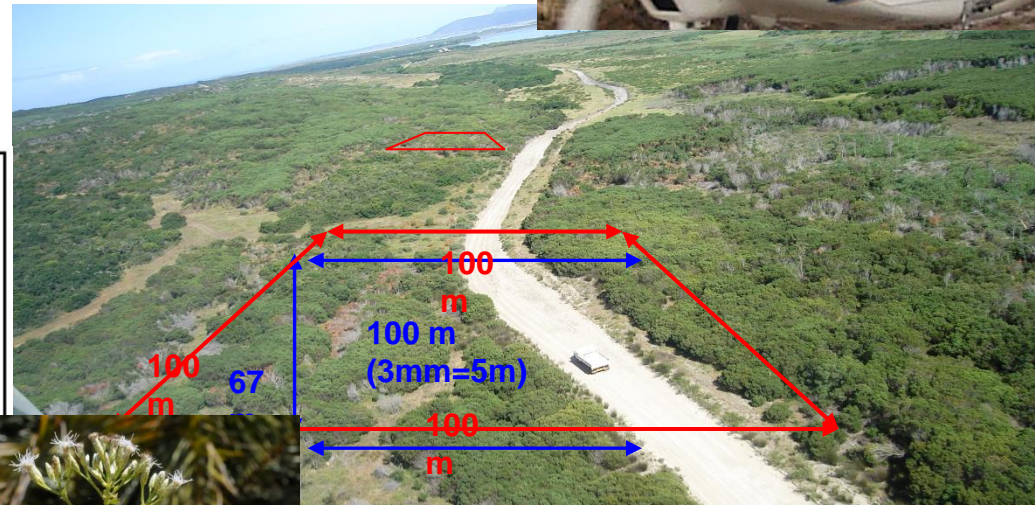
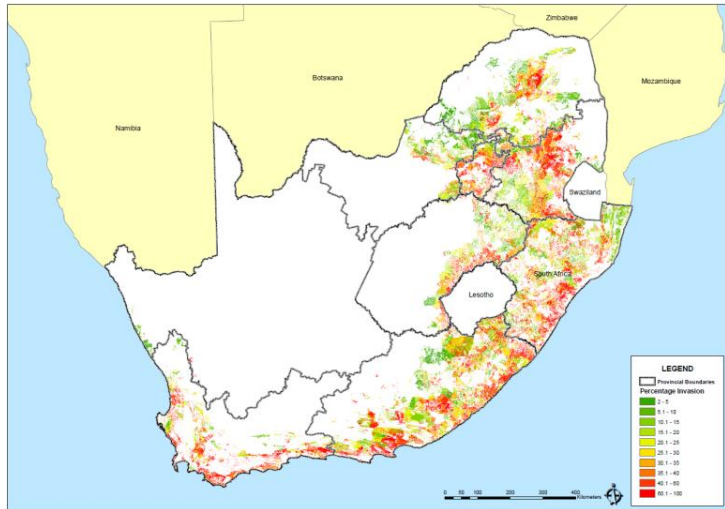
*Sludge dam at Pi Mine, Cullinan*

For more information contact Eric Economon or Chris Kaempfer at 012-310 2562 or [eric@arc.agric.za](mailto:eric@arc.agric.za) or [chrisk@arc.agric.za](mailto:chrisk@arc.agric.za)

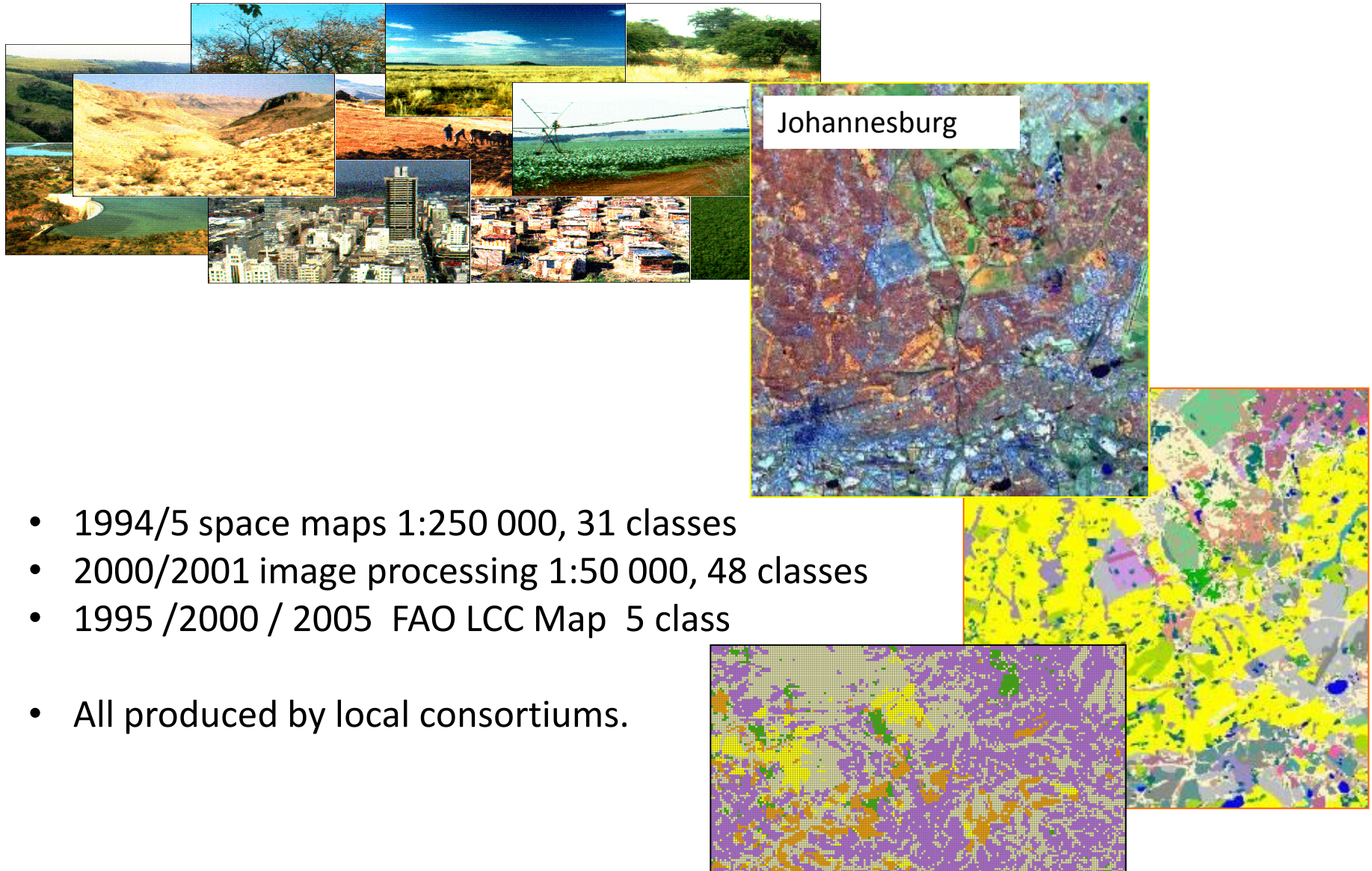
# Drought monitoring systems

The screenshot shows the 'ARC Drought Management' software interface. It features a map of South Africa with various layers and tools. The 'Project Calculations' panel shows a list of calculations to perform, including 'Spot Veg', 'MSG', and 'Rainfall'. The 'Detail Layer' panel shows options for 'Provinces', 'Towns', and 'Rivers'. The 'Legend' panel shows a color scale for 'Vegetation' ranging from 0.00 to 0.6-1. The 'Map Overview' panel shows a small map of South Africa with a scale of 1:1016000. The bottom of the interface includes logos for ARC + LNR, EUMETSAT, and SPATIALINTEL.

# Detailed survey of an invasive plant



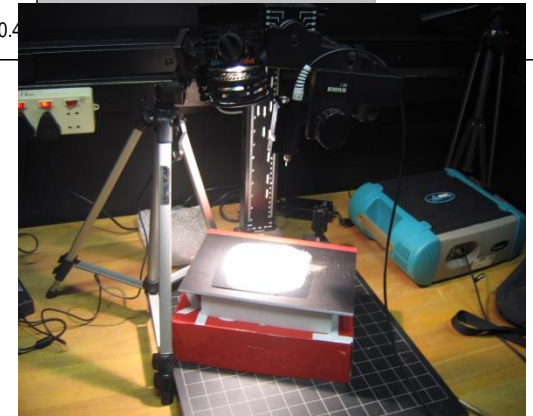
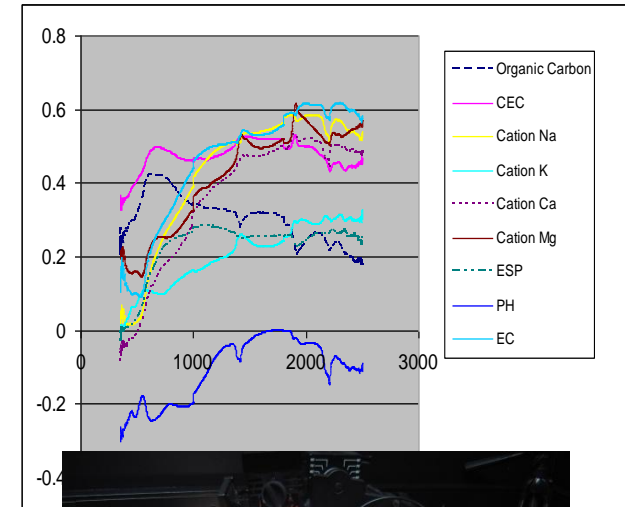
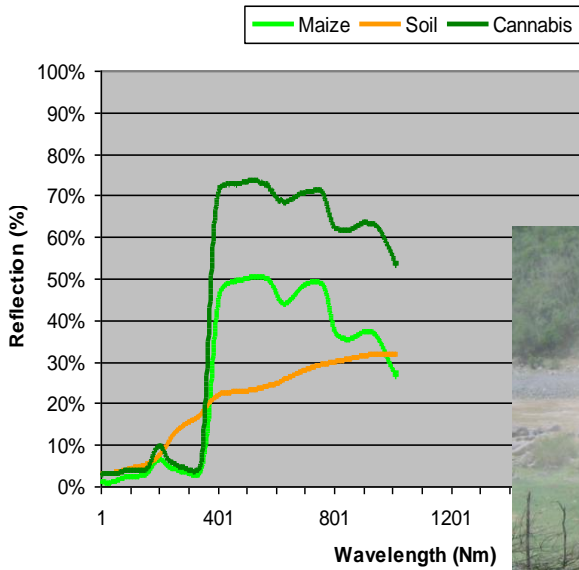
**1994-95 National Land-Cover Map**  
**2000/2001 National Land-Cover Map**  
**2005 National Land cover Map**



- 1994/5 space maps 1:250 000, 31 classes
- 2000/2001 image processing 1:50 000, 48 classes
- 1995 /2000 / 2005 FAO LCC Map 5 class
  
- All produced by local consortiums.

# Spectral Identification of Narcotic Plants and Remote Sensing of Saline Soils

Spectral Comparison of Cannabis Sativa L, Maize & Soil





## Adapting the way we live

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- 1. Preparing for rapid change and extreme events**
2. Planning for sustainable urban development in a South African context
3. Water security for South Africa
4. Food and fibre security for South Africa



# Theme C1: Preparing for rapid change and extreme events

- Increased magnitude of floods and droughts
- Changes to fire regimes (higher risk)
- Rise in sea level and “storminess”
- Dynamics of diseases affecting human and livestock



# Theme C1: Preparing for rapid change and extreme events.

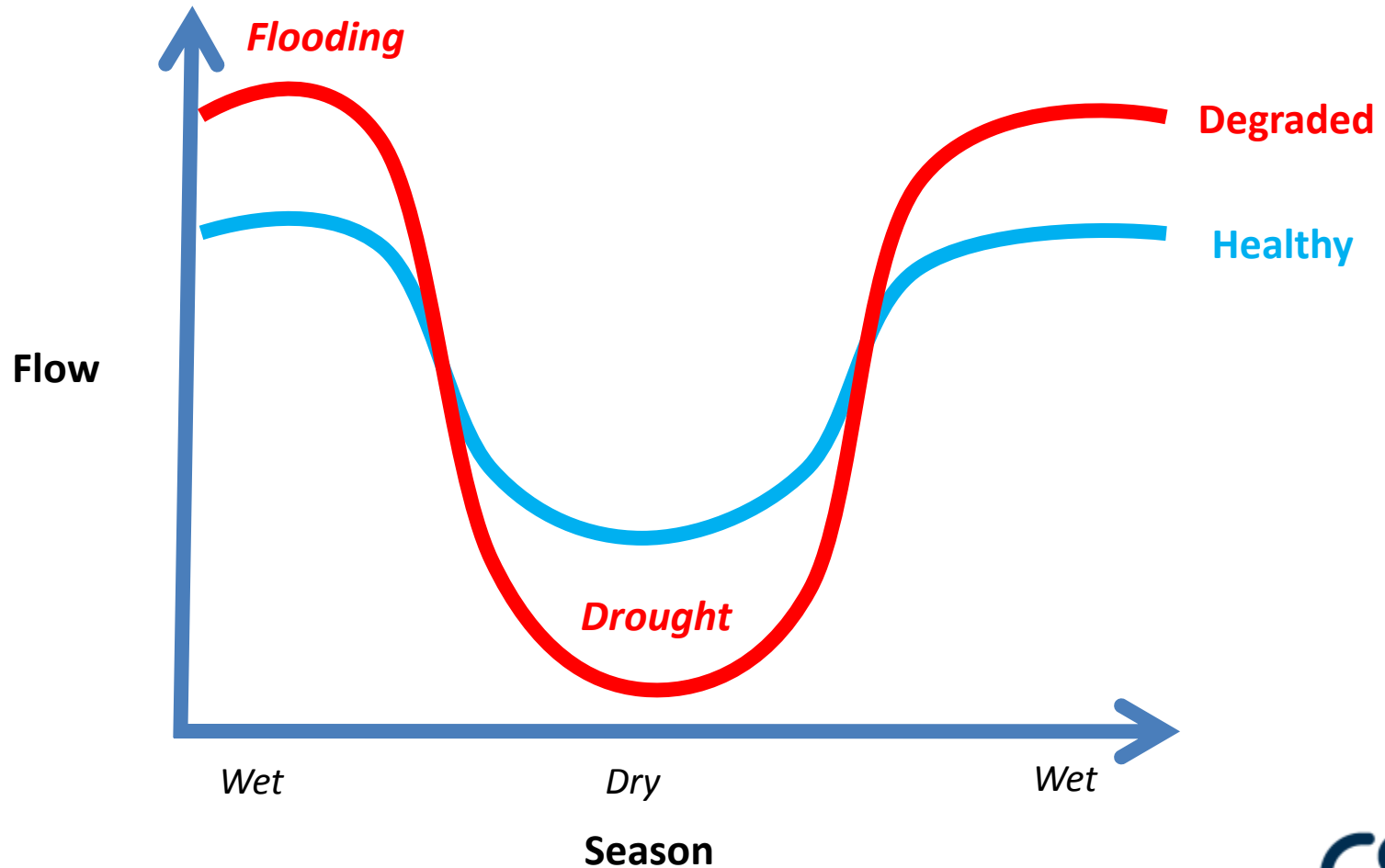
## Focus on areas at most risk:

- Coastal zone (highly populated east and south coast)
- Water-stressed ecosystems (water is “over-allocated”)
- Flood risk areas (increased streamflow variation)
- Higher fire danger areas
- People and animals at risk from diseases

# Theme C1: Research Focus

- Methods to understand uncertainty and risk.
- Areas at most risk from rapid changing conditions.
- Innovative response strategies and tactics
- Protecting biodiversity (especially threatened, rare and or otherwise important species) from adverse change.

# Flow regulation and ecosystem condition



# Is there a link?



**Mono culture, degraded riparian edge**



# Oops....



# Is there a link?



**Reduction in sand supply due to sand mining**





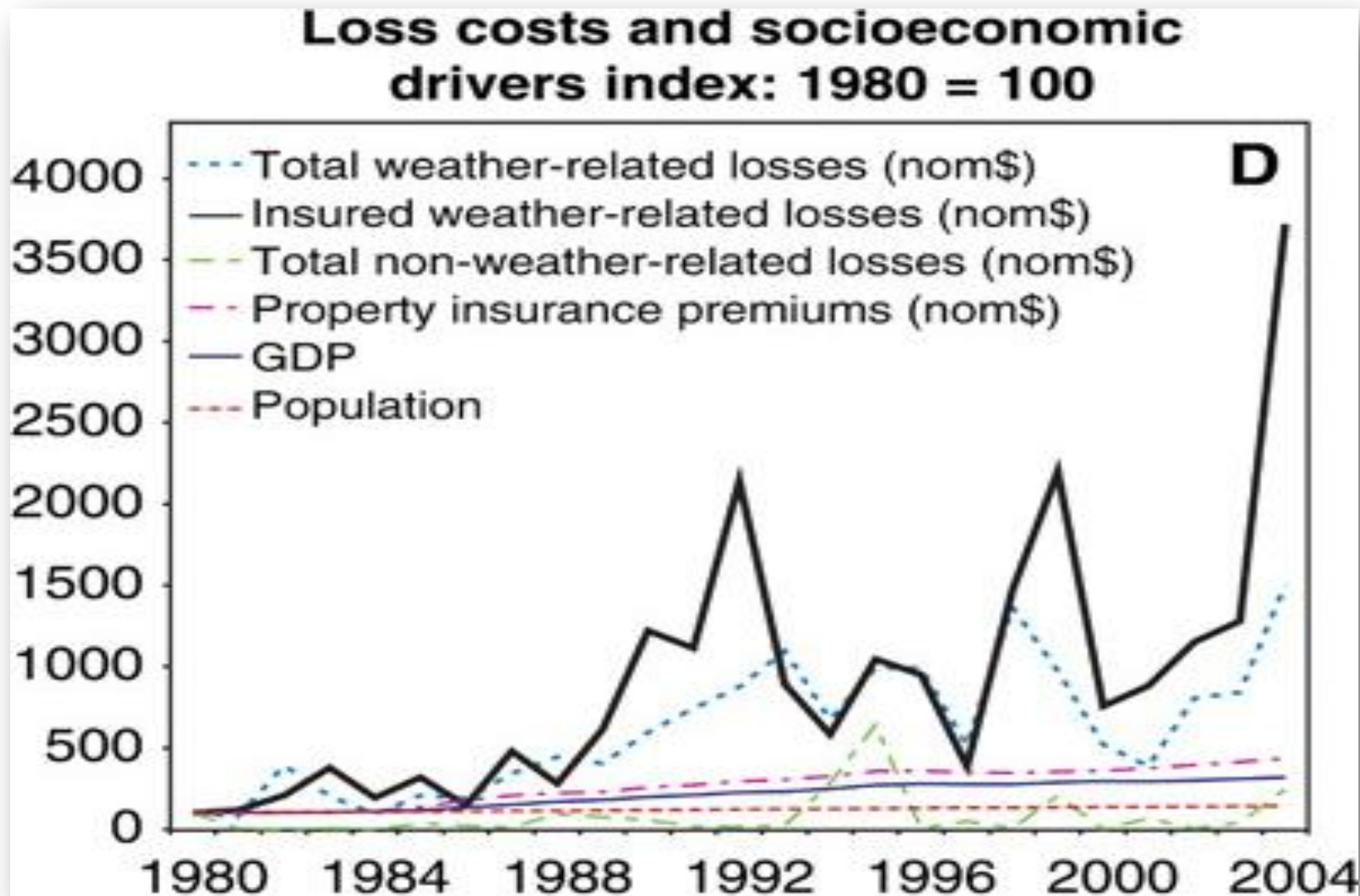
Myoti Estuary  
*Photo: N T Demetriades  
Marine & Estuarine Research*



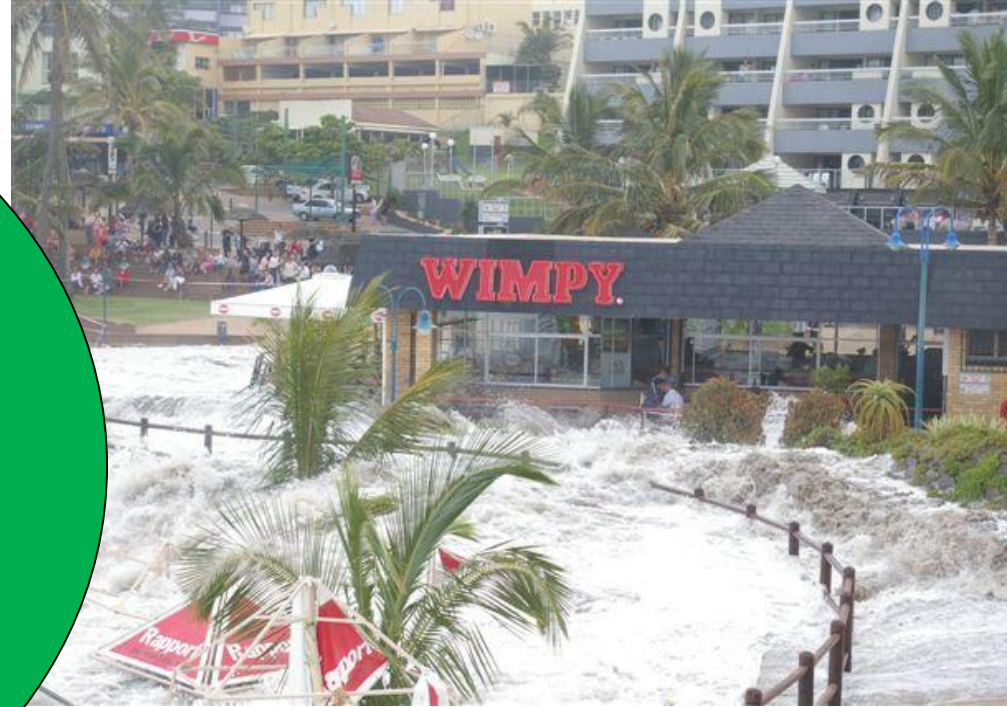
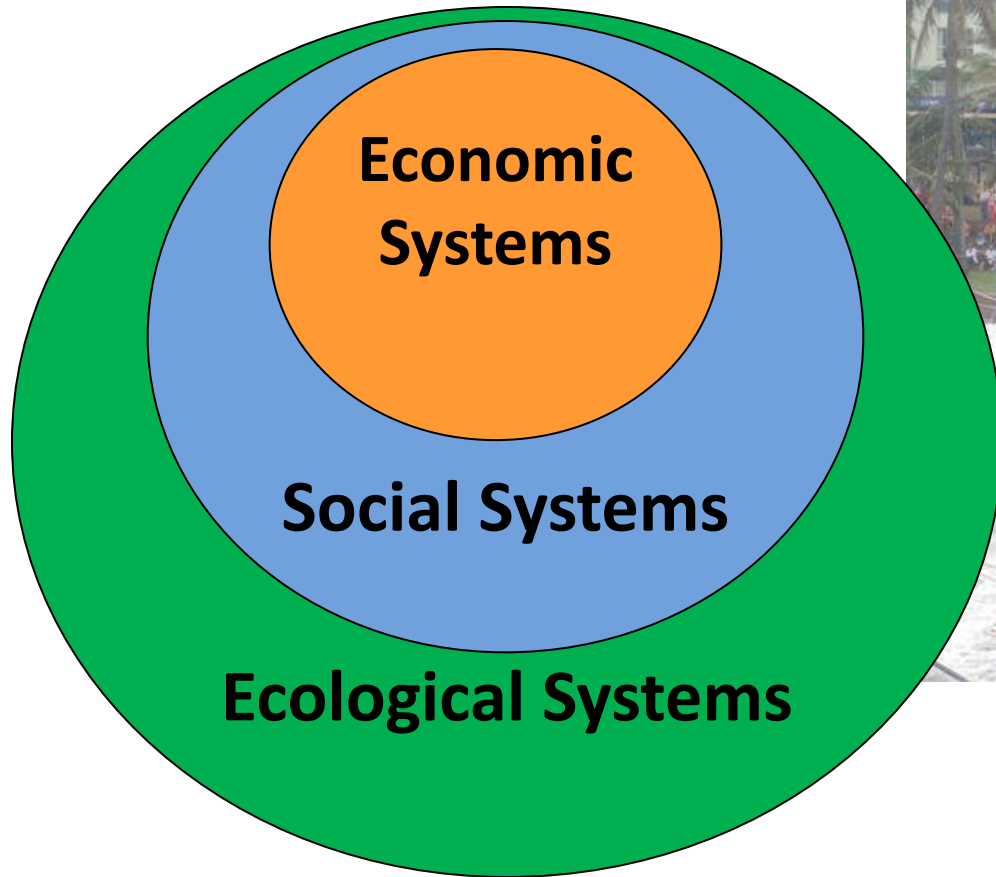
Thukela Estuary with as yet untouched sandbanks  
*Photo: N T Demetriades  
Marine & Estuarine Research*



# Trends in insured weather-related losses



# A Systems Approach



- All economic activity is embedded within a complex social-ecological landscape



## Adapting the way we live

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- 1. Preparing for rapid change and extreme events**
- 2. Planning for sustainable urban development**
- 3. Water security**
- 4. Food and fibre security**

# Example of science into awareness and practice



VILANCULOS, MOZAMBIQUE



Phase II

## RESPONDING TO CLIMATE CHANGE IN MOZAMBIQUE



USAID photo



Instituto Nacional de  
Gestão de Calamidade Naturais

**PROJECT GOAL:** To assist Mozambique in formulating and implementing its response to climate change, building resilience through disaster risk- and vulnerability reduction in a structured manner.

### MAIN OBJECTIVES:

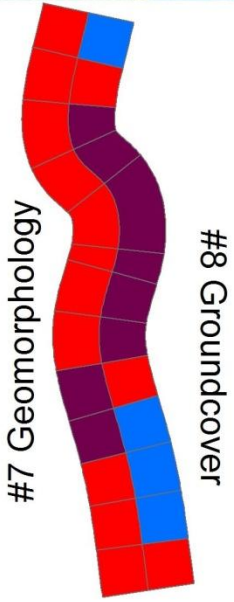
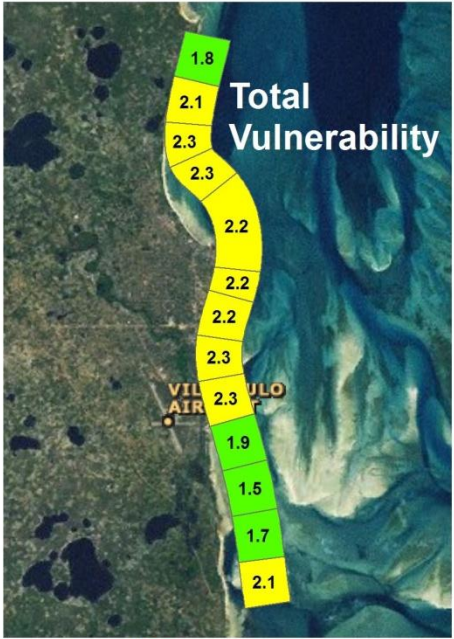
- To ensure the start of the implementation of adaptation actions and the building of resilience to climate change (with an emphasis on disaster risk reduction), in a structured and effective manner, in line with national priorities.
- To build national capacity to deal with all aspects of climate change.
- To provide strategic and policy guidance to enable and facilitate the implementation of adaptation to climate change (with emphasis on disaster risk reduction).



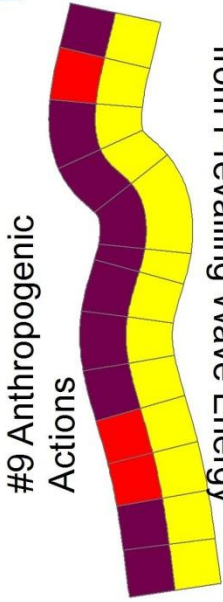
# 14 VULNERABILITY CRITERIA

(ADAPTED FROM COELHO et al (2006))

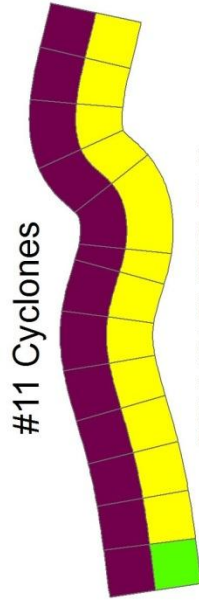
#	Vulnerability Criteria	Vulnerability Classification & Score				
		VL	L	M	H	VH
		1	2	3	4	5
1	TE: Elevation (m)	>30	21 - 30	11 -20	6 -10	<5
2	DS: Distance to shore (m)	>1000	200 - 1000	50 -200	20 -50	<20
3	TR: Tidal range (m)	<1	1 - 2	2 - 4	4 - 6	>6
4	WH: Max wave height (m)	<3	3 - 5	5 - 6	6 - 7	>7
5	EA: Erosion / accretion rate (m/yr)	>0 (accretion)	-1 to 0	-3 to -1	-5 to -3	< -5 (erosion)
6	GL: Geology	Hard rocks (Magmatic)	"Medium" hardness rocks (Metamorphic)	Soft rocks (Sedimentary)	Non-consolidated coarse sediment	Non-consolidated fine sediments
7	GM: Geomorphology	Mountains	Rocky cliffs	Erosive cliffs, Sheltered beaches	Exposed beaches, Flats	Dunes, river mouths, estuaries
8	GC: Ground Cover	Forest/ Mangroves	Ground Vegetation, cultivated ground	Non-covered	Rural urbanised	Urbanised or Industrial
9	AA: Anthropogenic Actions	Shoreline stabilisation Intervention	Intervention without sediment sources reduction	Intervention with sediment sources reduction	Without Intervention or sediment sources reduction	Without Intervention but with sediment sources reduction
10	Degree of protection from prevailing wave energy	Leeside of large island or extensive spit on opposite side of wave incident waves	Leeside of headland, rocky point or peninsula	Partially sheltered from deep-sea wave energy	Directly exposed to waves only slightly refracted from deep-sea	Directly exposed to storm wave attack, with narrow surf zone
11	Cyclones (occurrence/a)	0	>0, <1	1-2	>2-3	>3
12	Sea-level rise Bruun erosion potential (Inshore slope)	<0.1 (1/10)	0.1- 0.029	0.03 - 0.014	0.015-0.005	>0.005
13	Corals/fringing reefs (alongshore extent as % of total length)	<10	10-30	30-50	50-80	>80
14	Relative height (m) of the protective foredune buffer	>20	10-20	5-10	0.5-5	<0.5



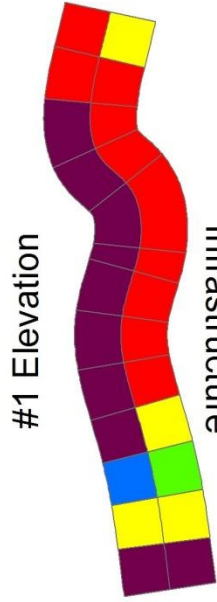
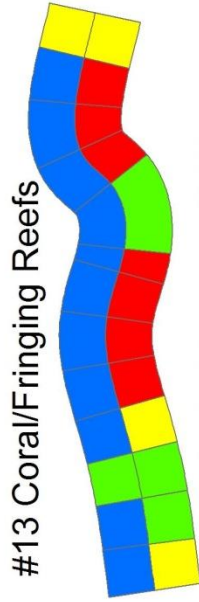
#8 Groundcover



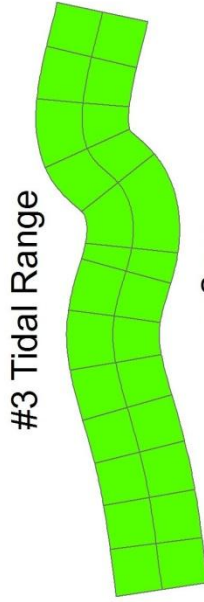
#10 Degree of Protection from Prevailing Wave Energy



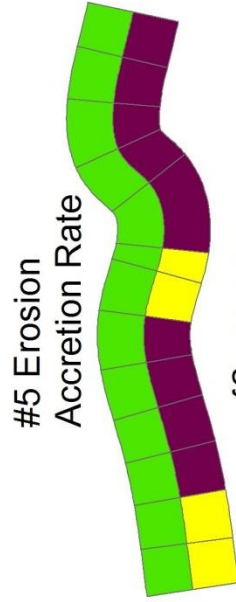
#12 Sea-level Rise



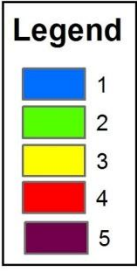
#2 Distance to Infrastructure



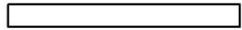
#4 Max Wave Height



#6 Geology



5 km



Prepared for:  
National Institute for  
Disaster Management



Prepared by:



# Climate change scenarios

## Summary of scenarios assessed for coastal vulnerability

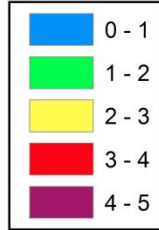
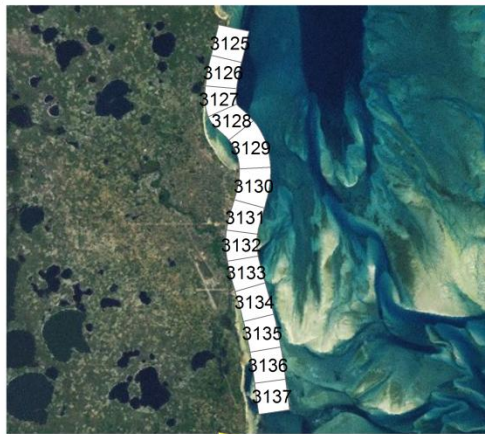
		Excluding cyclones		Including cyclones		
		Present wave climate	Increased storminess	Present wave climate	Increased storminess	
		#	1	2	3	4
<b>No Climate Change:</b>		<b>A</b>	Present wave climate	Present wave climate	Present wave climate	Present wave climate
<b>Climate change included</b>	SLR = 0.5 m	<b>B</b>	Present wave climate	Increased storminess	Present wave climate	Increased storminess
	SLR = 1.0 m	<b>C</b>	Present wave climate	Increased storminess	Present wave climate	Increased storminess
	SLR = 2.0 m	<b>D</b>	Present wave climate	Increased storminess	Present wave climate	Increased storminess

Note:

Scenario A1 is the same as A2, therefore no A2 Scenario is included in the scoring

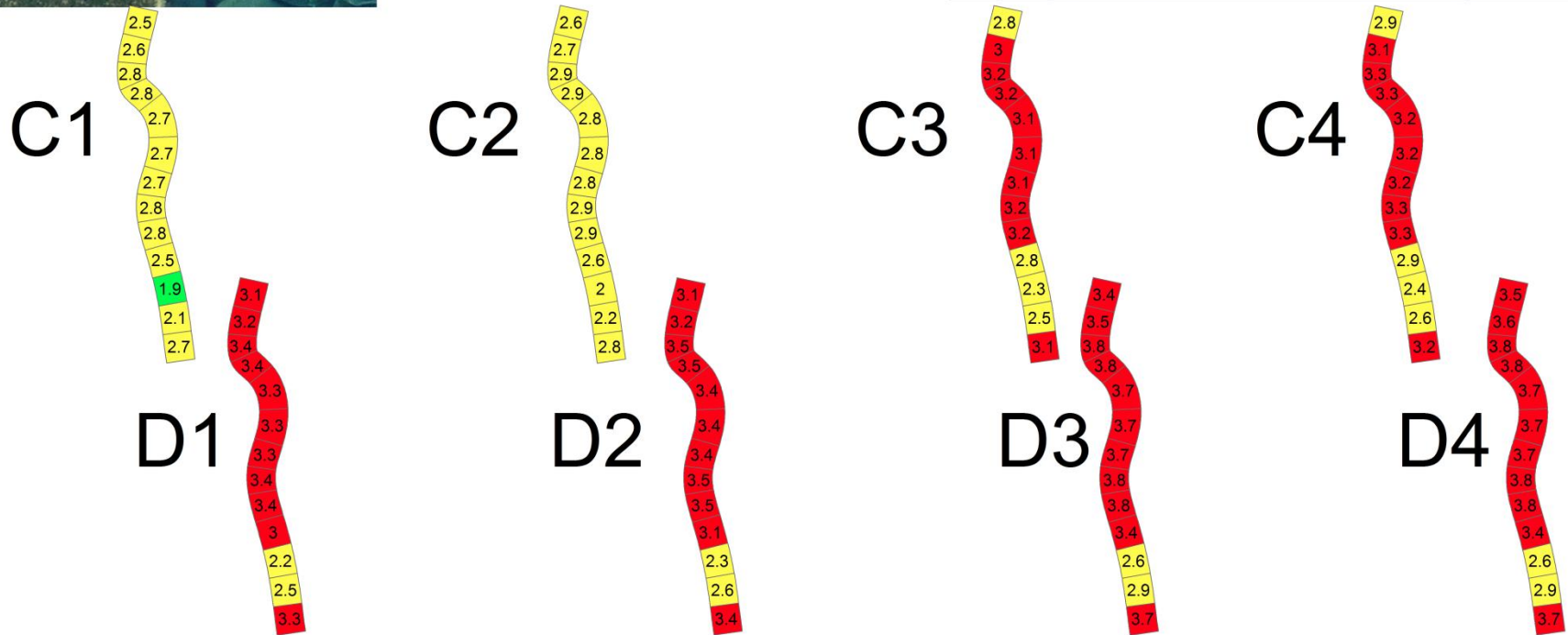
Scenario A3 is the same as A4, therefore no A4 Scenario is included in the scoring

# Summary of scenarios assessed for coastal vulnerability



		Excluding cyclones		Including cyclones		
		Present wave climate	Increased storminess	Present wave climate	Increased storminess	
		1	2	3	4	
No Climate Change	A	Present wave climate	Present wave climate	Present wave climate	Present wave climate	
Climate Change Included	SLR = 0.5m	B	Present wave climate	Increased storminess	Present wave climate	Increased storminess
	SLR = 1m	C	Present wave climate	Increased storminess	Present wave climate	Increased storminess
	SLR = 2m	D	Present wave climate	Increased storminess	Present wave climate	Increased storminess

**Note:** Scenario A1 is the same as A2; therefore no A2 scenario included in scoring  
Scenario A3 is the same as A4; therefore no A4 scenario included in scoring



Prepared for:  
National Institute for  
Disaster Management

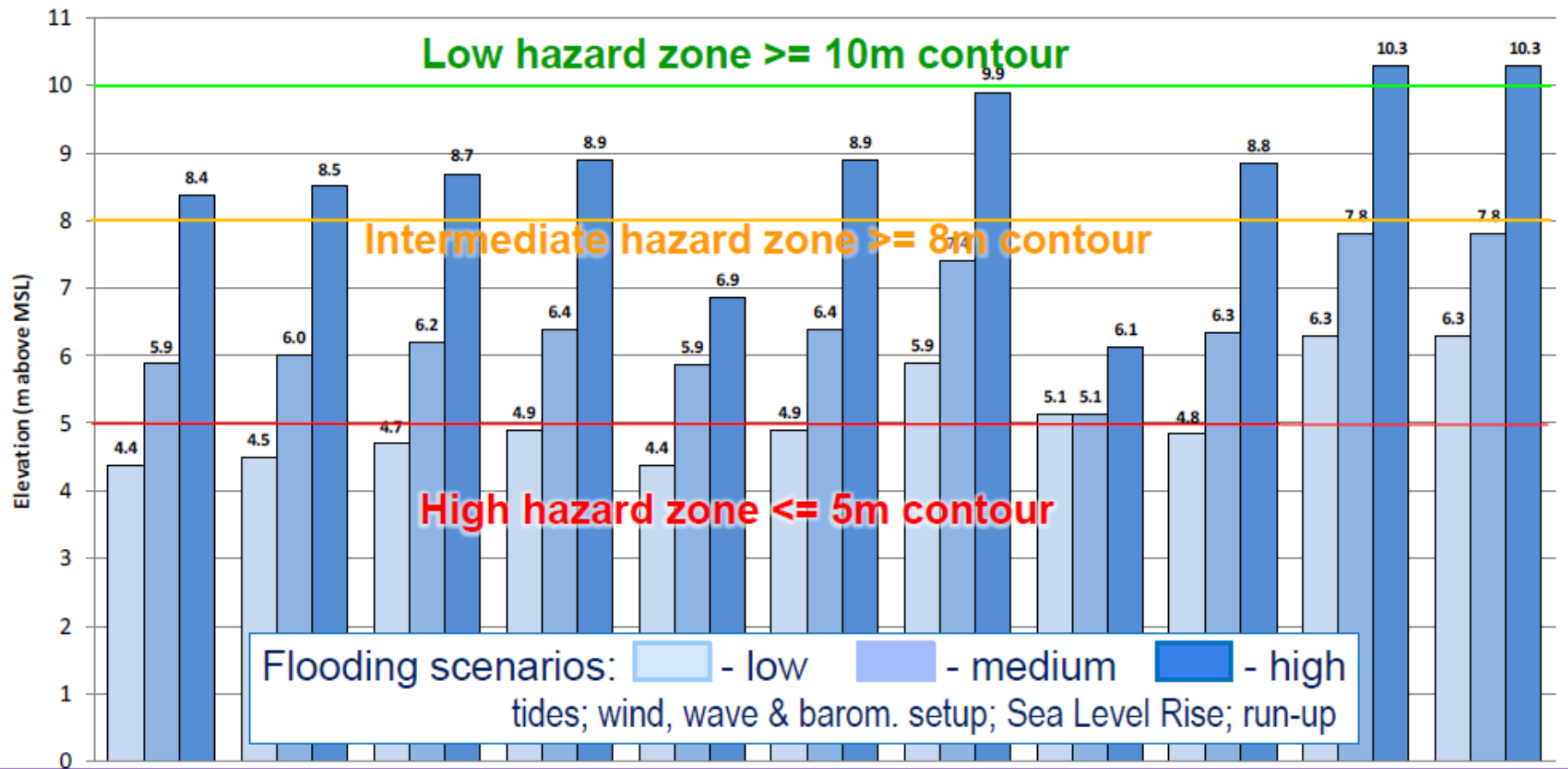


Prepared by:  
February 2011





# Coastal flooding levels for 11 towns/cities



**Town:** Ponta do Ouro, Maputo, Xai-Xai coast, Tofo (Bazaruto), Inhambane, Bazaruto (Vilanculo), Beira, Quelimane, Port Moçambique, Nacala, Pemba

- MHWS + wind, wave & barom setup + 1m SLR
- MHWS + wind, wave & barom setup + 1m SLR + 1.5m run-up
- MHWS + wind, wave & barom setup + 2m SLR + 3.0m run-up



Baobab Beach Camp / Vilanculos

+10m MSL  
+ 8 m MSL  
+ 5 m MSL

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Image © 2011 DigitalGlobe

22°00'33.19" S 35°19'18.92" E elev 10 m

17:00 29-8-11

Tide: ~4m (Bazaruto)



Photo: L Barwell 29-08-2011 at 17:00

## KEY: Adaptation measures

### A “Management options”

A1 “Accept & retreat”: zoning, etc.

A2 “Abstention” ‘do nothing’

A3 “Alternative” developments in safe areas

A4 “Accommodation” e.g. raising property

### B “Soft engineering” /Restoration

B1 Sand nourishment

B2 Managed (vegetated &/ reinforced) dune

B3 Managed/rehabilitated mangrove/wetland areas

### C “Hard engineering” & armouring

C1s Seawalls (vertical / curved concrete)

C1r Revetments (sloping rock)

C2 Dikes (sand/ earthen mound)

C5 Groynes (rock/concrete)

### Low/ moderate wave energy:

C11 “Geotextiles” sand filled

C12 Gabions & mattresses

---

# Vilanculos draft adaptation / coastal protection - priorities 1, 2 & 3



# RESPONDING TO CLIMATE CHANGE IN MOZAMBIQUE



Instituto Nacional de  
Gestão de Calamidades



National Institute for Disaster Management (INGC)  
PHASE II

THEME 2  
COASTAL PLANNING AND  
ADAPTATION TO MITIGATE CLIMATE  
CHANGE IMPACTS

March 2012

**REVISED VERSION**



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# Layout of the Presentation

- Collaborative Advantage
- Examples of collaborative research issues
- **Alignment with FP7 Theme 6**



# Regional strengths and advantages

- Unique mix of climate regimes
  - Unique ecological richness and complexity
  - Juxtaposition of distinct biomes
  - Good environmental and climate history
  - Many useful climatic gradients
  - Sensitivity to global drivers
  - Societal inter-dependence with ecosystem services
  - Applied Centre for Climate & Earth System Science (ACCESS) <http://www.access.ac.za/>
  - Launching point into the Southern Ocean “laboratory”
- 
- Major future scientific human resource base:
    - **60% of all Africa is  $\leq$  25 yrs old!**





Activity / Area	EU FP7 Topic	South Africa's Research Agenda			
		A	B	C	D
6.1	6.1-1	A1, A2, A4, A5			
	6.1-2	A1, A5	B2		
	6.1-3			C1, C2 , C3, C4	D1, D2, D3
	6.1-4	A1, A4, A5	B1, B2, B3, B4	C1, C2 , C3, C4	D1, D2, D3,D4
6.2	6.2-1		B1, B2, B3, B4	C1, C2, C3	D2, D4
	6.2-2	A1	B1, B2, B3, B4	C3, C4	D2, D4
	6.2-5		B1, B2		D2, D3, D4
	6.2-7	A1	B2, B5	C3, C4	
	6.2-8	A1, A4, A5	B1, B2		
6.3	6.3-1		B1, B2	C2	D2, D3
	6.3-3	A1	B1, B3	C2, C3	D3, D4
	6.3-4	A1, A5	B2, B3		
6.4	6.4-1	A1	B1, B2, B3	C1	D2, D4
	6.4-3	A1, A5	B2, B3	C1, C2	D1, D2, D3, D4, D5
6.5	6.5-3				D4

**Alignment with 2013 Call**

Activity / Area	EU FP7 Topic	South Africa's Research Agenda			
		A	B	C	D
6.1	6.1-1	A1, A2, A4, A5			
	6.1-2	A1, A5	B2		
	6.1-3			C1, C2 , C3, C4	D1, D2, D3
	6.1-4	A1, A4, A5	B1, B2, B3, B4	C1, C2 , C3, C4	D1, D2, D3,D4
6.2	6.2-1		B1, B2, B3, B4	C1, C2, C3	D2, D4
	6.2-2	A1	B1, B2, B3, B4	C3, C4	D2, D4
	6.2-5		B1, B2		D2, D3, D4
	6.2-7	A1	B2, B5	C3, C4	
	6.2-8	A1, A4, A5	B1, B2		
6.3	6.3-1		B1, B2	C2	D2, D3
	6.3-3	A1	B1, B3	C2, C3	D3, D4
	6.3-4	A1, A5	B2, B3		
6.4	6.4-1	A1	B1, B2, B3	C1	D2, D4
	6.4-3	A1, A5	B2, B3	C1, C2	D1, D2, D3, D4, D5
6.5	6.5-3				D4

Alignment with 2013 Call: highest potential highlighted

# A

## Understanding a changing planet

- 1 Observation and monitoring
- 2 Dynamics of the oceans around southern Africa
- 3 Dynamics of the complex internal earth system
- 4 Linking the land, air and sea
- 5 Improving model predictions at different scales

# B

## Reducing the human footprint

- 1 Waste-minimisation methods and technologies
- 2 Conserving biodiversity and ecosystem services
- 3 Institutional integration to manage ecosystems and ecosystem services
- 4 Doing more with less

# C

## Adapting the way we live

- 1 Preparing for rapid change and extreme events
- 2 Planning for sustainable urban development in a South African context
- 3 Water security for South Africa
- 4 Food and fibre security for South Africa

# D

## Innovation for sustainability

- 1 Dynamics of transition at different scales – mechanisms of innovation and learning
- 2 Resilience and capability
- 3 Options for greening the developmental state
- 4 Technological innovation for sustainable social-ecological systems
- 5 Social Learning for sustainability, adaptation, innovation and resilience

*The Global Change Research Plan identifies four major cross-cutting knowledge challenges and 18 key research themes.*

 **EU FP7 Alignment**

# Conclusion

- Collaborative Advantage
- Examples of collaborative research issues
- Alignment with FP7 Theme 6

- 1. A diverse “Living Laboratory”**
- 2. Aligned research agenda**
- 3. Willing and able people & their “tools”**



European - South African Science and Technology  
Advancement Programme

# THANK YOU FOR YOUR ATTENTION

We do share enough common  
issues & concerns to work  
together!!!



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