



Take the lead with **WITS**

# **DST Global Change Challenges**

Contributions from Wits



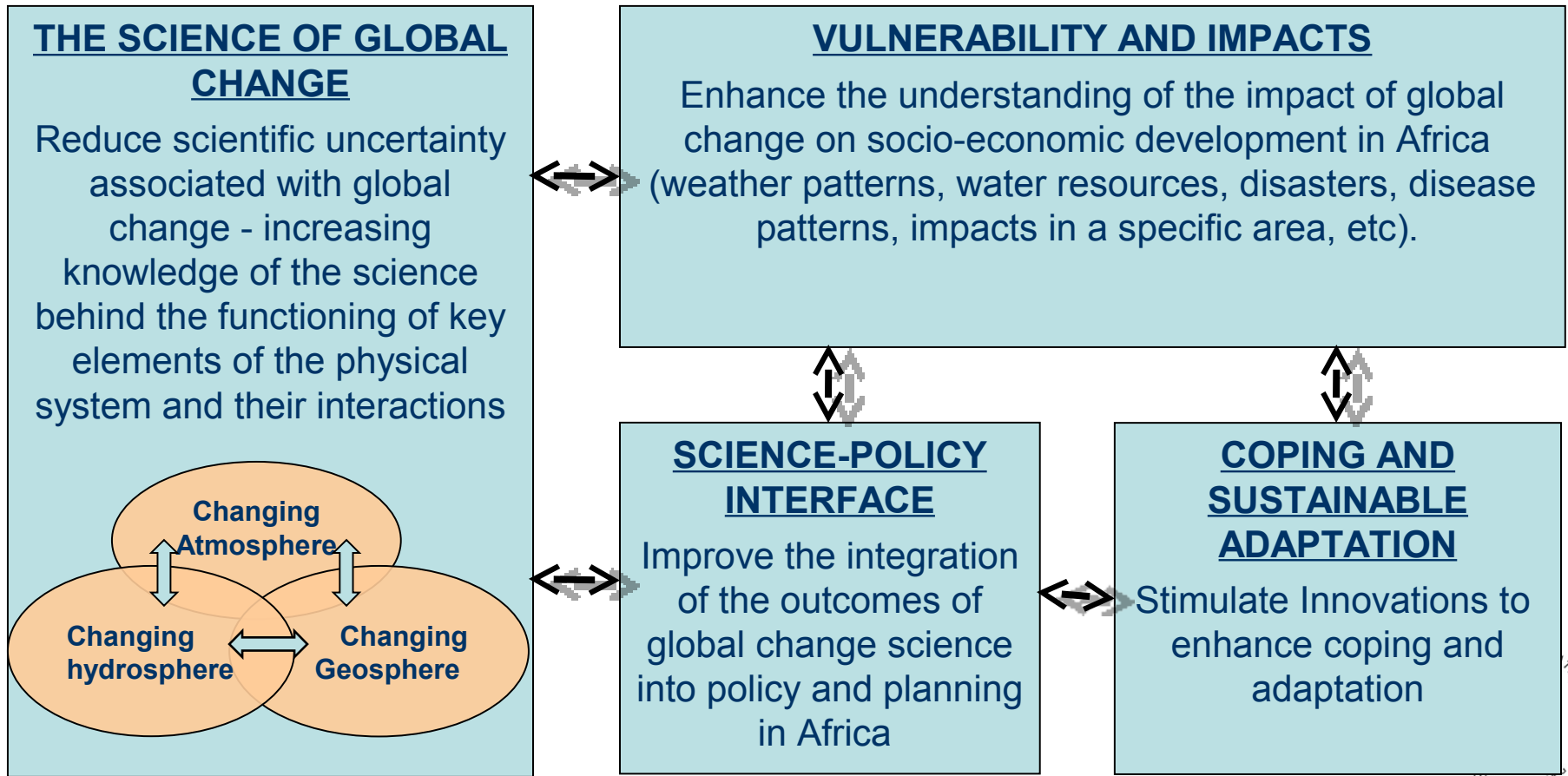


# Rationale behind Wits engagement

- Need to *urgently* build GEC science capacity for the 'next generation'
- Need to *better* understand the complex Earth System
- Need to *better* understand how knowledge of this system is produced and shared,
- Need to *better* understand how such science can contribute to SD both for SA and Africa



# What DST wish to achieve (Framework of outcomes) (Source: DST)





# Wits' role in science of the Earth System

Well placed in:

- Observation, data gathering and monitoring,
- Climatological science,
- Palaeoclimatological science,
- Atmospheric (pollutants and pollution) science,
- Biodiversity and ecosystems science,
- Biogeochemistry science,
- Earth system science – knowledge production and use.



# One example of expertise: pollution and atmospheric studies

- Understanding the **fundamental science behind human induced climate change** remains an important component of the **Global Change challenge**.
- **Modeling activities can only realistically be as good as the understanding of the fundamental components that drive the forcing mechanisms of the earth's radiation budget.**
- **Key areas of opportunity within the southern African context that could make contributions to this understanding are in studies associated with climatic changes of the past, influences of atmospheric constituents on radiative forcing at a regional scale, especially the direct and indirect effects of aerosols in the atmosphere and evaluation of existing models within the local context.**



# Atmospheric –Wits science contributions

- Atmospheric constituents over southern Africa that contribute to changes in radiative balance such as common air pollutants and their complex chemical transformations in the atmosphere (SO<sub>2</sub> oxidized to sulphate for example),
- Evaluating existing climate model results with actual observed meteorological data in order to establish areas that need specific attention in the southern African context.



# Understanding Earth Systems: A Geological Perspective

- Mass extinction events of the past: Short lived physical events, e.g. volcanic activity, meteorite impact
- The 6<sup>th</sup> Mass extinction: Human induced
- Triggers of climate change in the recent past – predictions for the future
- Co-evolution of life and earth; tectonic events and speciation
- Earth, a recycling machine; buffering capacity, e.g. CO<sub>2</sub> extraction by oceans, weathering processes, soils
- The South Atlantic Anomaly – a serious and growing hazard - signs of an imminent geomagnetic reversal?



# Further Wits contributions: GEC

- Health science (including AHPU longitudinal survey);
- Climate impacts + adaptation- drought and floods;
- Environment – ecosystems good and services , invasive species, system response to climate change;
- Managed systems – agriculture, public & private conserved areas (and those in between);
- Env. resource utilisation – rural and urban;
- Green technologies;
- Scenario development – thresholds etc.



# **Science - policy – practice**

**(beyond communication)**

- Institutions, methods, knowledge required
- EWS – developing integrated EWS
- Public health infrastructure and technologies
- Vulnerability and resilience (prac, science, policy)
- Disaster risk reduction (prac, science, policy)
- Policy and governance



## Wits and GEC

- Committed to scientific excellence
- International and local expertise in GEC

## What should be in a national science plan?

- long term multi-year sustained support
- more systematic impacts & adaptation workplan (can debate institutional or virtual structure)
- Fill the PhD and postdoctoral capacity gap (broaden supervision capacity)
- Sustained platform for communication – ‘boundary organization’ (but caution)
- Onus on institutions themselves to evolve to support Science Plan (what would create an enabling environment? Direct engagement right at top – VC, DVC-Research, DVC-Partnerships)