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Overview of the Issues Relevant to the Impacts Associated with Slow Onset Events for SIDS

Dr Murray C. Simpson

Chief Executive Officer, The CARIBSAVE Partnership and INTASAVE
Senior Research Associate, University of Oxford

UNFCCC, Barbados, 9 October 2012



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Presentation

- Slow Onset Events: Cancun Agreements
- Slow Onset Events and their impacts on SIDS
 - Increased temperature
 - Sea level rise
 - Land and forest degradation
 - Salinisation
 - Ocean acidification
 - Loss (and Changes) in Biodiversity
 - Desertification
 - (Glacial retreat??)
- Addressing Slow Onset Events
- The Future?



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Slow onset events

According to the Cancun Agreements

- **Decision 1/CP.16**

“recognizes the need to **strengthen international cooperation and expertise** in order to **understand and reduce loss and damage** associated with the adverse effects of climate change, including impacts related to extreme weather events and **slow onset events**”

Slow onset events include: sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinization, land and forest degradation, loss/(changes) in biodiversity and desertification.



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Slow Onset Events

The Facts.....Slow Onset Events (SOEs) are not a future event they are already happening and are having a significant and devastating impact on economies and livelihoods in SIDS

- **Impacting on multiple sectors**
- **Complex**
- **Exacerbate and intensify extreme events**
- **Undermining international development and increasing poverty**
- **Not often politically or media attractive**
- **Extremely costly and growing**
- **SOEs can sometimes seem 'silent' but they are deadly**
- **Urgency is Key**



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Increased Temperature

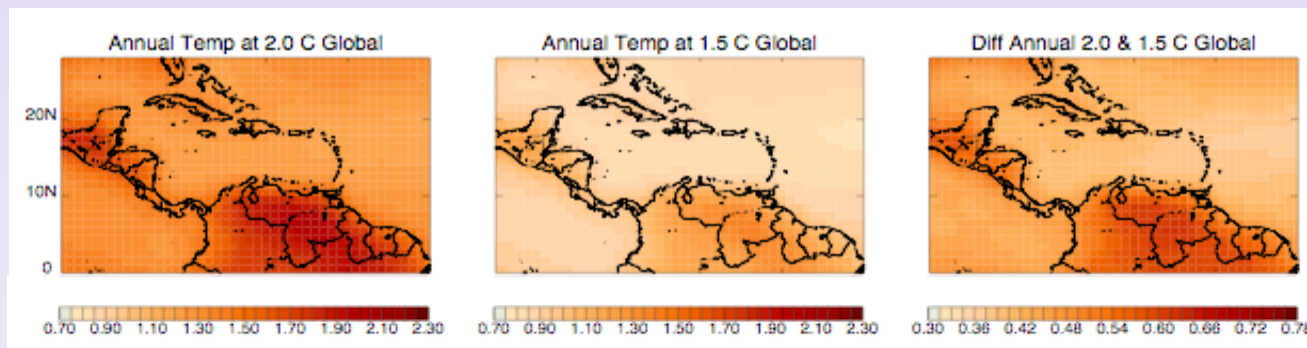
A Driver.....(and an impact).....



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Increased Temperature in SIDS e.g. Caribbean

- Caribbean temperature trends paralleled observed global warming over the past 50 years, and are projected to **continue tracking global temperature** over the 21st C
- At the 2.0°C global warming threshold, average annual temperatures in the Caribbean would be **roughly 0.5°C warmer compared to the 1.5°C threshold** - perhaps more so at locations remote from the sea
- **Holding global average** temperature increases to 1.5°C **will restrict temperature** increases in the Caribbean



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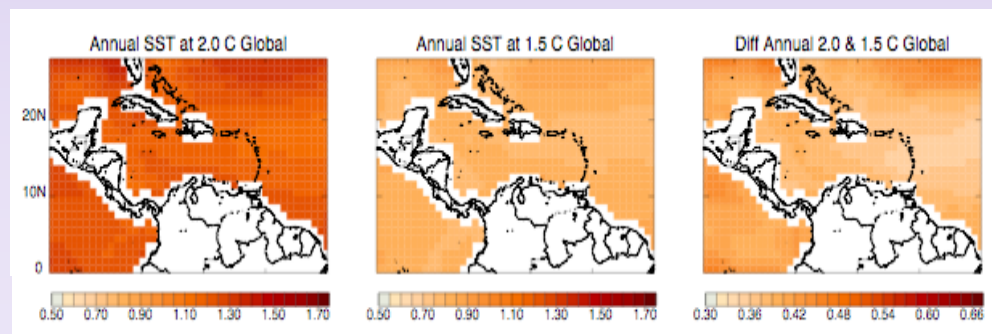
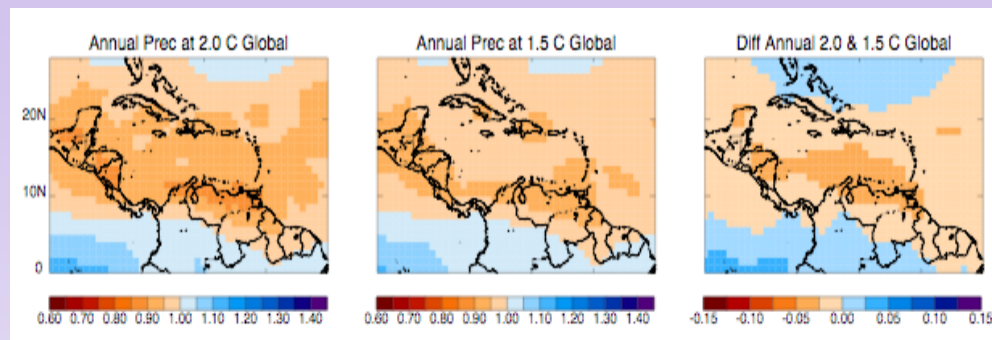
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Increased Temperature, Rainfall and Sea Surface Temperature

- Total annual **rainfall is expected to decrease up to 20%** in most CARICOM countries, and up to a 30% at the 2.0°C threshold
- As with air temperature, increase in **average sea surface temperature is projected to be approx. 0.5°C warmer at the 2.0°C threshold**





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Sea Level Rise

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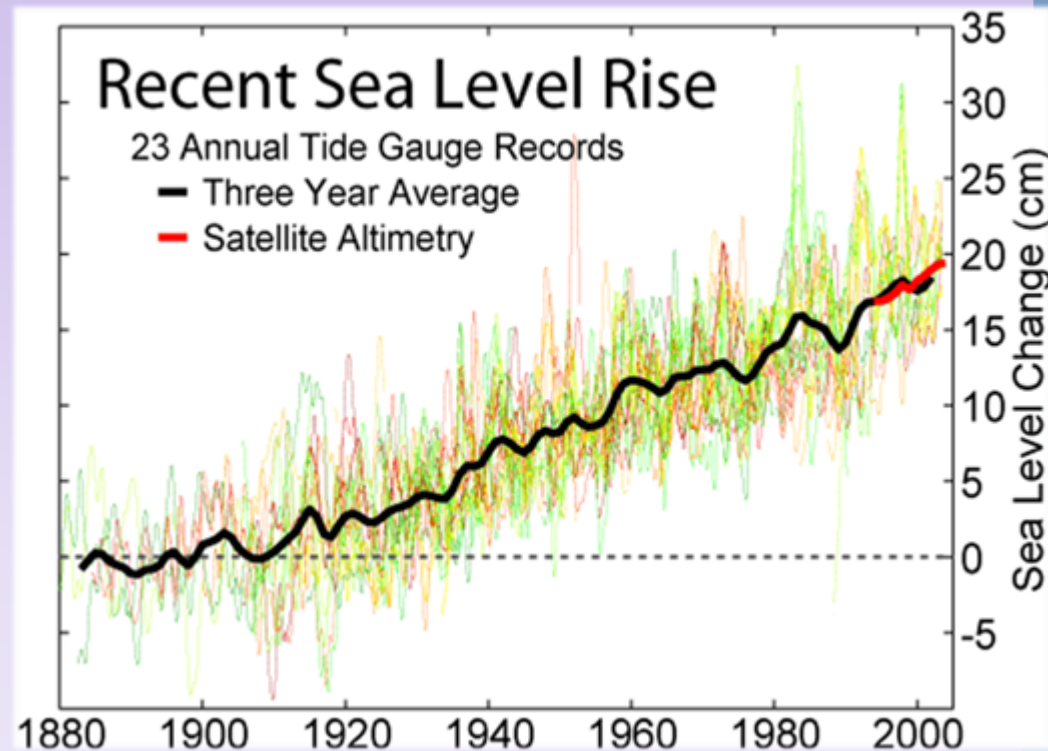
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Sea Level Rise (SLR) Trends

- Global temperatures and the SLR are linked
- SLR in the Caribbean has paralleled global trends over the last 40 years
- With a $+1.5^{\circ}\text{C}$ in mean global temperatures, the magnitude of SLR may slow versus recent observations
- **$+2^{\circ}\text{C}$ in mean global temperature, the rapid increase in SLR will continue**



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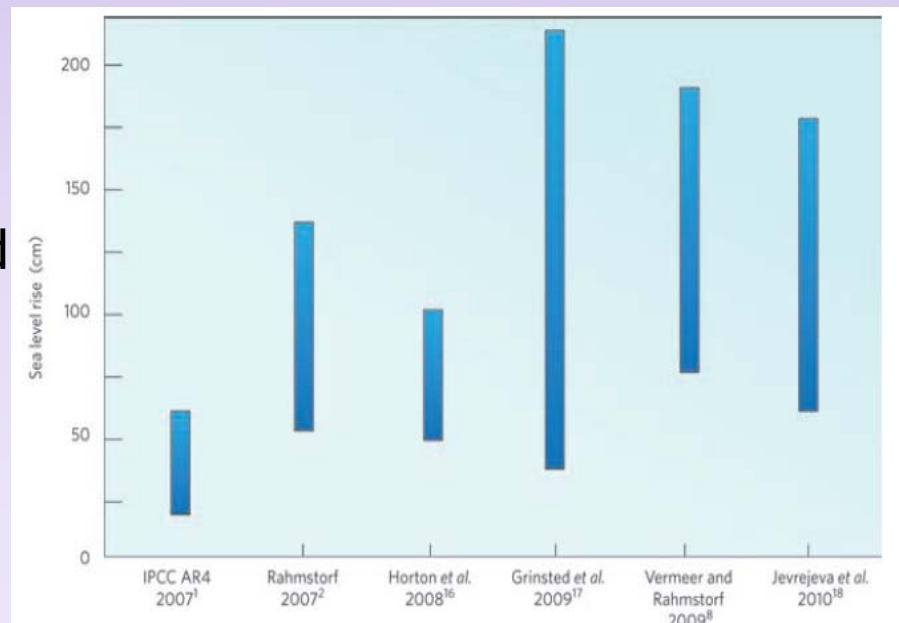
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Global Sea Level Rise Projections

- Moderate to high GHG emission scenarios pose a major **threat to the stability of the world's ice sheets**, introducing the possibility of rapid SLR on a decadal timescale up to 10x the rate observed a century ago
- Accounting for rapid ice sheet melt (Greenland & Antarctic), recent studies have supplanted IPCC projections and **forecast 1.5-2m SLR by 2100**



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Sea Level Rise

- Impact of tropical storms, hurricanes/cyclones on coastlines, even at present levels, will be intensified as sea level rises
- SLR will continue for centuries after 2100, even if global temperatures are stabilized at 1.5°C or 2.0°C
- Impacts of sea level rise in SIDS include loss of livelihoods, reduction in agricultural productivity, coastal erosion and displacement/migration
- Gravitational and geophysical factors means the Caribbean will be **more seriously affected by SLR**
 - SLR in northern Caribbean may exceed global average by **up to 25%**



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Key Findings for UNDP Barbados Caribbean Study (applicable across SIDS)

- Impacts of SLR significant for all states (average capital costs of up to **48% of GDP in 2080**)
- Rebuild costs **disproportionately high for smaller island** states
- Rebuild costs of tourist resorts very high in many cases (average of up to **28% of GDP in 2080**)
- **Key infrastructure** (ports, airport and power plants) in most countries **vulnerable** to 1m SLR
- Impacts increase significantly from 2050 to 2080



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Key Findings for UNDP Barbados Caribbean Study (applicable across SIDS)

- Nearly **one-third** of major tourism resorts and airports are at risk to **1m SLR**
- A **large majority** of land around seaports, vulnerable to flooding from 1m SLR.
- **Geographic pattern of impacts** among the CARICOM nations remains **broadly similar** under a 2m SLR scenario; **magnitude** of impacts for the region as a whole and in the highly vulnerable nations was **far more pronounced**



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Sea Level Rise Conclusions

- Projected SLR is **transformational** to the economies of the Caribbean and SIDS.
- **SIDS lack the resources** needed to adapt and address SLR
- **Costs of damages** on unprotected coastlines and the **costs of protecting** high-value urban coastlines and strategic infrastructure = **major impact** on communities and national economies.
- **Significant repercussions** for food security, livelihoods and health
- **Significant barrier** to achieving Millennium Development Goals and sustainable development



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Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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Land and Forest Degradation

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Land and Forest Degradation in SIDS

- E.g. as a result of....changes in norms of seasons, wet and dry
- ...changes in norms of drought and flood....soil degradation
- Impacting on 'tipping points' of natural and social systems
- Economic..... and Non-Economic Loss e.g. cultural heritage
- Agricultural cultivation no longer possible in areas = significant implications for food and livelihood security
- Loss of livelihood prompting displacement and migration
- Loss of territory, ownership, natural assets
- Community impacts (food, water and energy insecurities)
- Management and Regulatory issues
- Conflict, displacement and migration



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Salinisation

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Salinisation in SIDS

- Freshwater Aquifers, Agriculture and Land Use impacted
- SIDS are **particularly vulnerable**
- Sea level rise can induce **salt water intrusion miles inland**
- Scarcity of **drinking water**
- **Significant impacts on health** including stomach and digestive, skin disease and malnutrition
- **Agricultural cultivation no longer possible in many areas** with significant implications for food and livelihood security
- **Loss of livelihoods** leading to displacement and migration



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Ocean Acidification

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Ocean Acidification

- Average pH of ocean surface water is:
 - **0.1 unit lower today** than before the industrial period
 - **projected to decrease another 0.3 to 0.4 units** by the end of the century.
- **Alters marine ecosystems** and coral reefs, and has significant consequences for SIDS livelihoods.



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Greatest Climate Change Impacts on SIDS Reefs

1. Increased frequency and intensity of coral bleaching
 - June to October 2005, elevated water temperatures of 2°C caused severe and mass coral bleaching, with many areas exhibiting over 90% bleaching and over 50% mortality. There has been little or no sign of recovery.
2. Increased infectious disease outbreaks since the 1970s
 - Coral diseases have been a major factor in decreasing Caribbean reefs, with correlations made between summertime thermal stress and disease outbreaks, even at temperatures below those that cause mass bleaching
3. Increased acidification of oceans
 - This reduces carbonate ion concentrations that corals use to build their calcium carbonate skeletons, slowing coral growth and processes that cement reefs together







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Slow Onset Events & Coral Reefs

- Rising Temperatures and Ocean Acidification are the greatest threats to SIDS corals; **a vital livelihood resource to communities and national economies**
- For the parameters of climate change that are affecting corals, **two can be quantified to differentiate impacts under 1.5 and 2.0°C** globally averaged warming scenarios: coral bleaching and ocean acidification. There is also strong evidence that **rising temperatures will increase infectious diseases**
- The ecosystem services (fisheries and tourism) provided by coral reefs in the Caribbean are valued at **US\$ 1.5-3.5 billion/annum**. +2.0°C will rapidly degenerate the corals, resulting in the loss of these ecosystems and Billions of US\$



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Loss (and Changes) in Biodiversity



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Loss and Changes to Biodiversity in SIDS

- Ecosystems deeply affected; fragmentation, degradation and destruction (deforestation)
- Species Loss and Invasive Species; marine and terrestrial
- Changes in migratory patterns
- Fish stocks degraded and/or lost
- Vegetation and crops degraded and/or lost
- Impacting on 'tipping points' of natural and social systems
- Economic..... and Non-Economic Loss e.g. cultural heritage, medicinal/health impacts
- Livelihoods and economies impacted
- Changes and loss of flowering plants supporting food security and animals
- Natural assets and aesthetics lost



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Desertification

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Desertification

- **Increased temperatures throughout SIDS** lead to more frequent and prolonged droughts and increasing desertification
- **SIDS agriculture highly vulnerable to desertification** due to greater warming and less precipitation
- Limited water supplies and increasing temperatures will likely have a **significant impact on food security** in the region
- **Loss of productive land and livelihood options**



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Slow Onset Events, Desertification and Agriculture

- In CARICOM countries (UNDP study), climate change will:
 - **Decrease the average yields** of three key crops by **3-8%** (irrigated and rainfed rice, rainfed maize and rainfed cowpea)
 - Yield effects = agricultural value **fall between US \$85 - \$243 Mill p.a.**

Climate Change & Water Resources

- Global temperature increase of 1.5°C will severely impact water resources in a minority of CARICOM states, while **+2.0°C will severely impact the majority**
- Decreased precipitation, reducing surface water reserves and groundwater recharge; drought; saltwater intrusion



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Addressing Slow Onset Events in SIDS

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Addressing Slow Onset Events in SIDS

- Prepare effectively
- Increase Capacity
- Transfer and Share Risk



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Addressing Slow Onset Events in SIDS

Prepare Effectively e.g.

- Understanding, Awareness and Communication
- Long Term Planning
- Monitoring and Forecasting
- Data Collection, Collation and Sharing
- Integrated learning (community, private and public)
- Land use zoning, setbacks and restoration
- Land suitability and adaptive agriculture
- Evacuation and resettlement plans
- Land reclamation and land elevation raising
- Integrated management of land and water

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Addressing Slow Onset Events in SIDS

Increase capacity e.g.

- Improved knowledge and skills
- Institutional
- Human
- Technical
- Financial
- Cross-ministerial, inter-sectoral, multi-disciplinary
- Flexibility in decision making
- Adaptive learning and Adaptive management
- Systems transformation over time
- Resilience



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Addressing Slow Onset Events in SIDS

Transfer and Share Risk e.g.

- Investigate financial and index-based approaches
- Insurance (micro, macro and regional) ?
- Sustainable finance mechanisms across sectors
- Regional Centres of Excellence
- Adaptive governance mechanisms
- Hybrid approaches (reduction, retention, sharing and transfer)



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The Future ?

- Embrace Recommendations Immediately and Implement Urgently
- Regional and global cooperation and collaboration (South-South)
- International/national mechanisms including institutional frameworks
- Financial and technical assistance for SIDS
- Better understanding of current realities and probable future impacts
- Political leadership and capacity building of national and local institutions to prepare and respond effectively
- Data visualisation and the democratisation of science
- Establishing and implementing pragmatic policies to reduce loss and damage from slow onset events
- Regional Centres of Excellence working collaboratively with other providers and organisations: local, national, regional, global

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THANK YOU

murray.simpson@ouce.ox.ac.uk

murray.simpson@intasave.org

www.caribsave.org

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