

Producing climate services in the Southwest Indian Ocean from CMIP6 Downscaled Data

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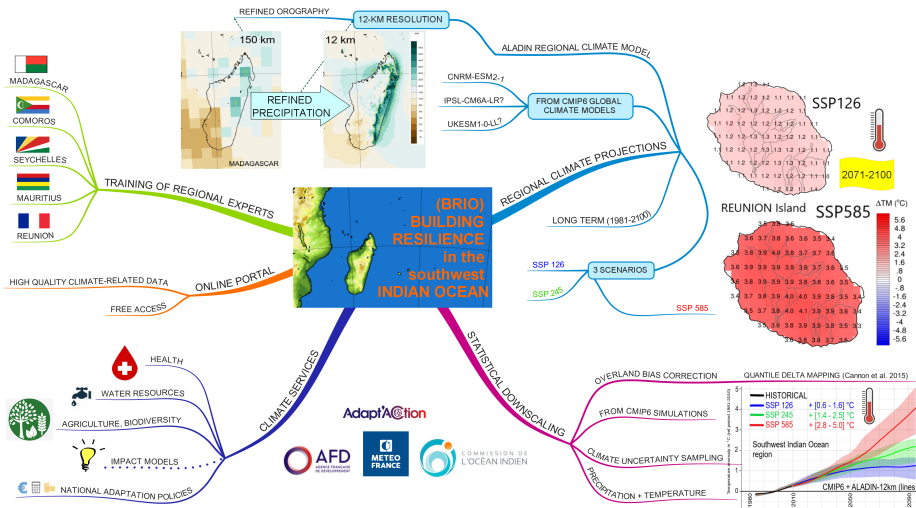
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25-29 September 2023
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ADAPT
ACTION

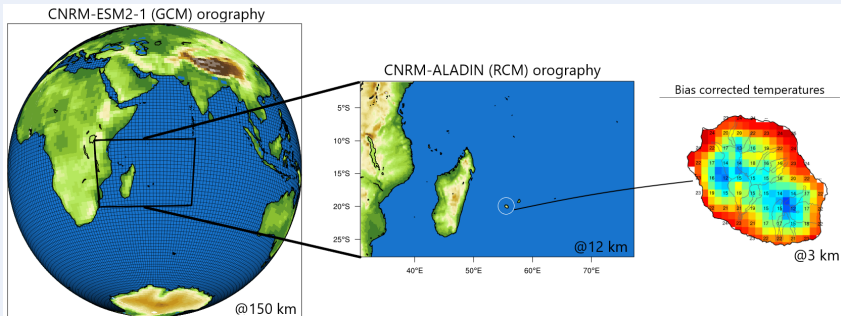


The BRIO project



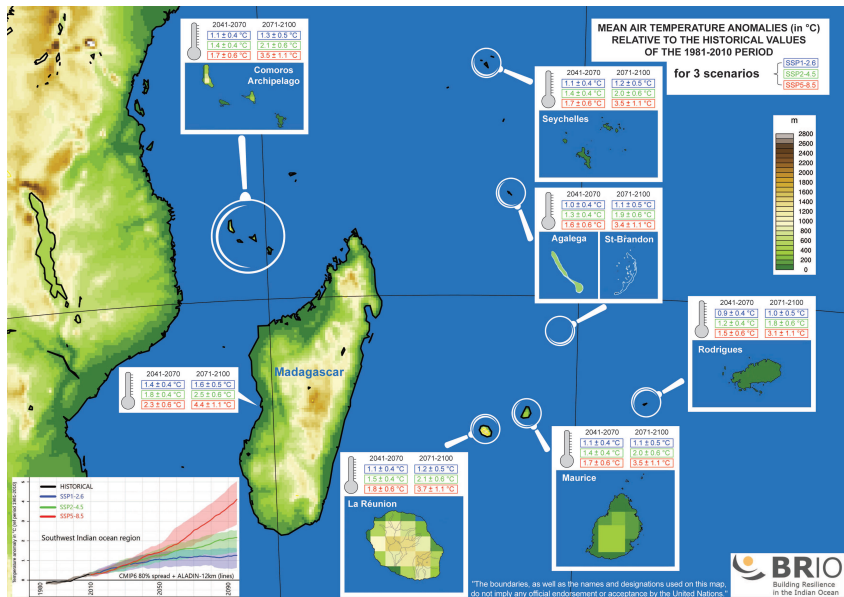
Methods and Tools

Dynamical and Statistical Downscaling

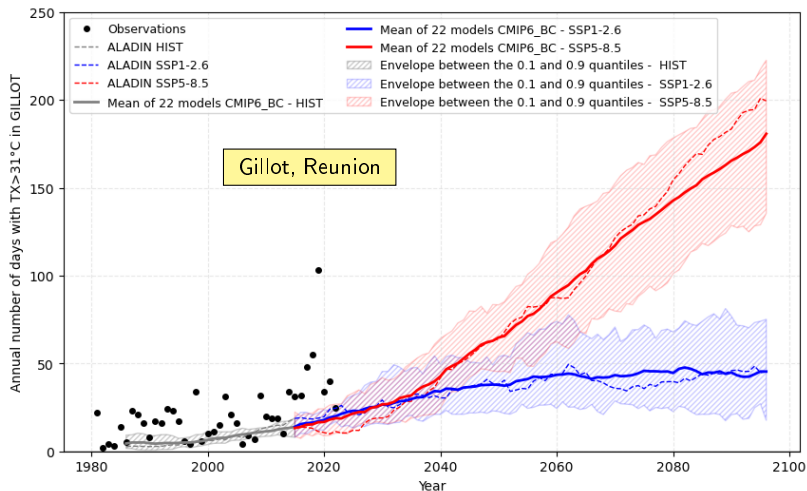


- Regional 12-km resolution CNRM-ALADIN model forced by CNRM-ESM2-1
 - 1981-2100 simulations : HIST + 3 scenarios **SSP1-2.6**, **SSP2-4.5**, **SSP5-8.5**
 - Bias correction (CDF-t method) over inhabited territories at 3 km resolution
- Statistical downscaling over La Reunion at 3 km resolution using a subset of 22 CMIP6 models (**SSP1-2.6** and **SSP5-8.5** scenarios)

Mean temperature anomalies (°C, ref. 1981-2010)

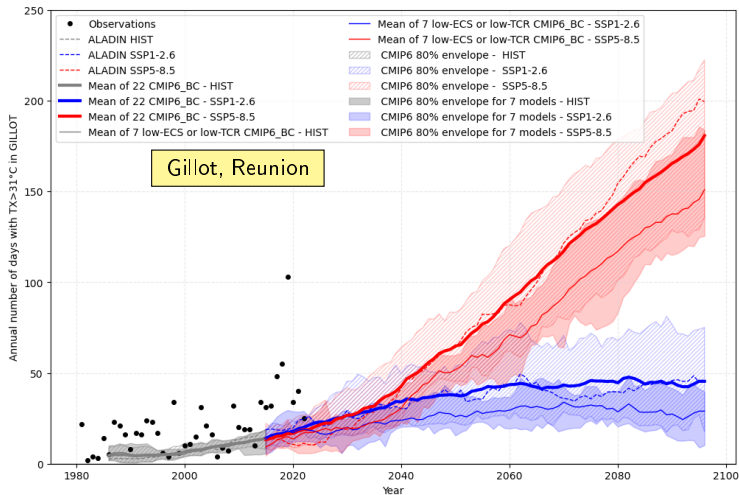


Number of hots days ($T_{\max} > 31^{\circ}\text{C}$)



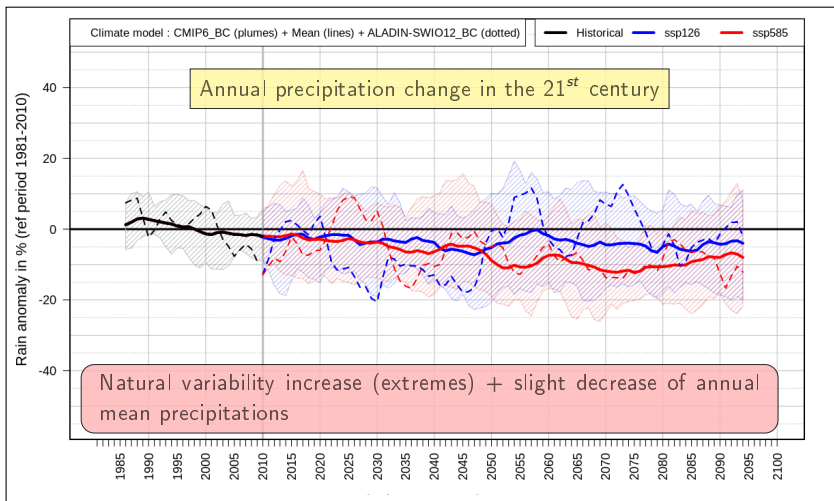
The frequency of hot days will increase

Number of hots days ($T_{\max} > 31^{\circ}\text{C}$)

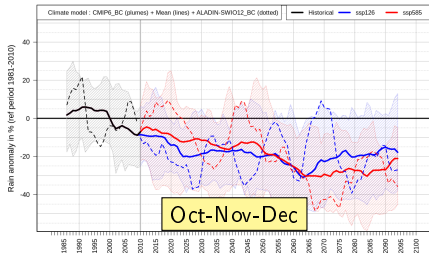
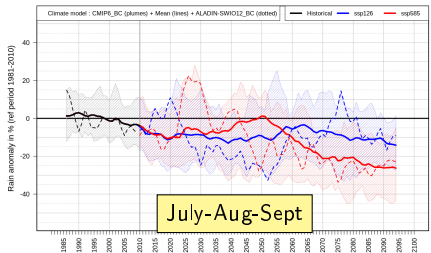
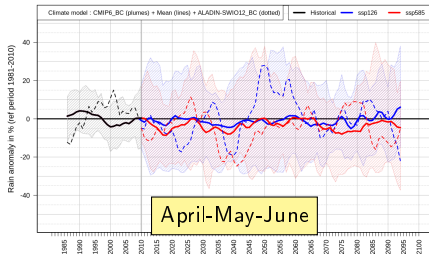
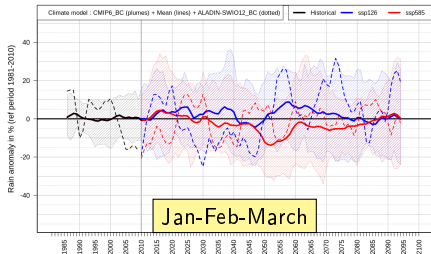


The frequency of hot days will increase

Precipitation anomalies (% , ref. 1981-2010)



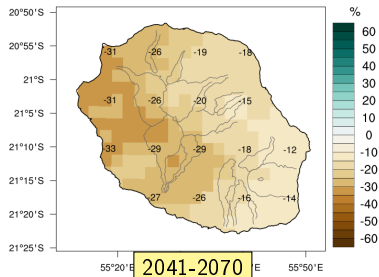
Precipitation anomalies : seasonal contrasts



Precipitations will decrease, especially in the 2nd semester (all scenarios)

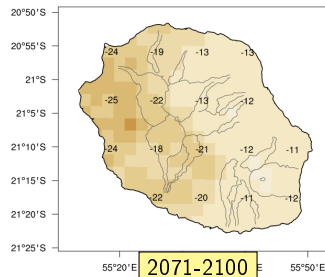
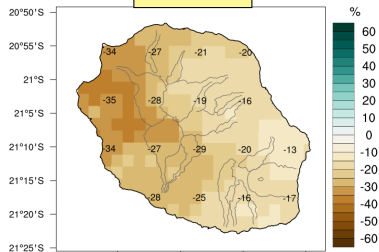
Precipitation anomalies, dry season (% , ref. 1981-2010)

SSP1-2.6

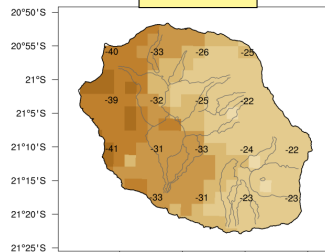


2041-2070

SSP5-8.5

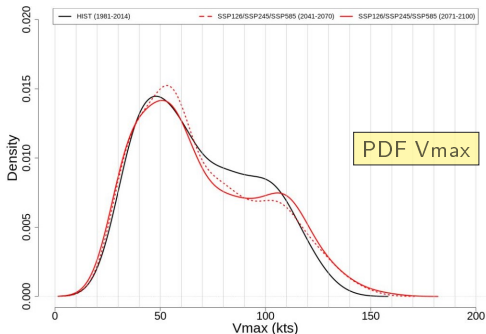


2071-2100



Precipitations will decrease more in the west (leeward side)

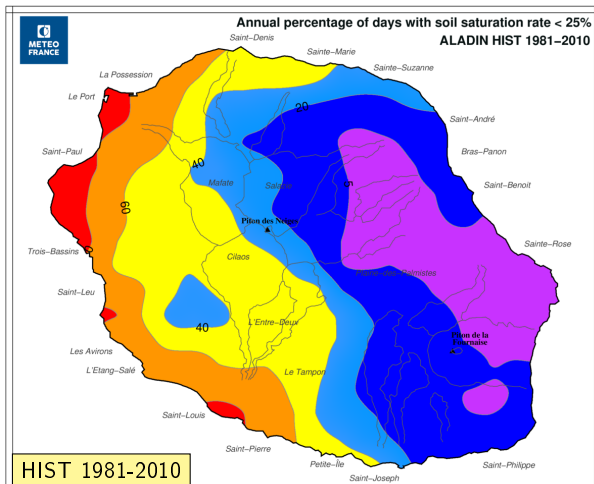
Evolution of cyclonic activity in the SWIO



- Decrease in the overall frequency of tropical systems in the SWIO basin
- Higher tropical cyclone (TC) intensities (x1.2 for a +4°C GWL)
- Greater proportion of very strong TCs (Cat. 4-5, VMAX > 115 kts) (x2 for a +4°C GWL)
- Increase in the duration of tropical storms (VMAX > 34 kts)
- Poleward migration of TC lifetime maximum intensity
→ Increased risks on the Mascarenes

Ombrothermal Index, HIST

Annual % of days with soil water saturation below 25%

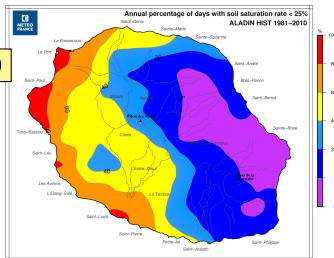


HIST 1981-2010

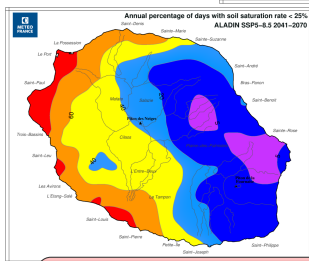
Hyper-humid climate on the East / Hyper-arid on the West

Ombrothermal Index, SSP5-8.5 scenario

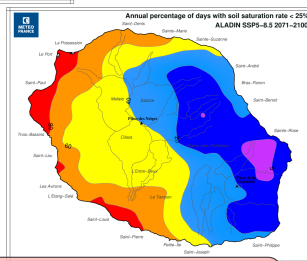
HIST 1981-2010



SSP5-8.5, 2041-2070



SSP5-8.5, 2071-2100



significant reduction in the spatial extent of very humid zones ;
Arid and hyper-arid areas are expected to expand to higher altitudes