# Coupled regional modelling of land-atmosphere-ocean interactions over western-southern Africa under climate change

## CORDEX FLAGSHIP Study

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# Key research questions

- How will **Benguela** upwelling on the west coast of southern Africa change in a changing climate, and what are the feedbacks to climate?

- How will **tree-grass-fire dynamics** change in the savannahs of western southern Africa under climate change, and what are the **feedbacks to climate**?

- How do **biomass burning** from the southern African savannahs **interact with the Sc** cloud deck of the southeast Atlantic, and what are the implications for climate sensitivity?

- Can **high-resolution coupled regional modelling** help to reduce the CMIP5 & CMIP6 SST biases along the west coast of southern Africa?

- What are the **implications of climate change in the coupled regional Earth System** of western southern Africa to agriculture, live-stock production, water security and west-coast fisheries?

# CORDEX Flagship Study: the coupled climate system of southern Africa and the Atlantic

- Domain size: 2000 x 2000 km$^2$;
- Model resolution ideally 8 km in the horizontal or finer; any simulations with resolution higher than 50 km in the horizontal (i.e. higher than in CORDEX Africa) are welcome.
- Participating models should simulate at least one aspect of the coupled system in addition to standard atmosphere-only simulations.
- Examples are coupled ocean-atmosphere, coupled land-atmosphere  and coupled ocean-atmosphere-land simulations
- The use of DGVMs, dynamic fire and dynamic ocean models in coupled regional climate/Earth System models are novel for this domain and welcomed.

**Figure: CCAM 8 km resolution stretched-grid covering western-southern Africa**
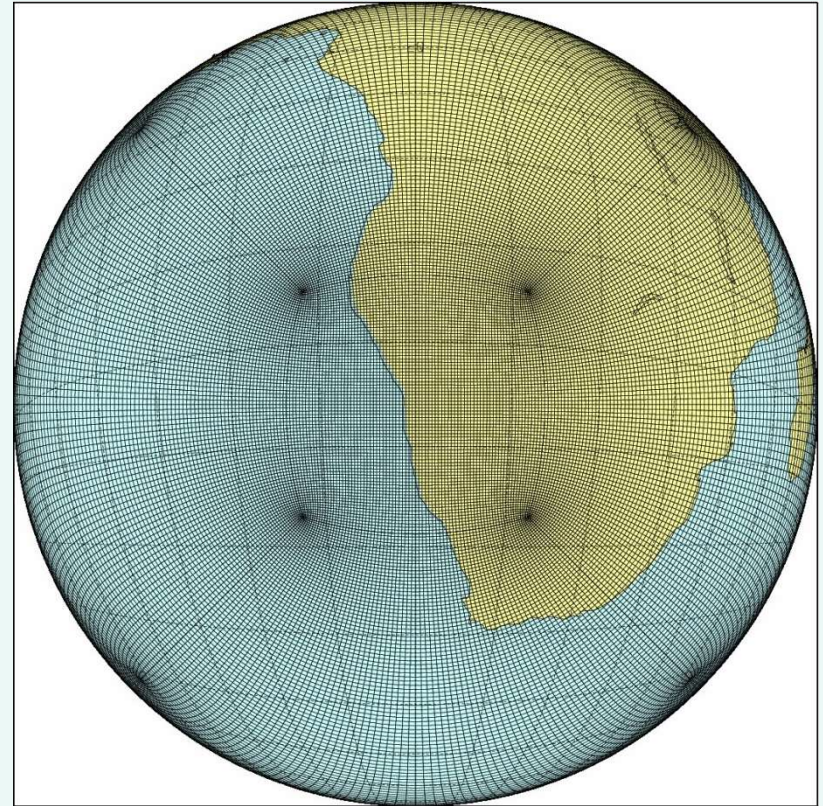


**Tier 1 experiments:**
- **Reanalysis downscalings centred over Walvisbay in Namibia; 1979-2018**

**Tier 2 experiments:**
- **CMIP5/CMIP6 downscalings for 1961-2100 (continuous or for CMIP6 time-slabs of near, mid and far future + present-day)**