

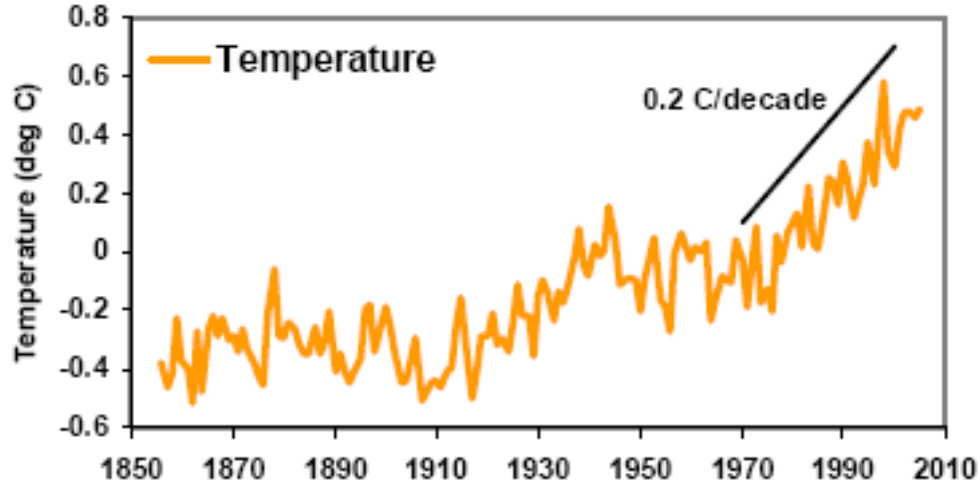
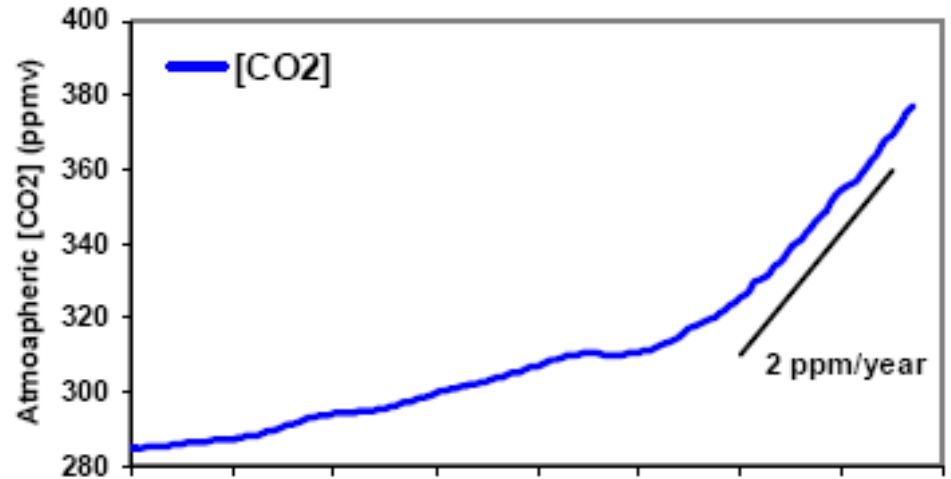
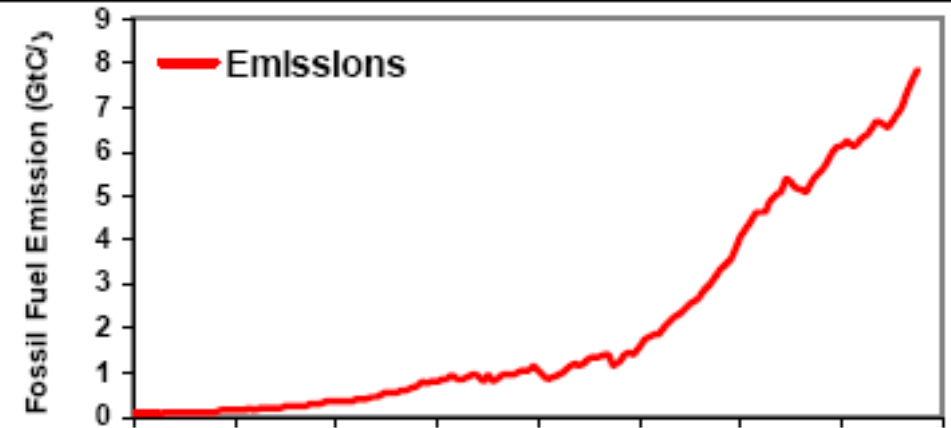
Position of southern Africa in global climate change

Prof GF Midgley

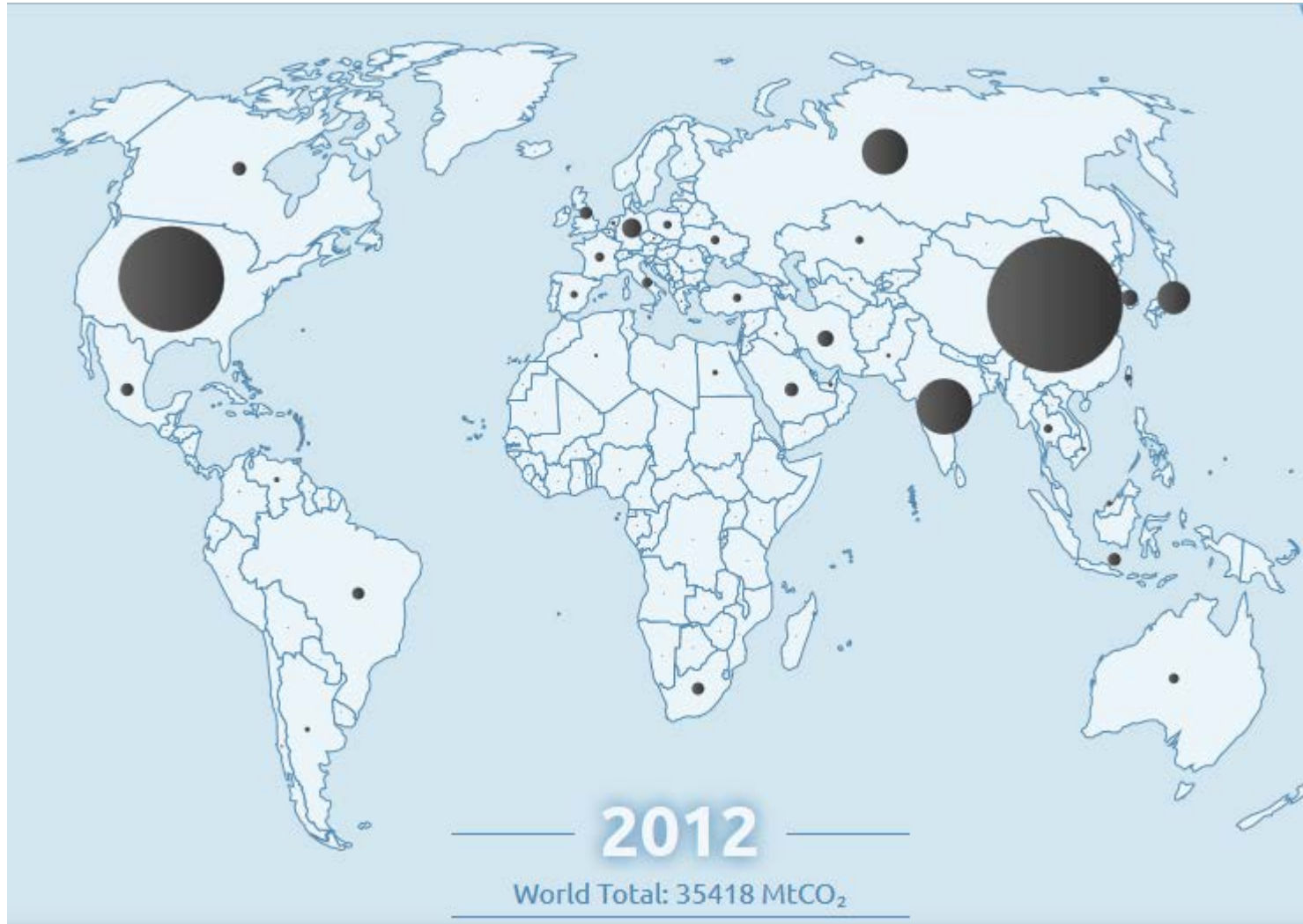
South African National Biodiversity
Institute



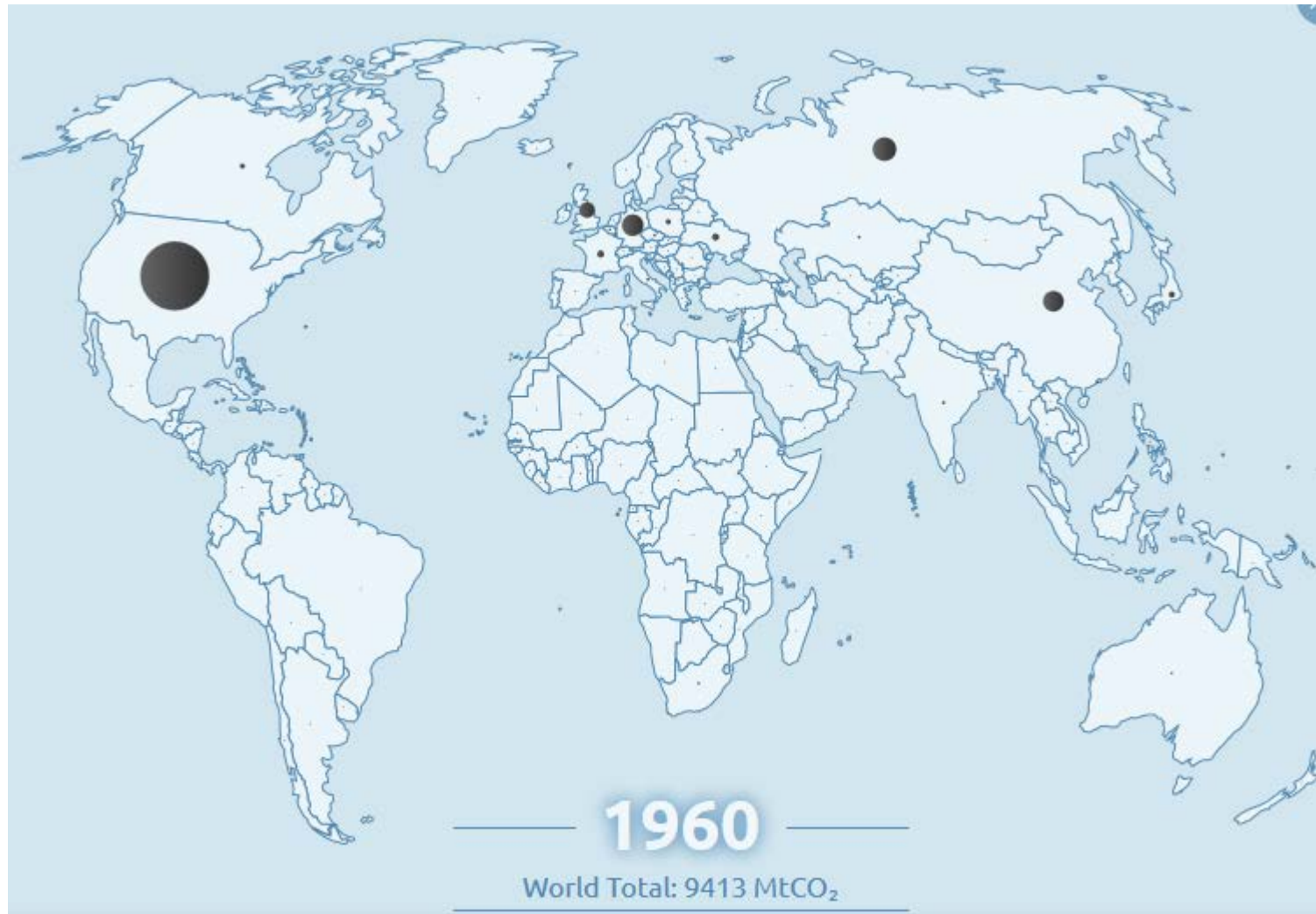
Our planet did not come with a book of instructions!



Global emissions (all sources) 2012



Global emissions (all sources) 1960



Global emissions (land use) 2012



COUNTRY	AREA x 1000 km ²
China	9 597
USA	9 829
India	3 287
Mexico	1 964
Peru	1 285
France	633
Spain	508
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	326
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	146
Greece	132
TOTAL	30.102
AFRICA	30.221



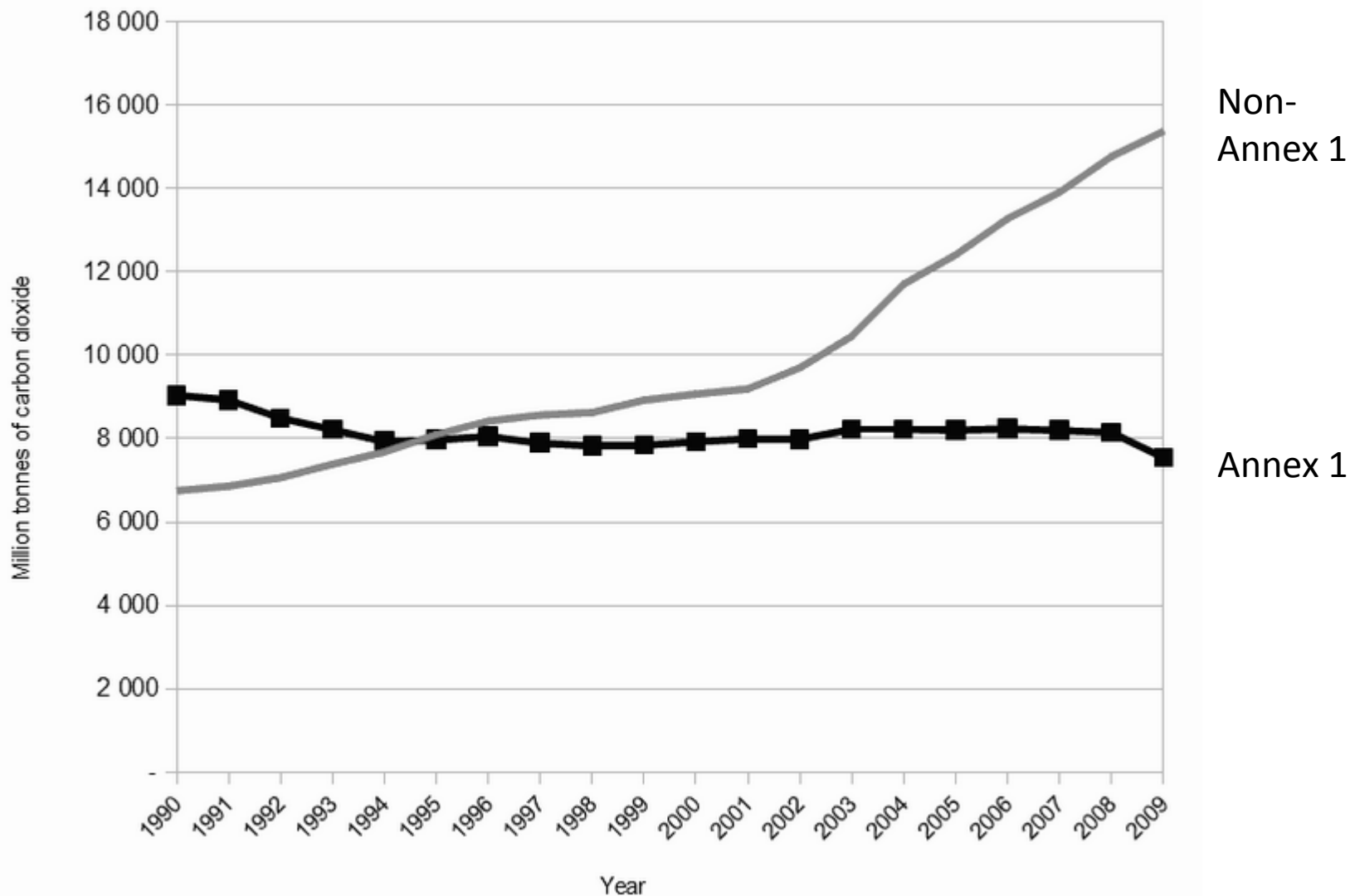
In addition to the well known social issues of *illiteracy* and *innumeracy*, there also should be such a concept as *“inmappancy”*, meaning *insufficient geographical knowledge*.

A survey with random American schoolkids let them guess the population and land area of their country. Not entirely unexpected, but still rather unsettling, the majority chose “1-2 billion” and “largest in the world”, respectively.

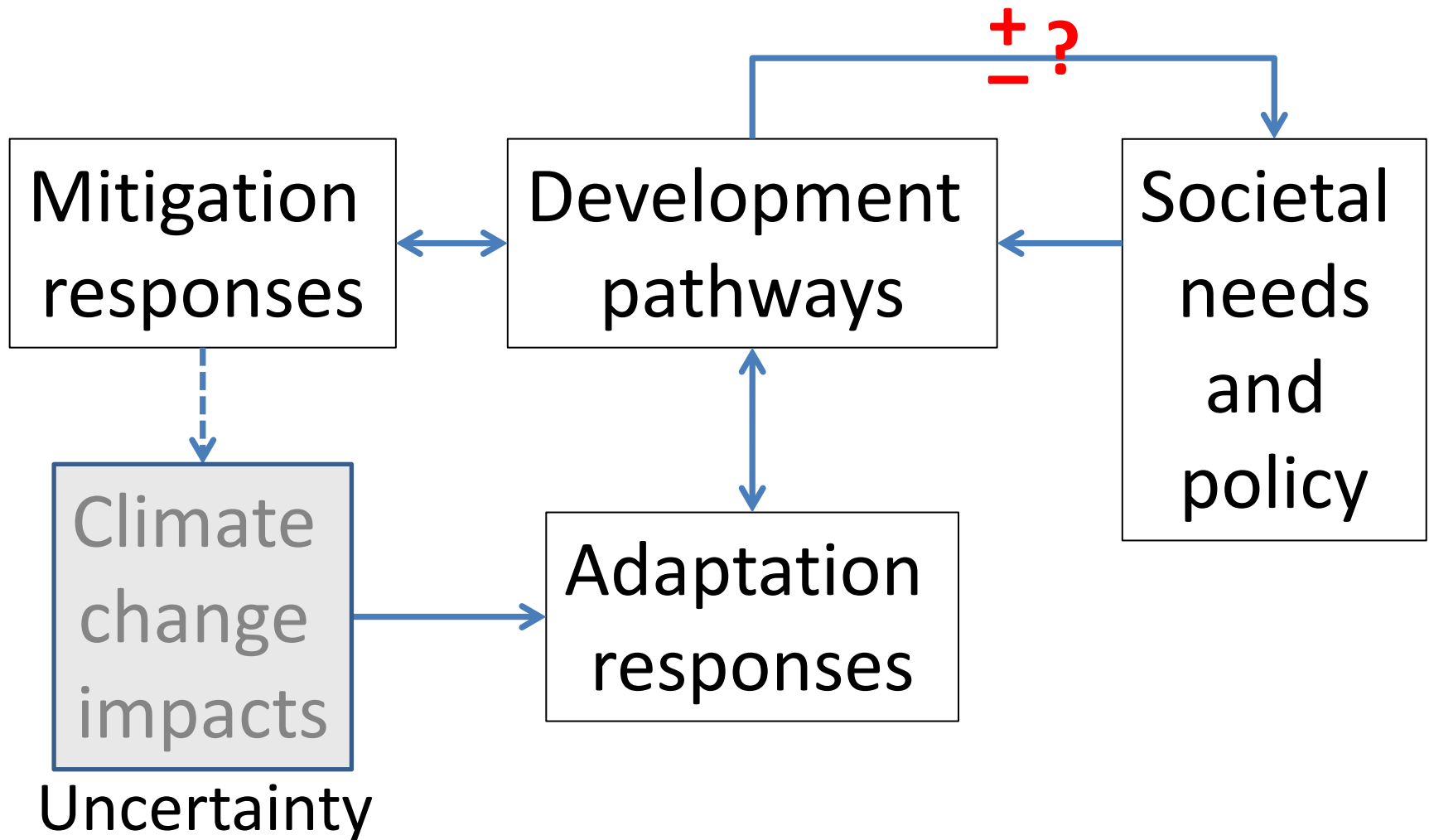
Even with Asian and European college students, geographical estimates were often off by factors of 2-3. This is partly due to the highly distorted nature of the predominantly used mapping projections (such as *Mercaator*).

A particularly extreme example is the worldwide misjudgement of the true size of *Africa*. This single image tries to embody the massive scale, which is larger than the *USA*, *China*, *India*, *Japan* and *all of Europe*..... combined!

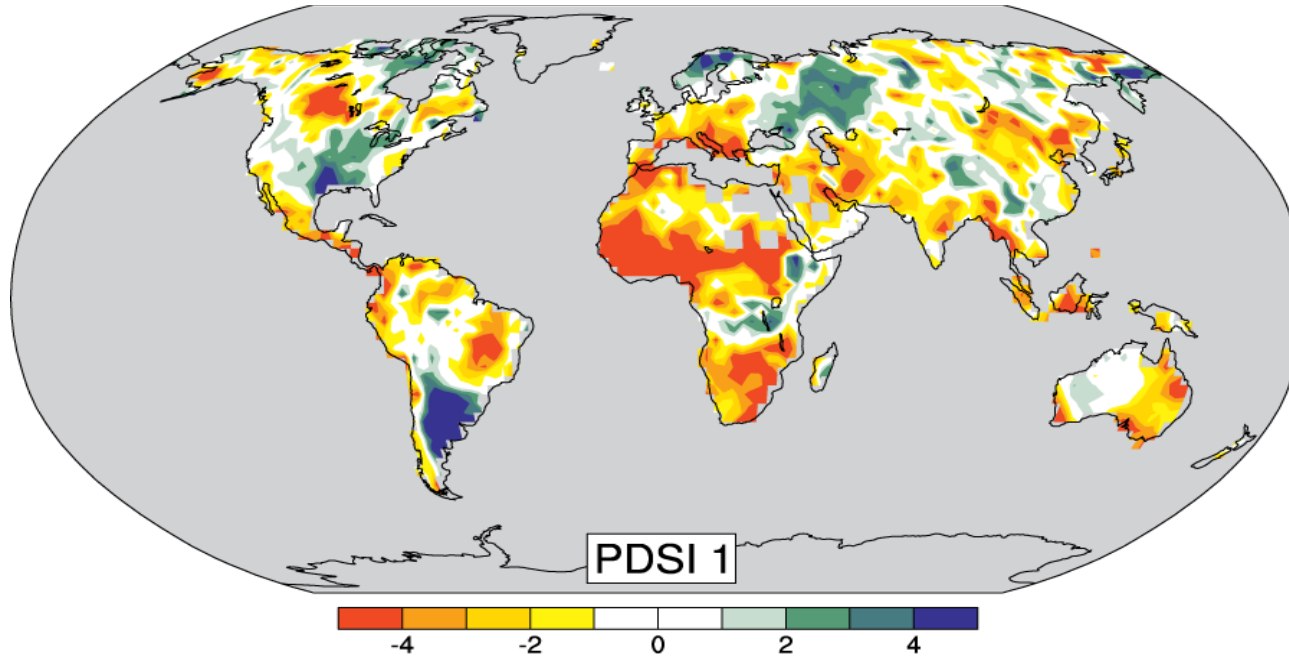
Emissions Annex 1 and non-Annex 1 Kyoto Protocol



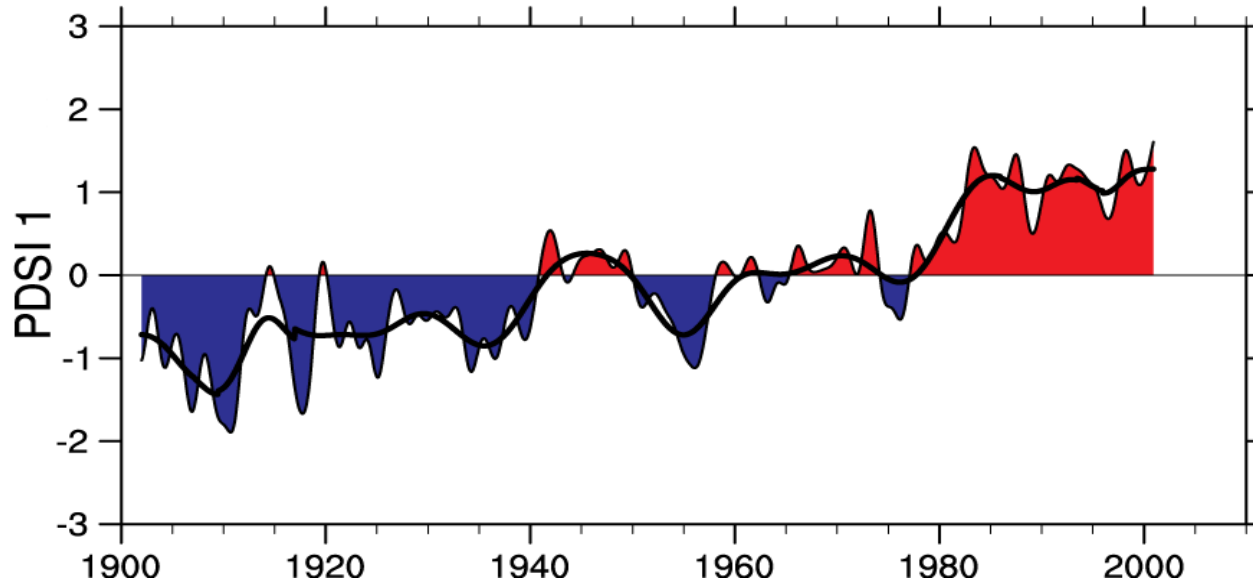
Climate change and the wicked challenge of sustainable development



Drought severity increased globally over the last century

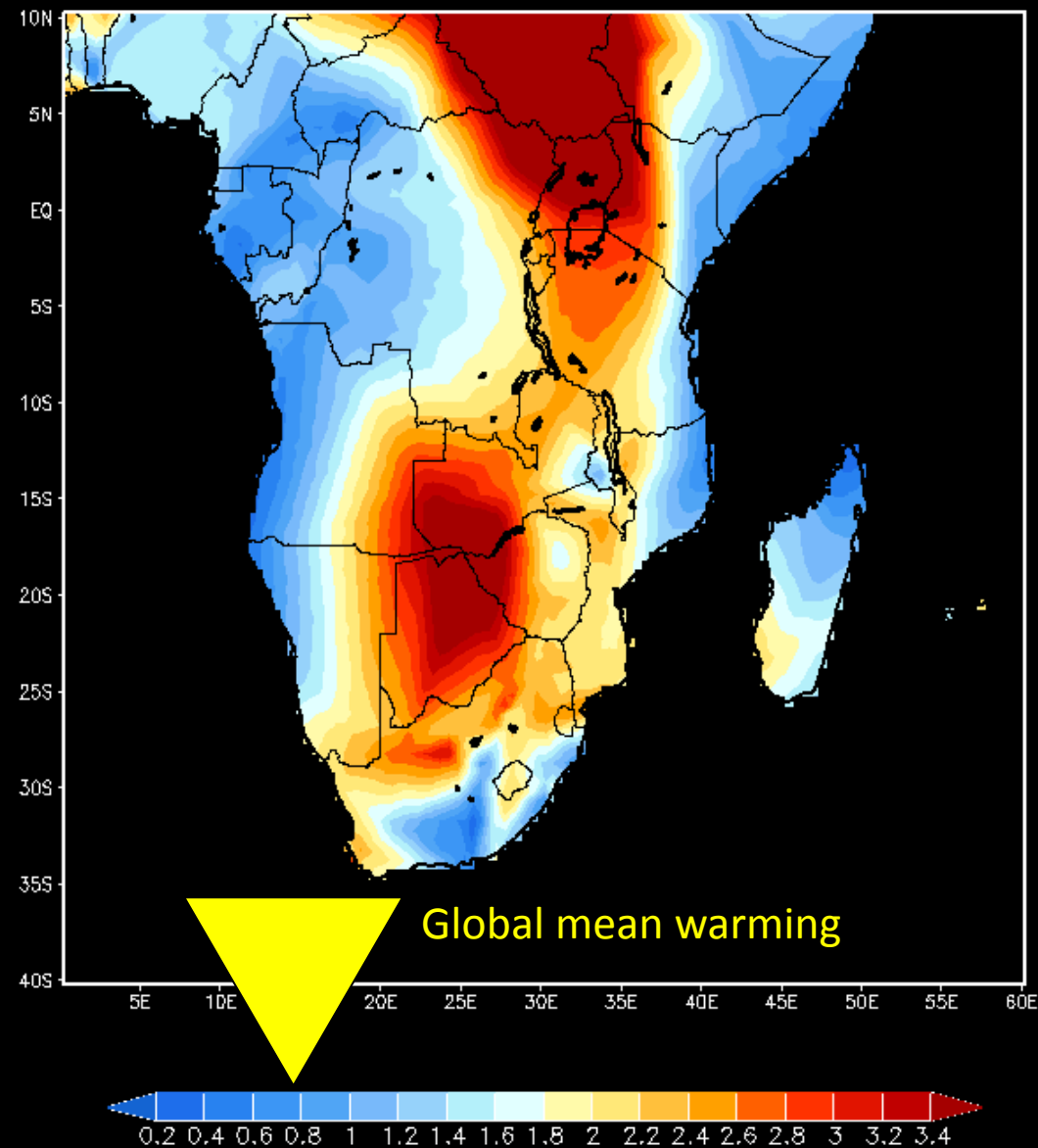


The most important spatial pattern (top) of the monthly Palmer Drought Severity Index (PDSI) for 1900 to 2002.



The time series (below) accounts for most of the trend in PDSI.

CRU 3.1 trend Ann ave temp 1961–2009

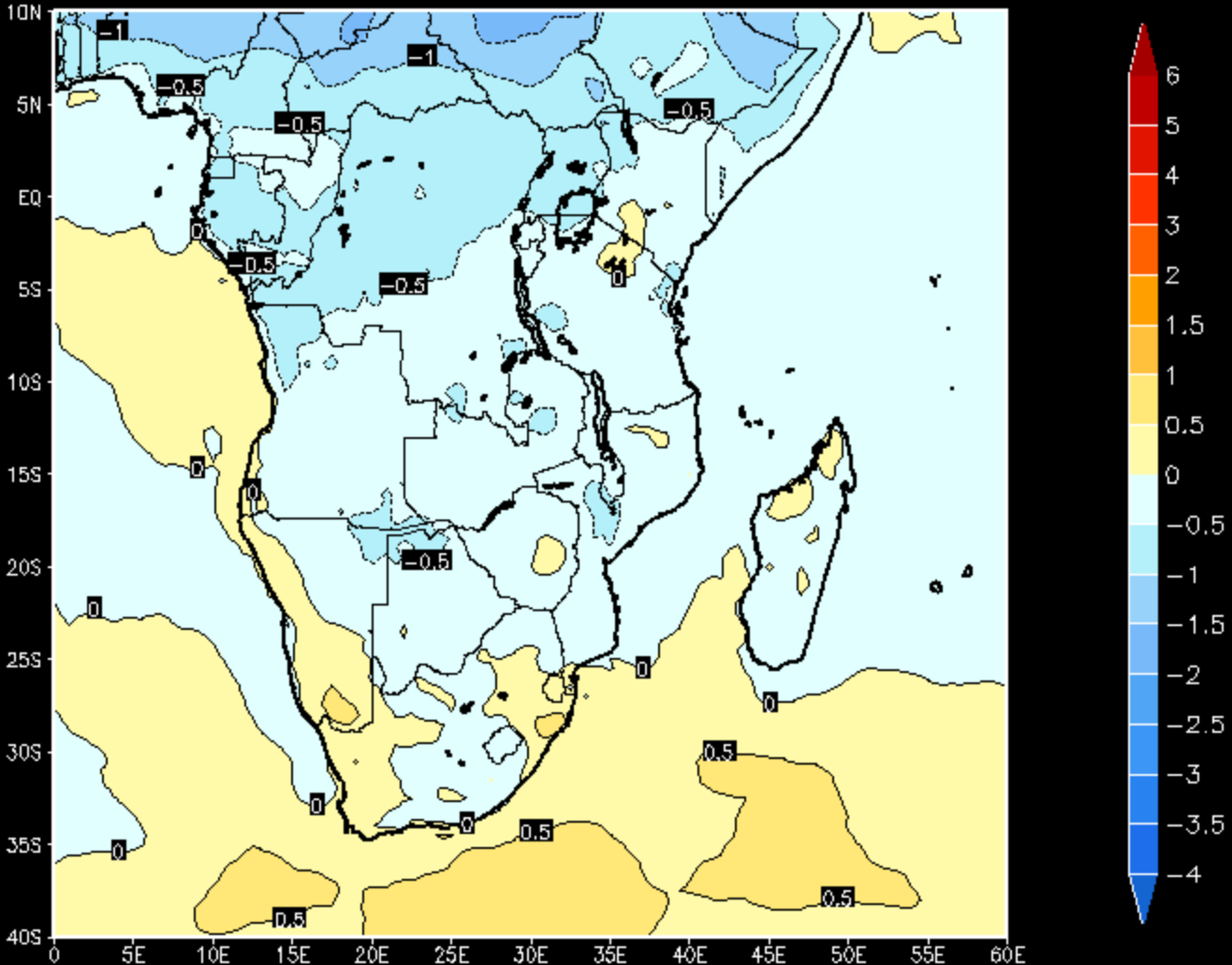


Hadley Center: CRU 3.1 linear temperature trend 1961-2009

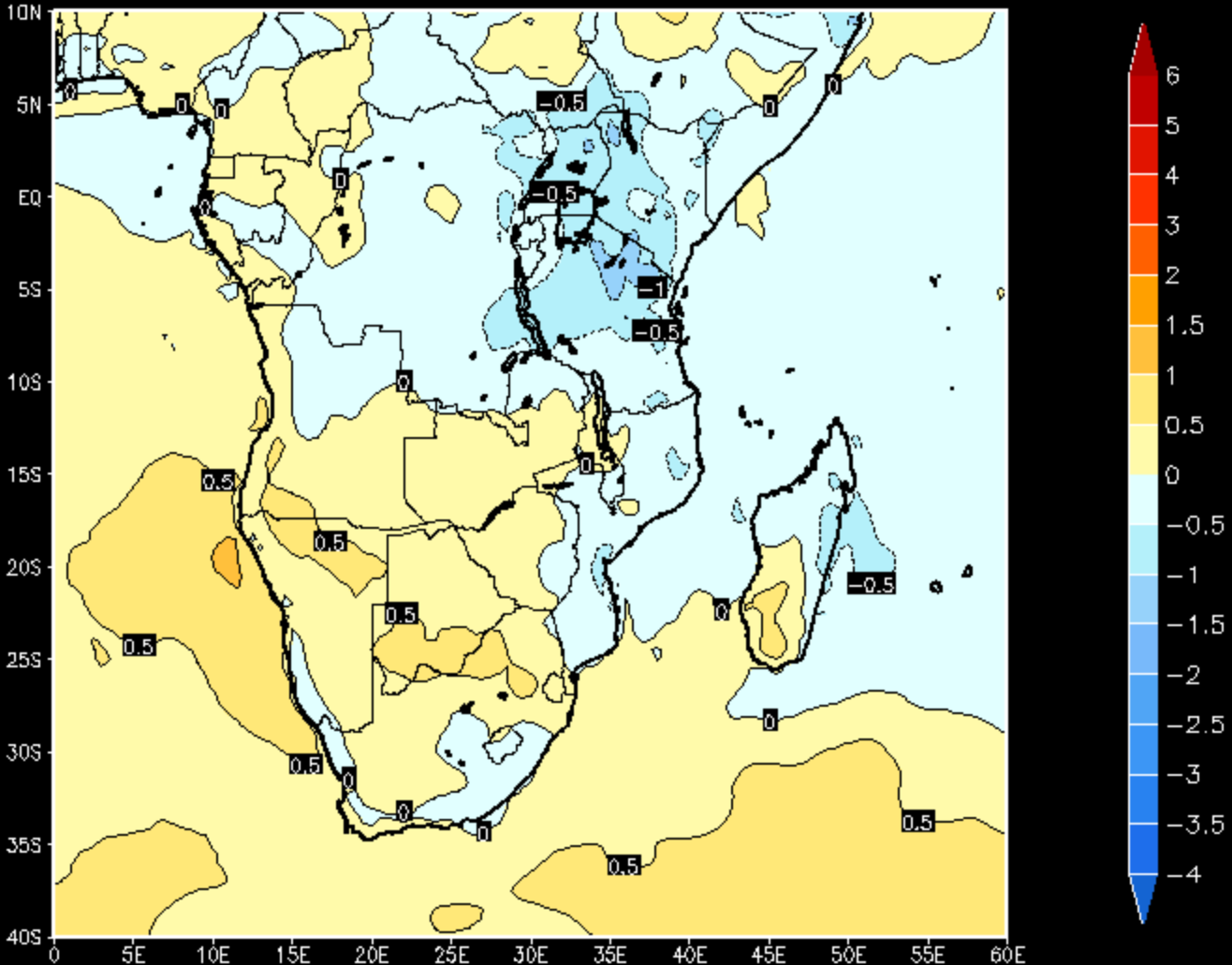
Strong warming has occurred
over the central parts of
southern Africa

Warming more moderate
along the coastal areas,
except south-western SA and
southern Mozambique

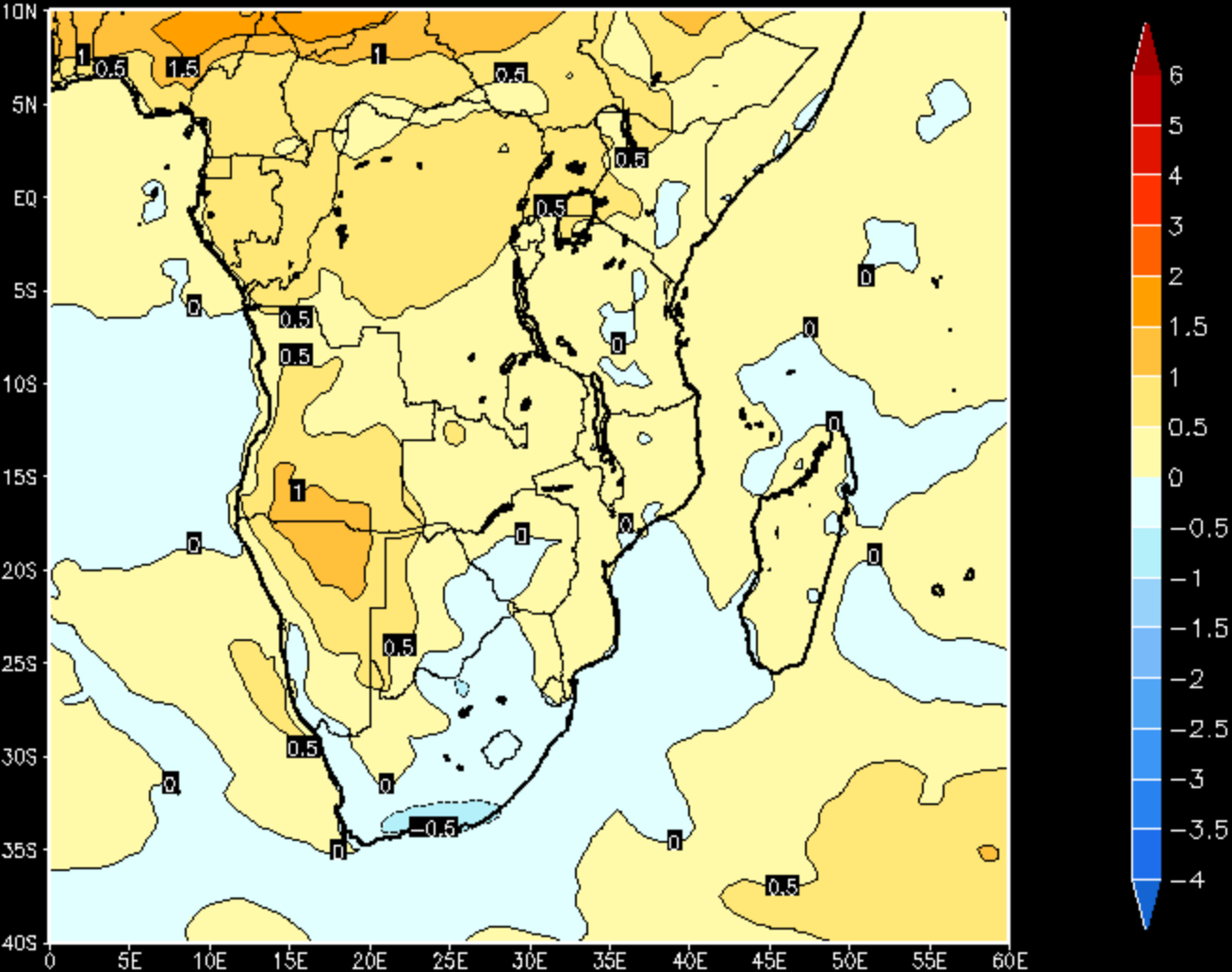
Temp anomaly 1983



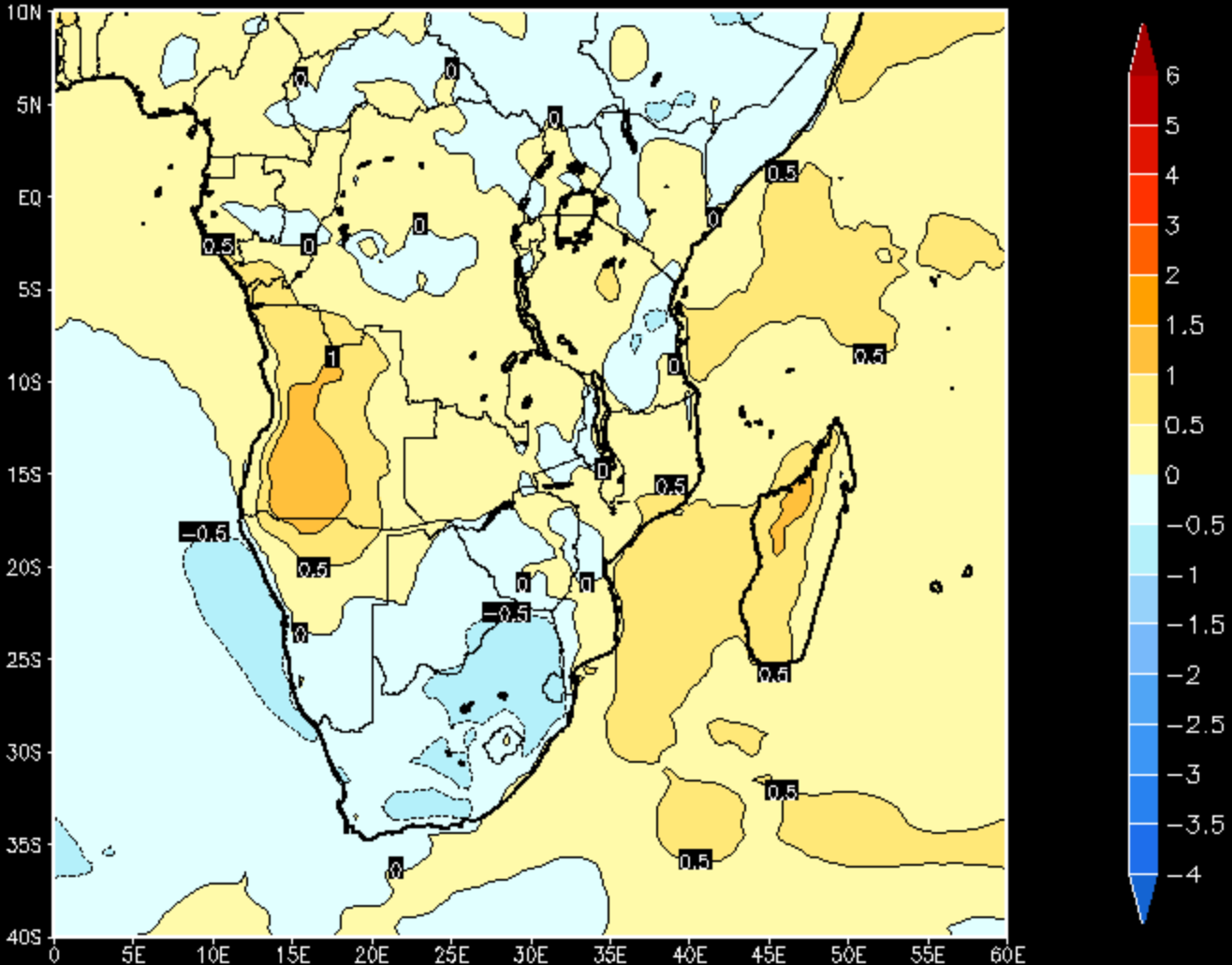
Temp anomaly 1984



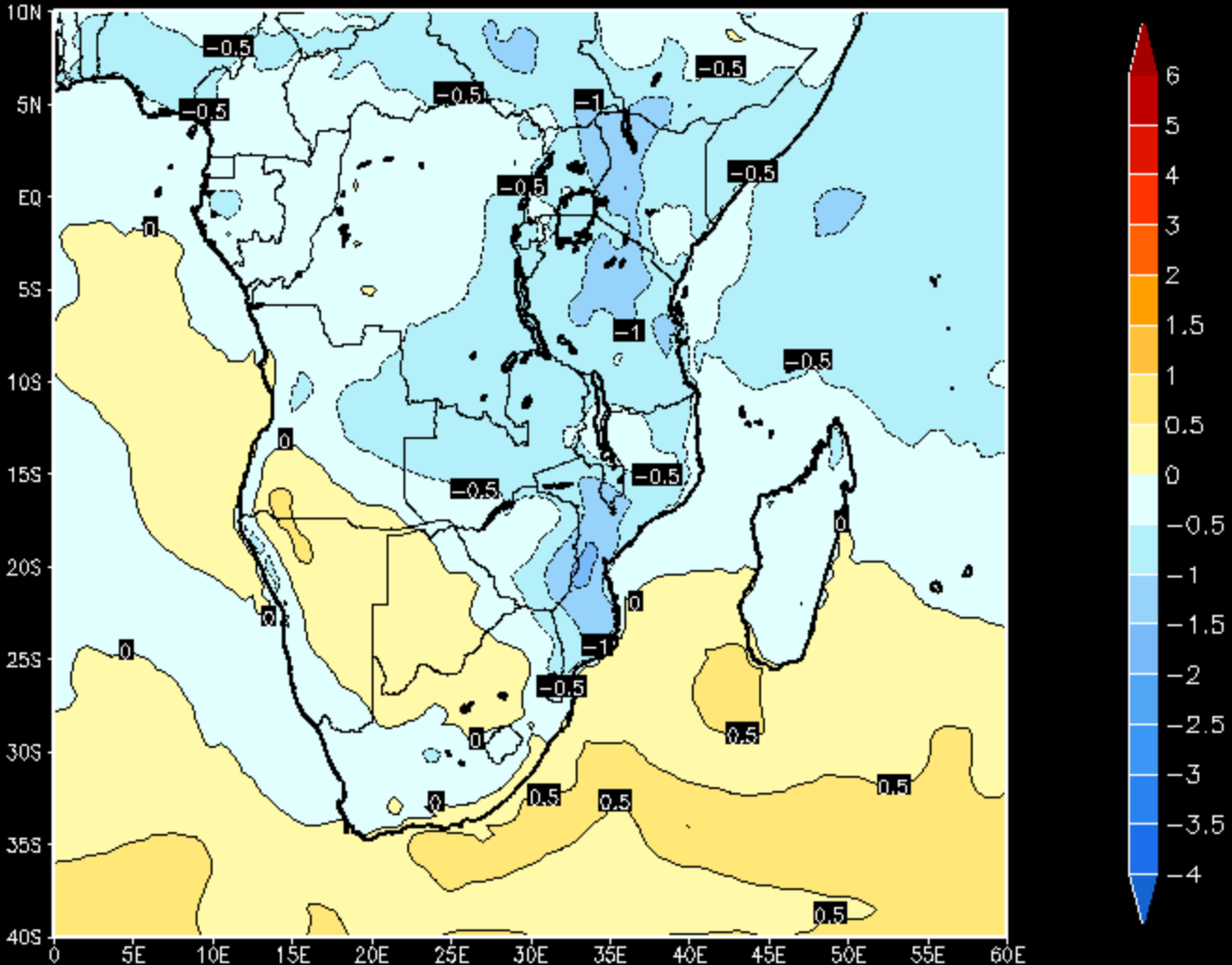
Temp anomaly 1985



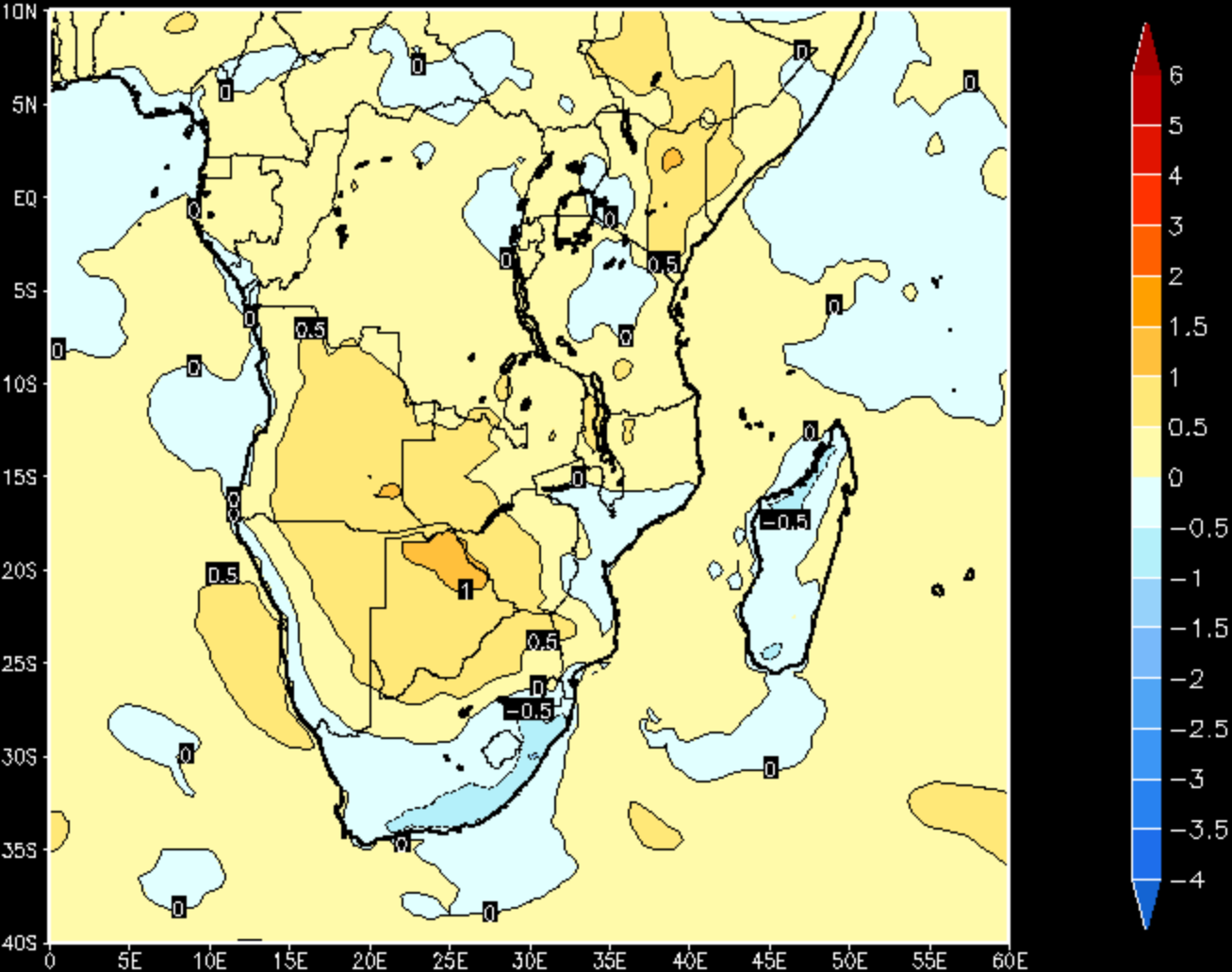
Temp anomaly 1986



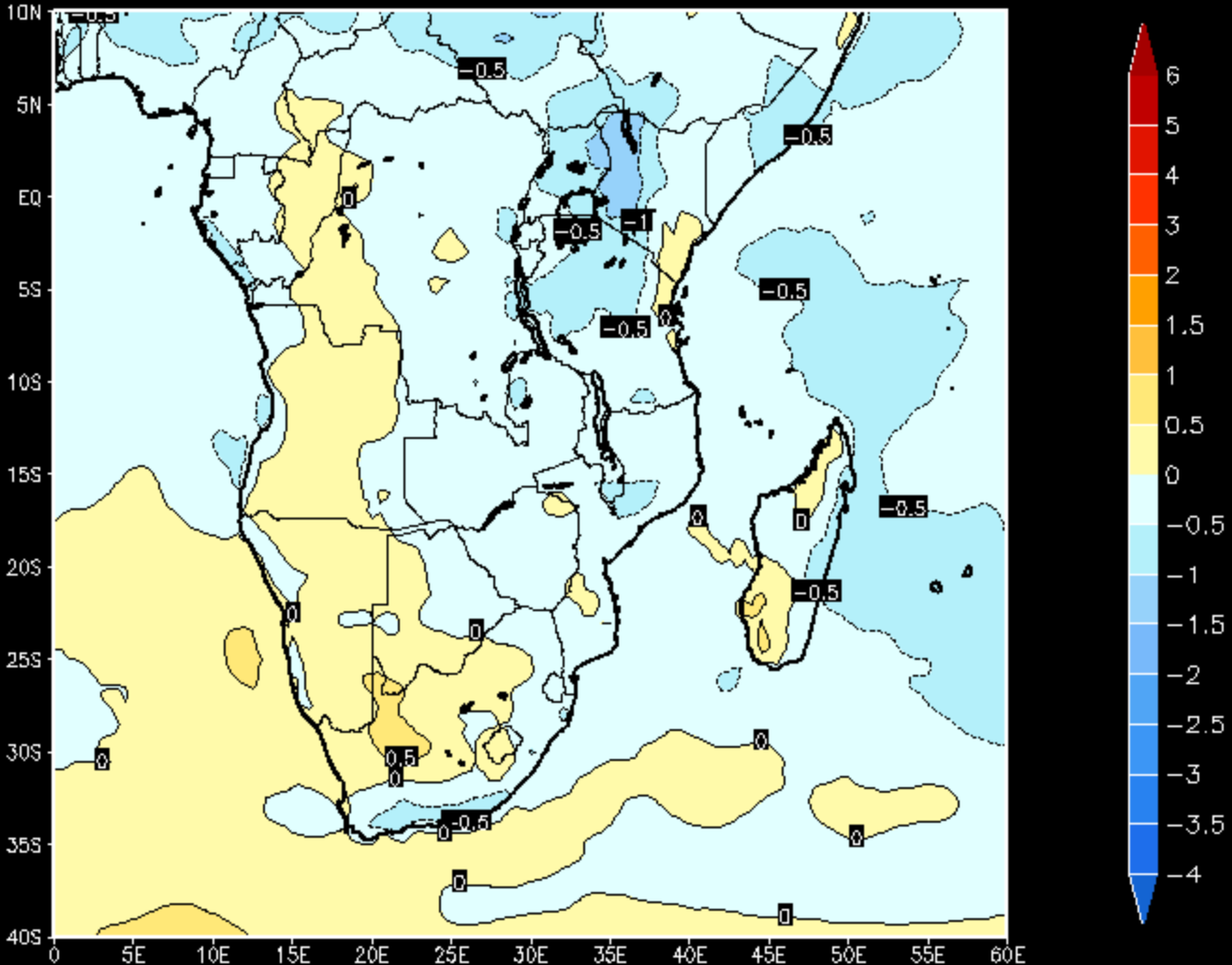
Temp anomaly 1987



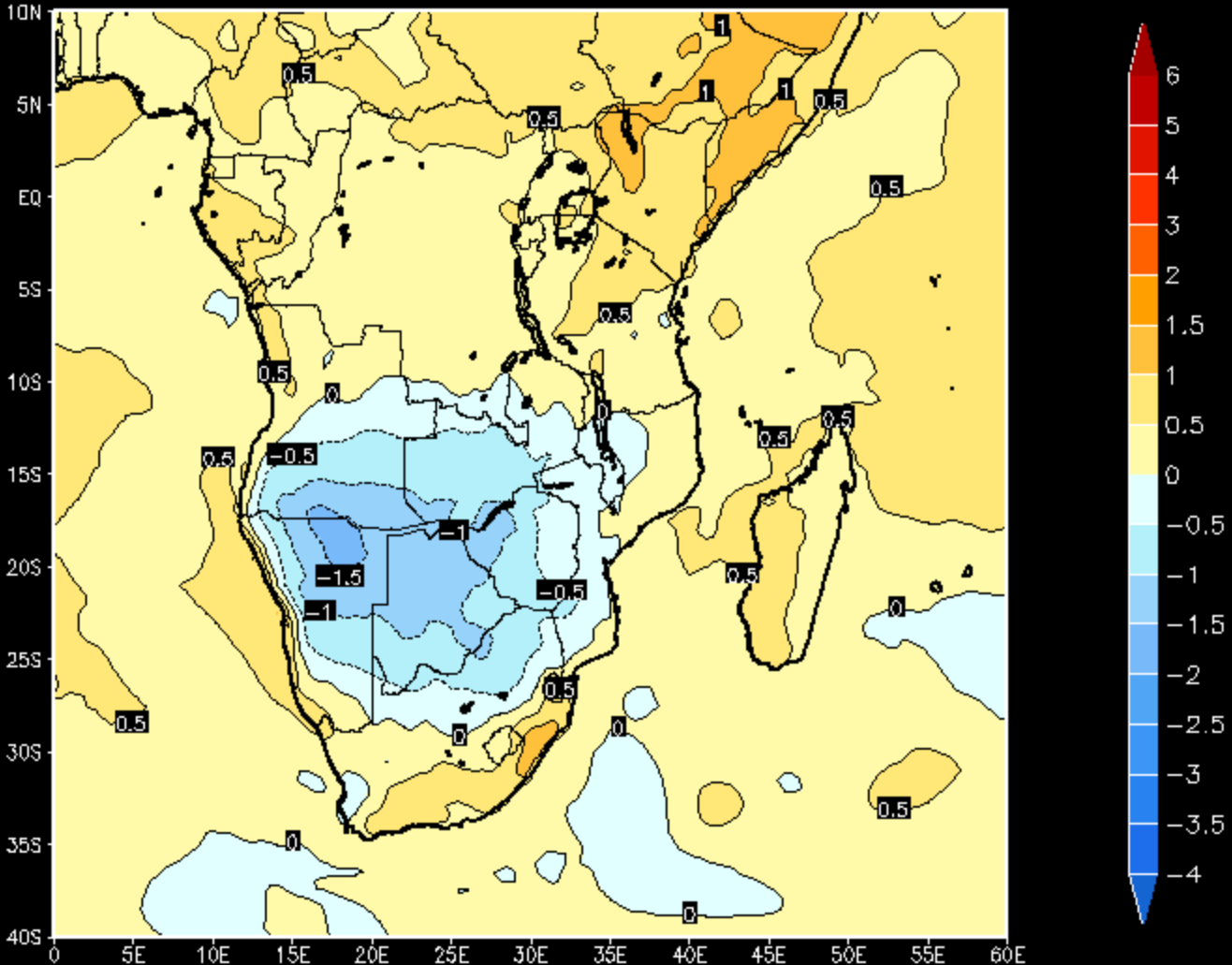
Temp anomaly 1988



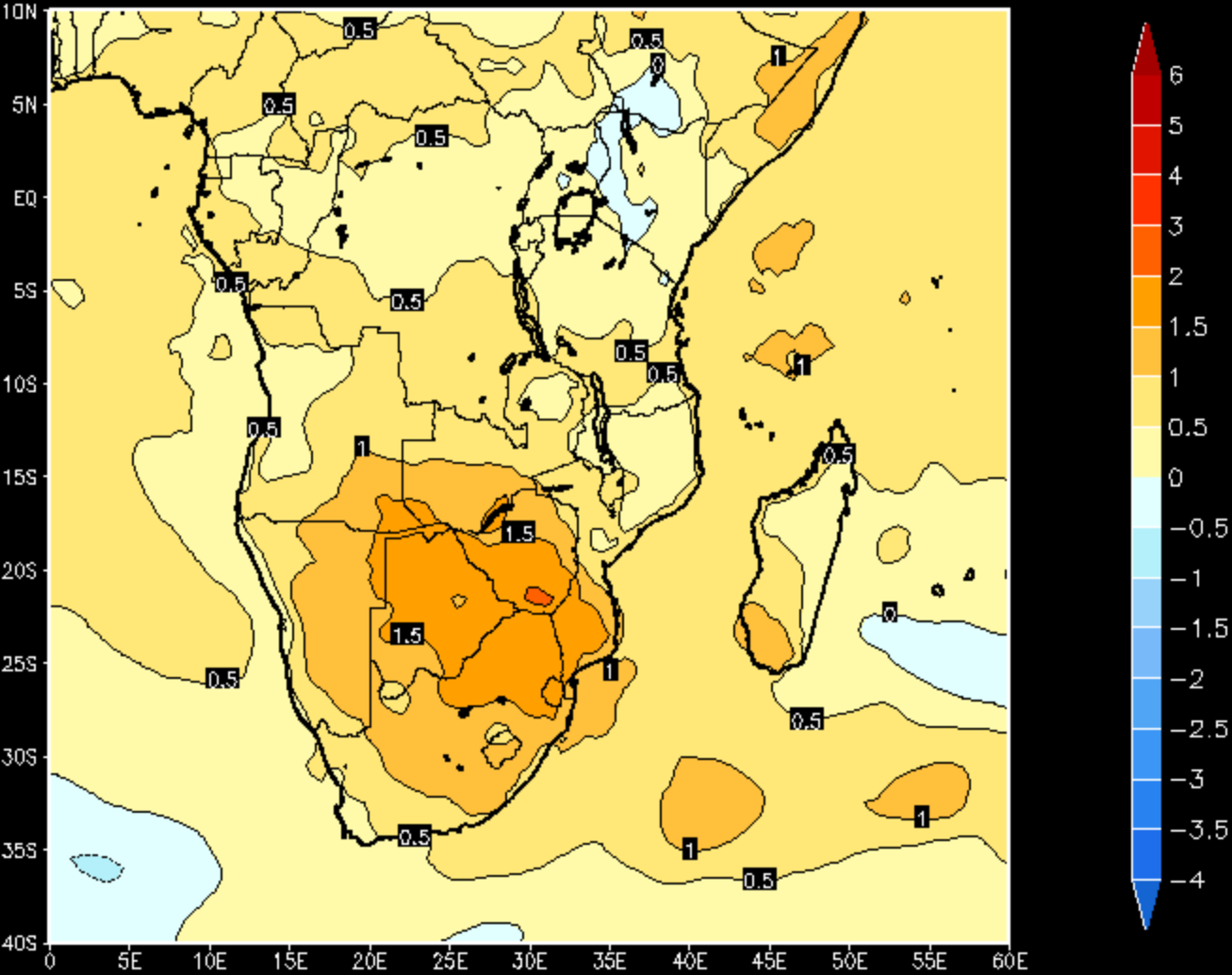
Temp anomaly 1989



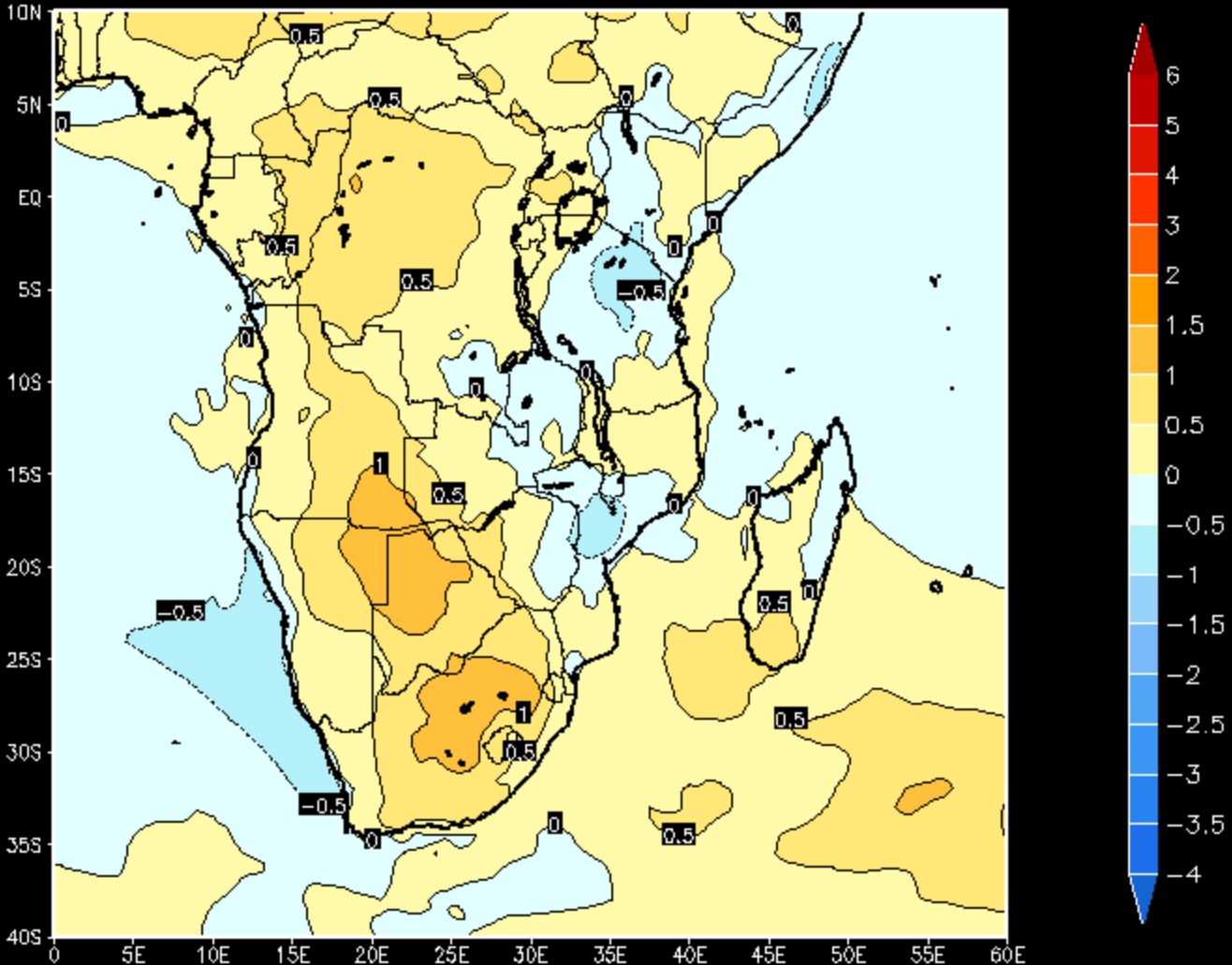
Temp anomaly 1990



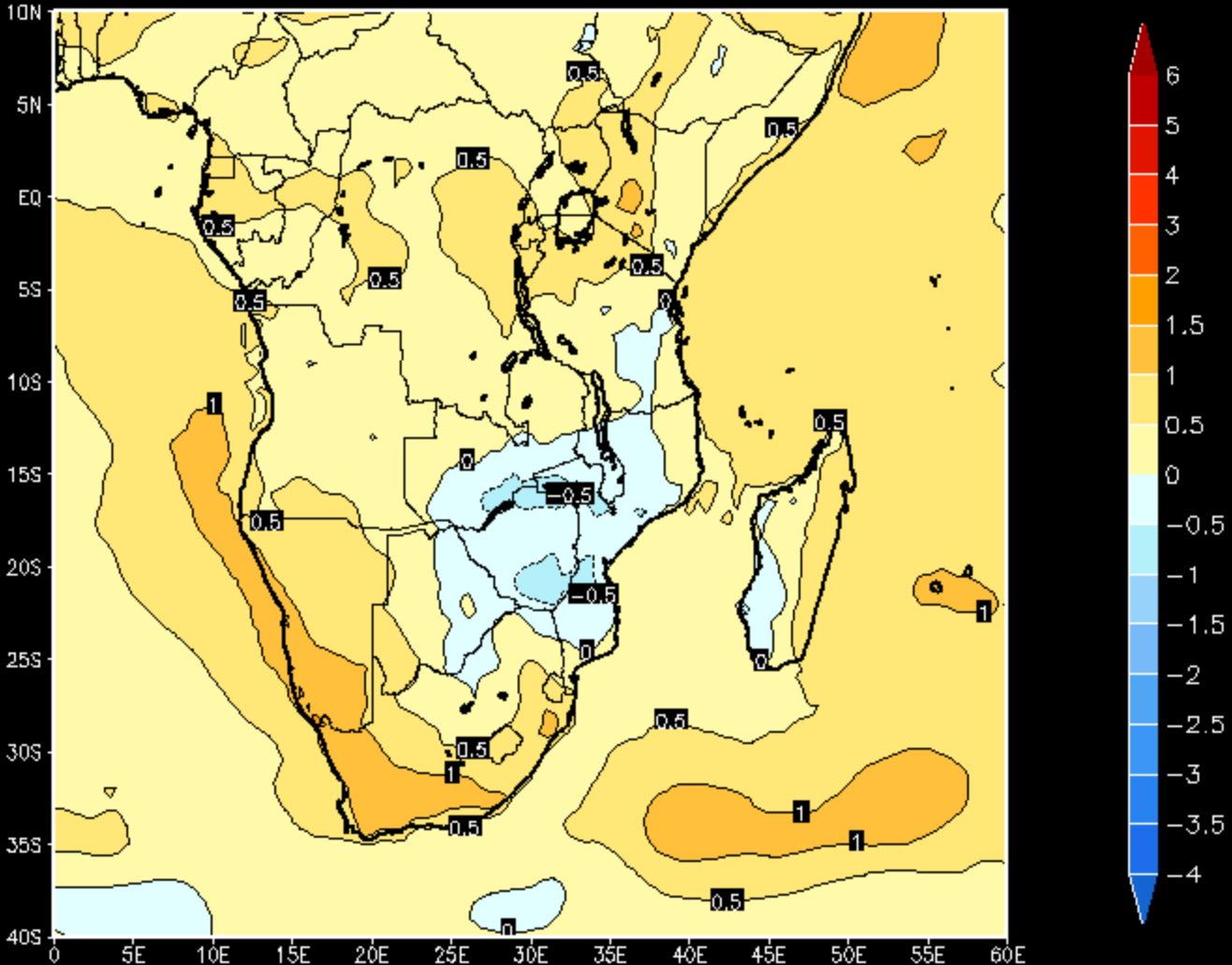
Temp anomaly 1991



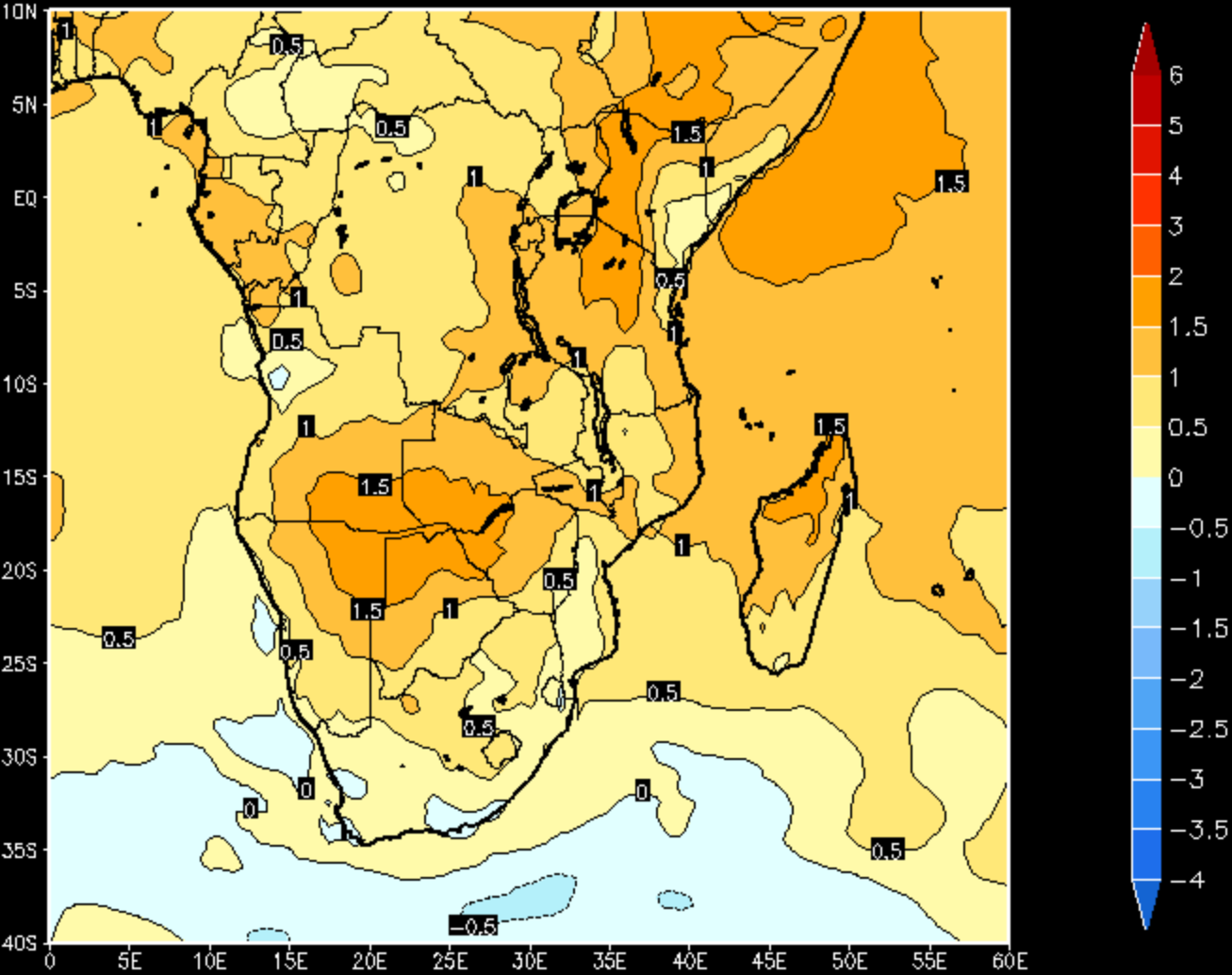
Temp anomaly 1992



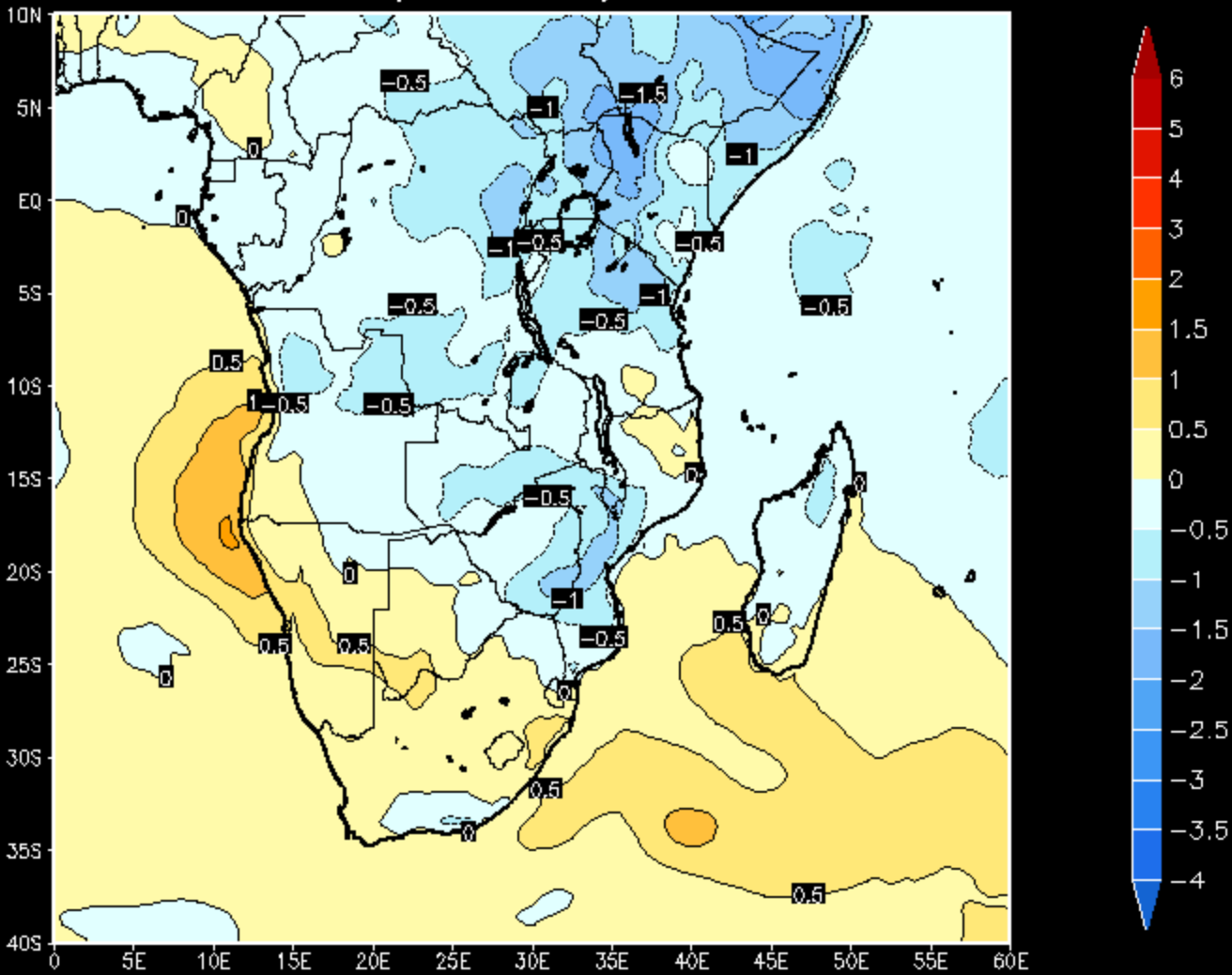
Temp anomaly 1993



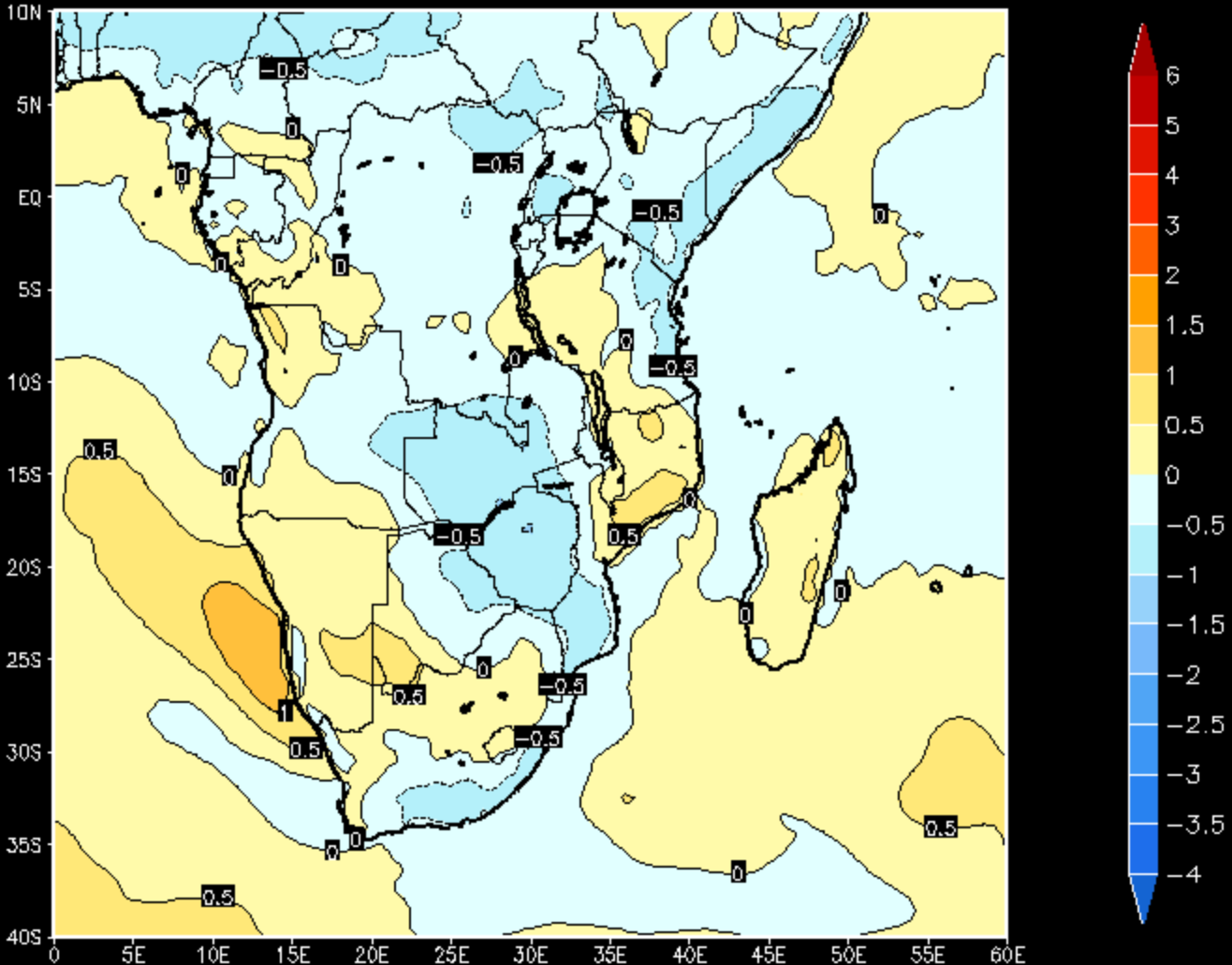
Temp anomaly 1994



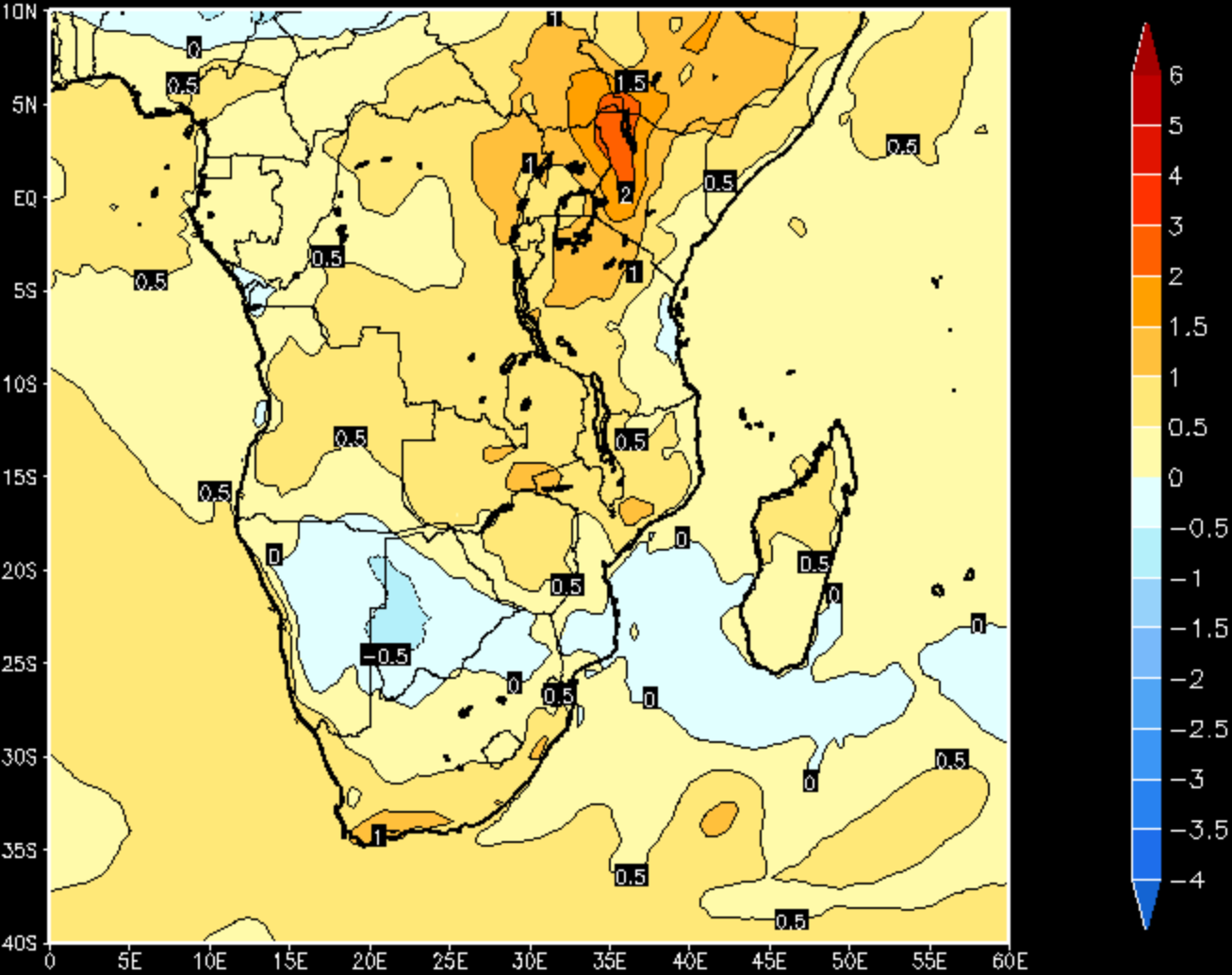
Temp anomaly 1995



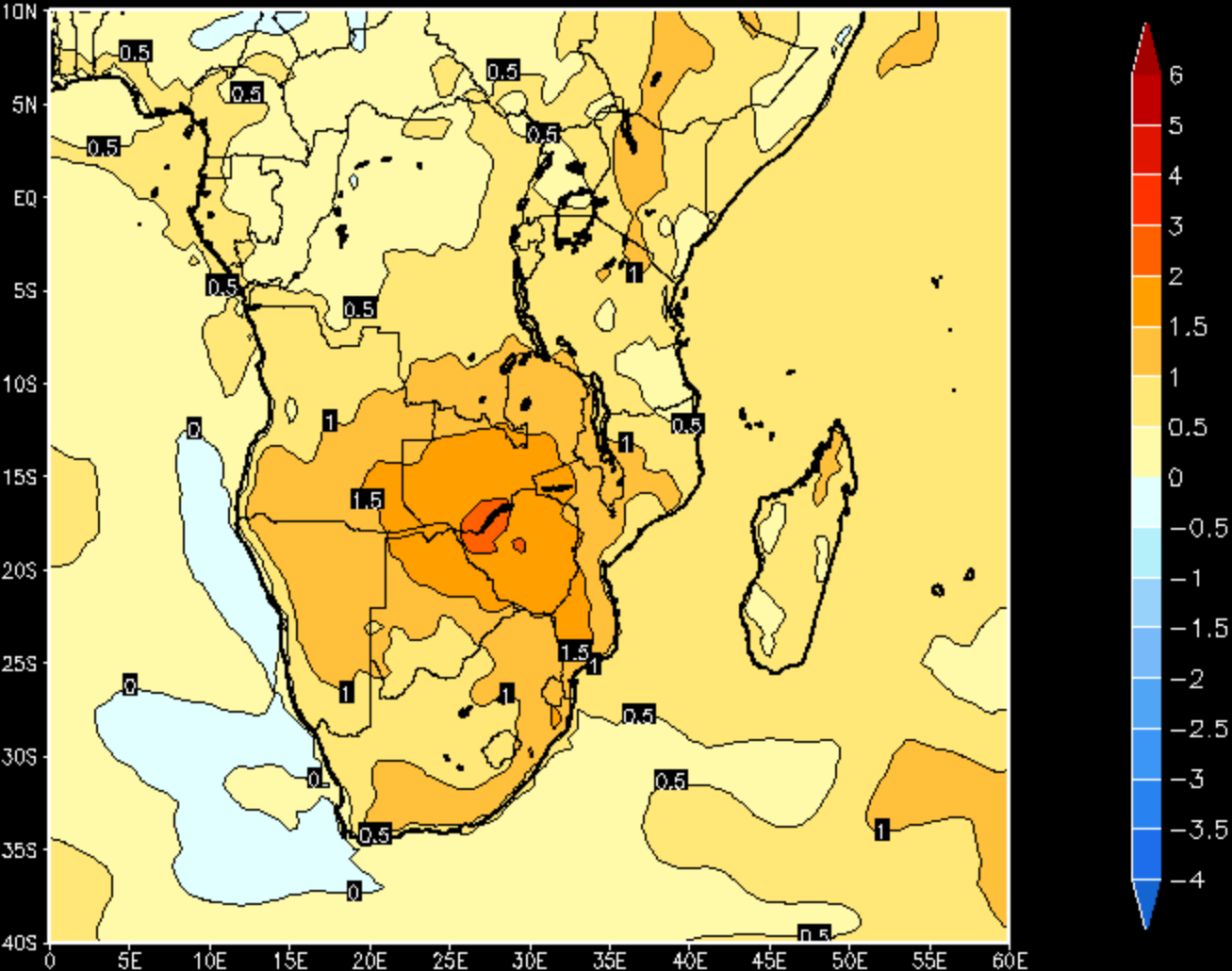
Temp anomaly 1996



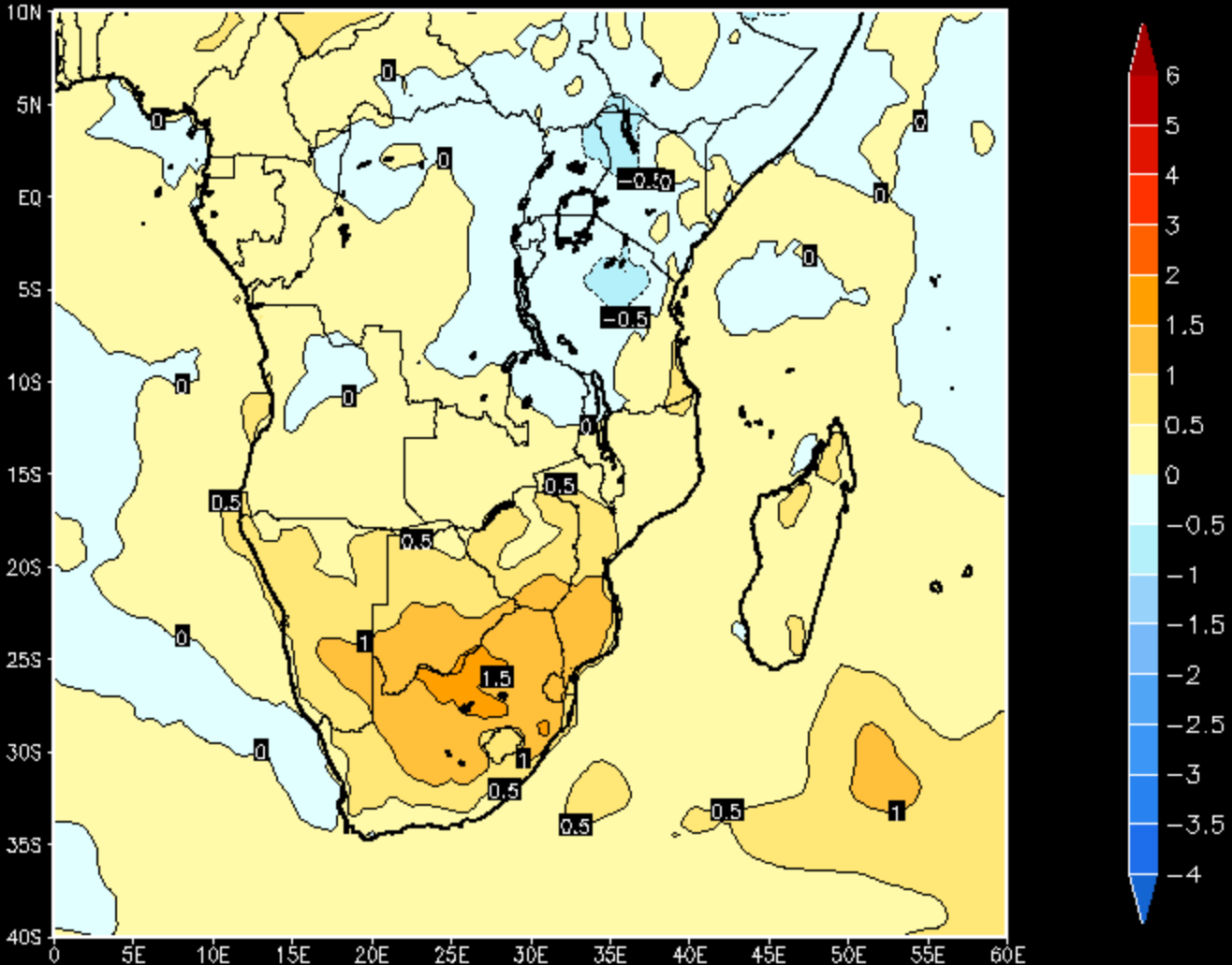
Temp anomaly 1997



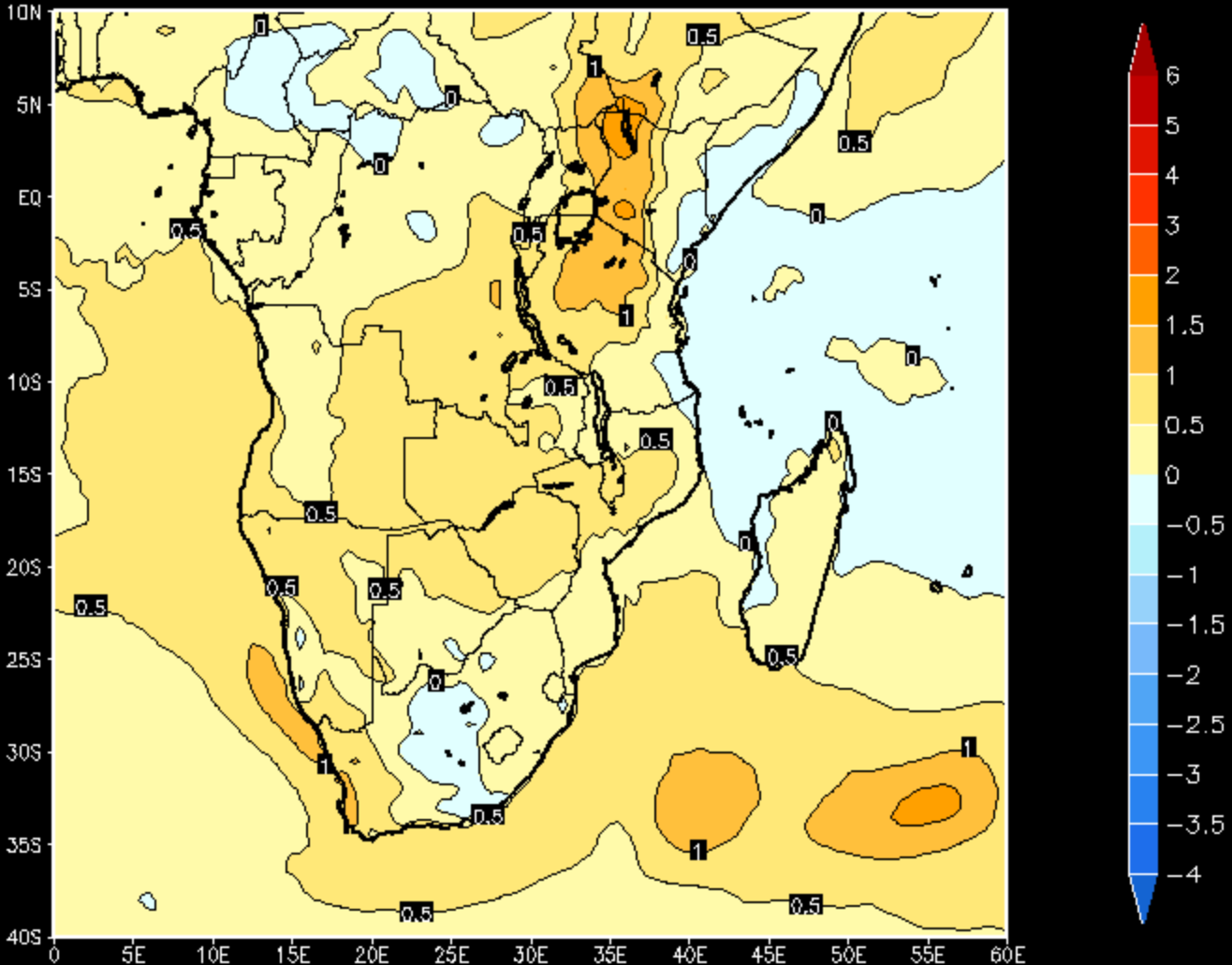
Temp anomaly 1998



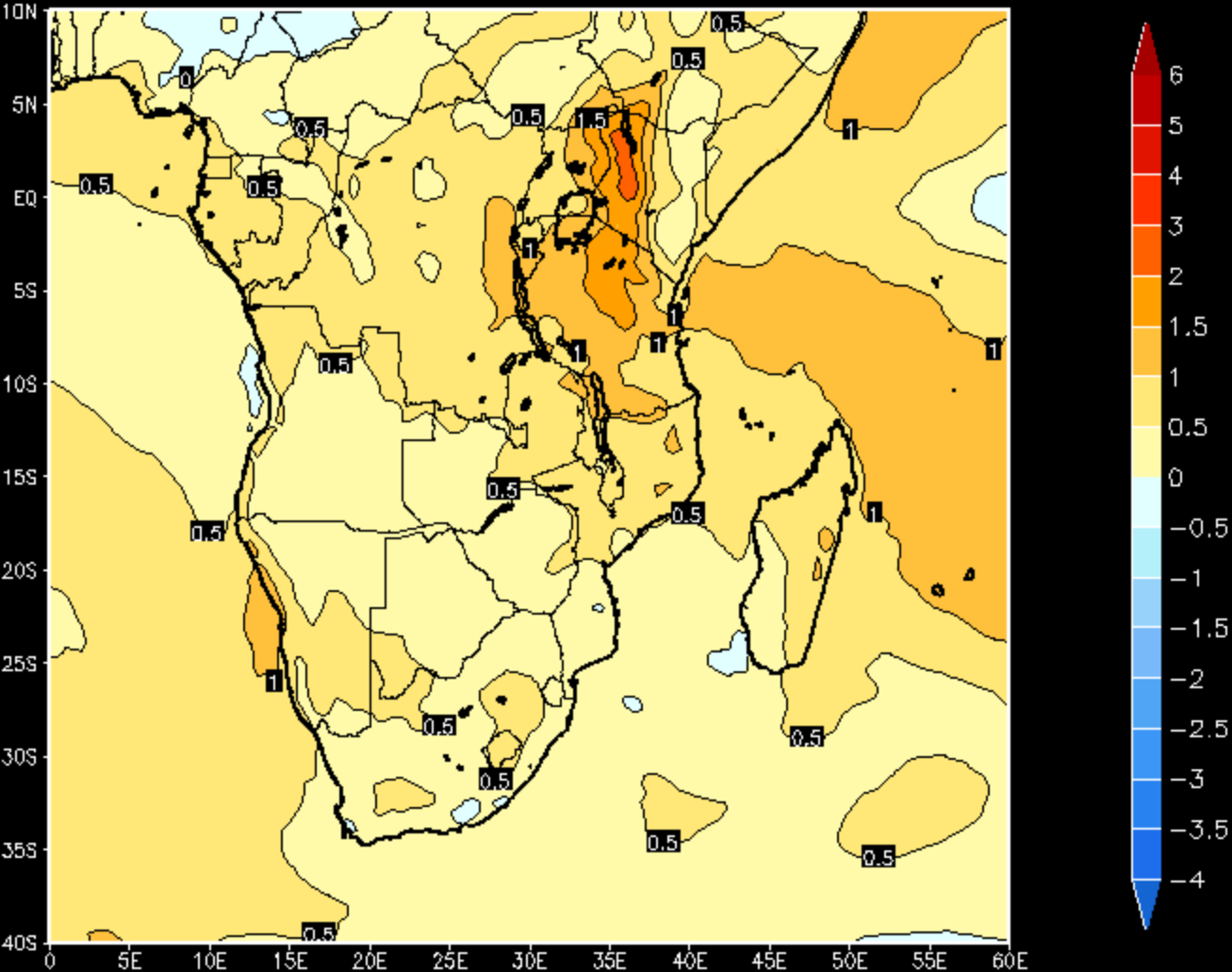
Temp anomaly 1999



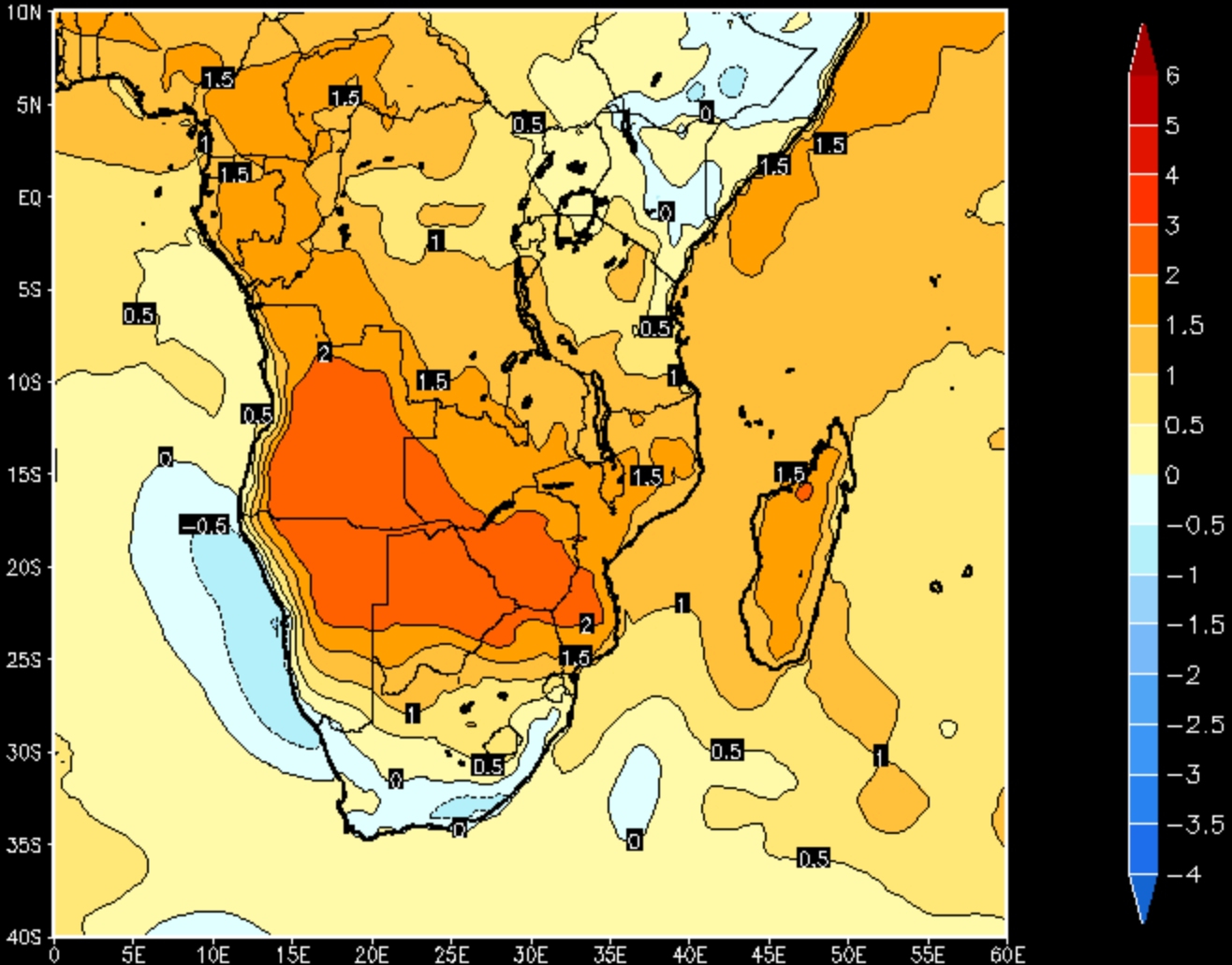
Temp anomaly 2000



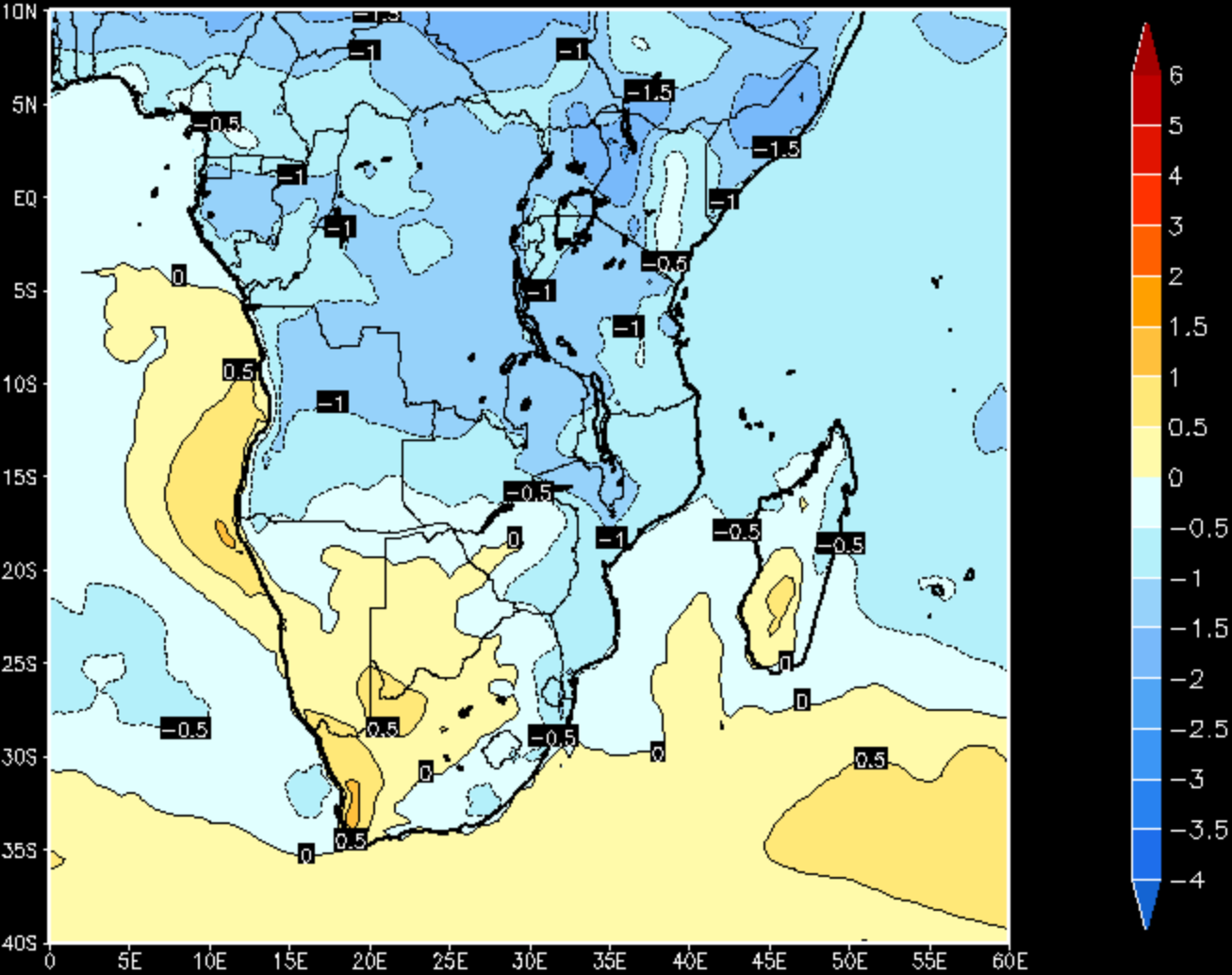
Temp anomaly 2001



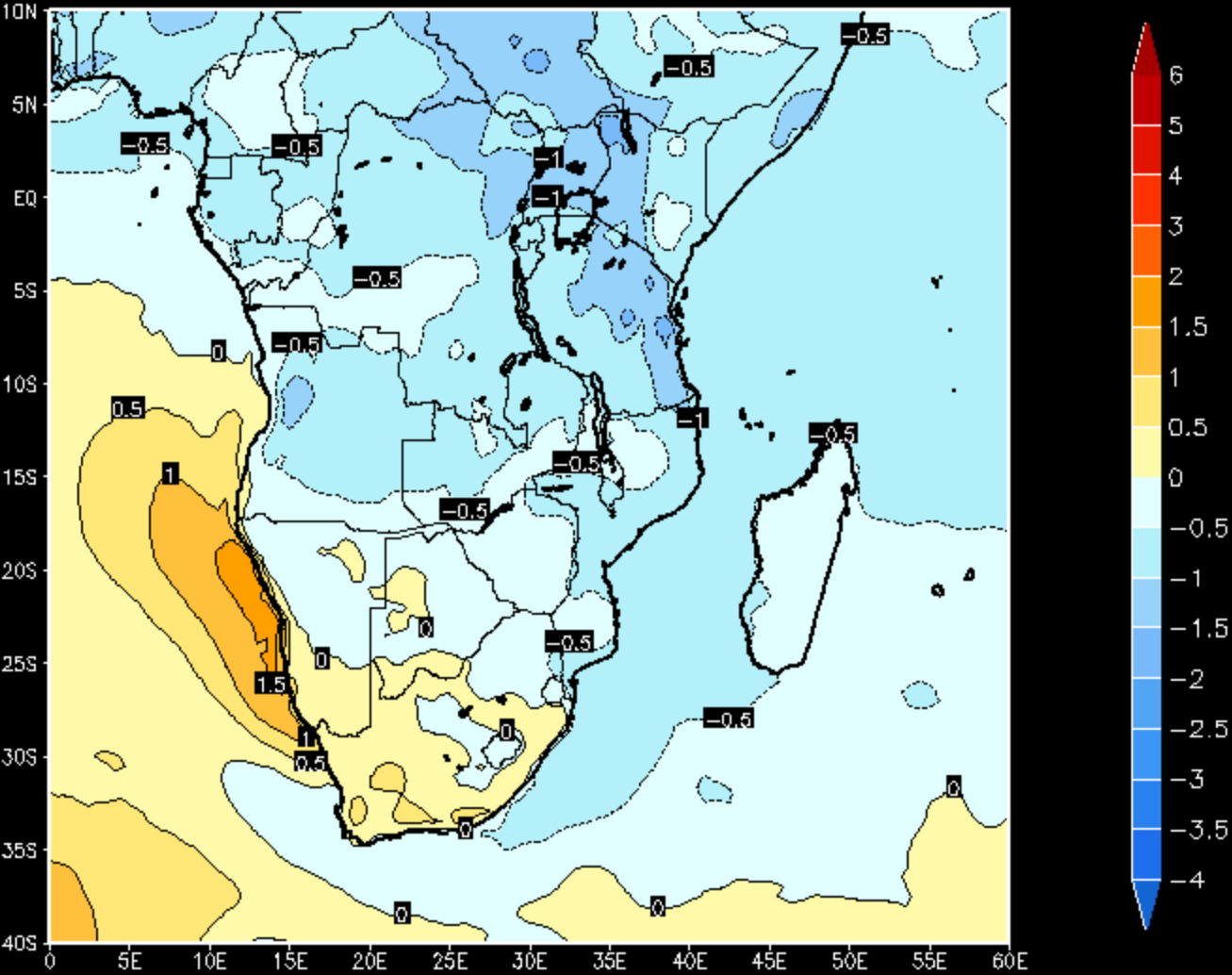
Temp anomaly 2002



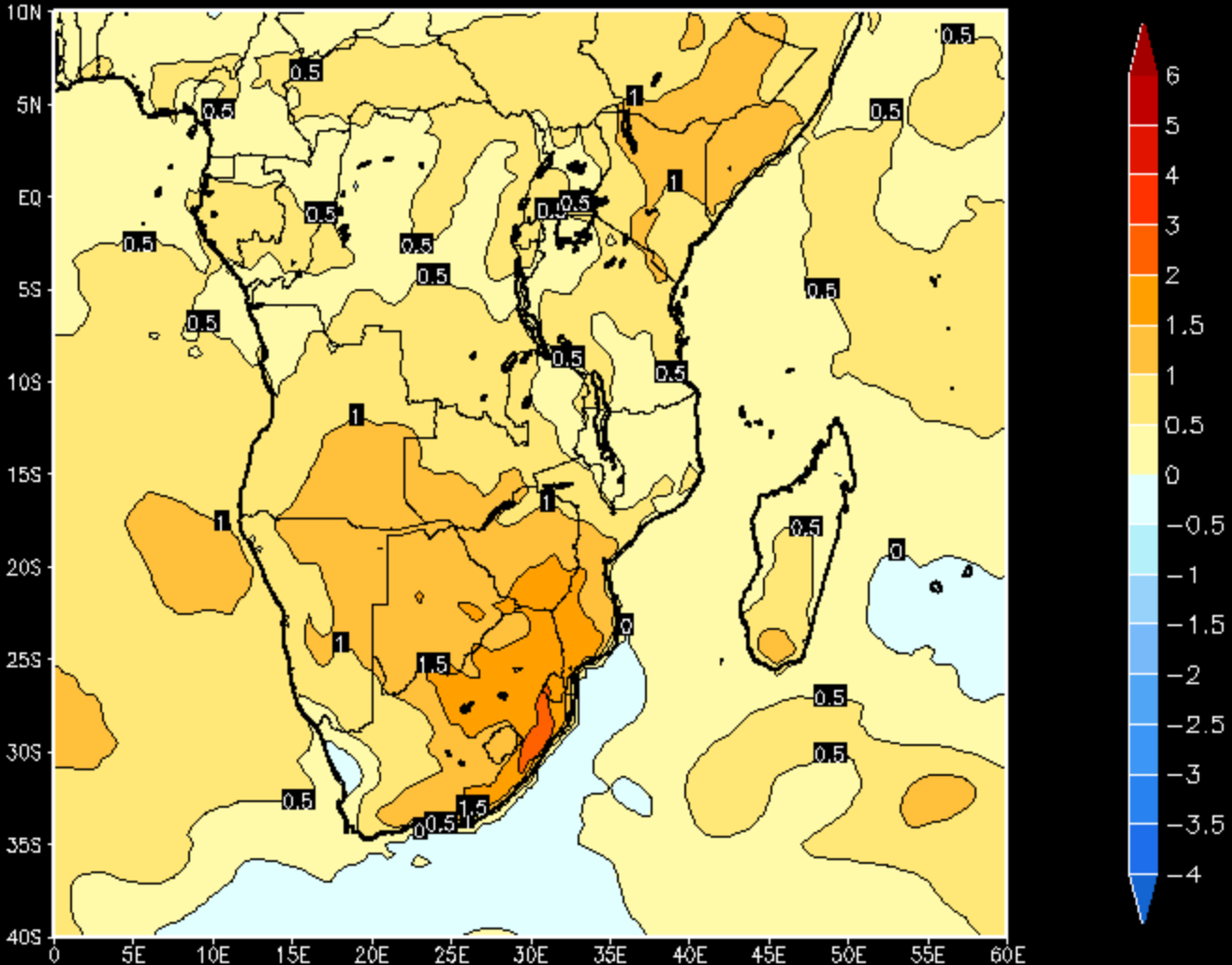
Temp anomaly 2003



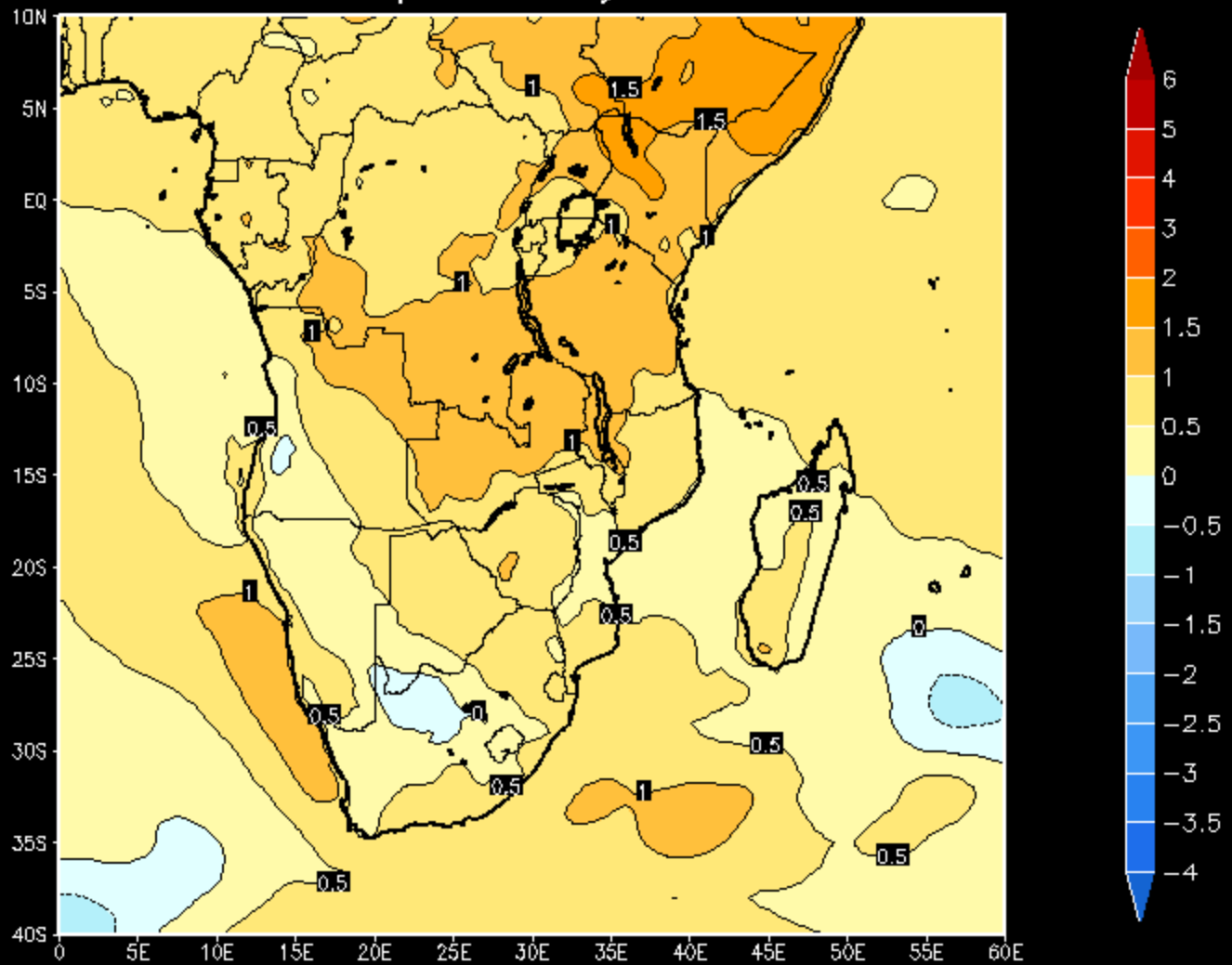
Temp anomaly 2004



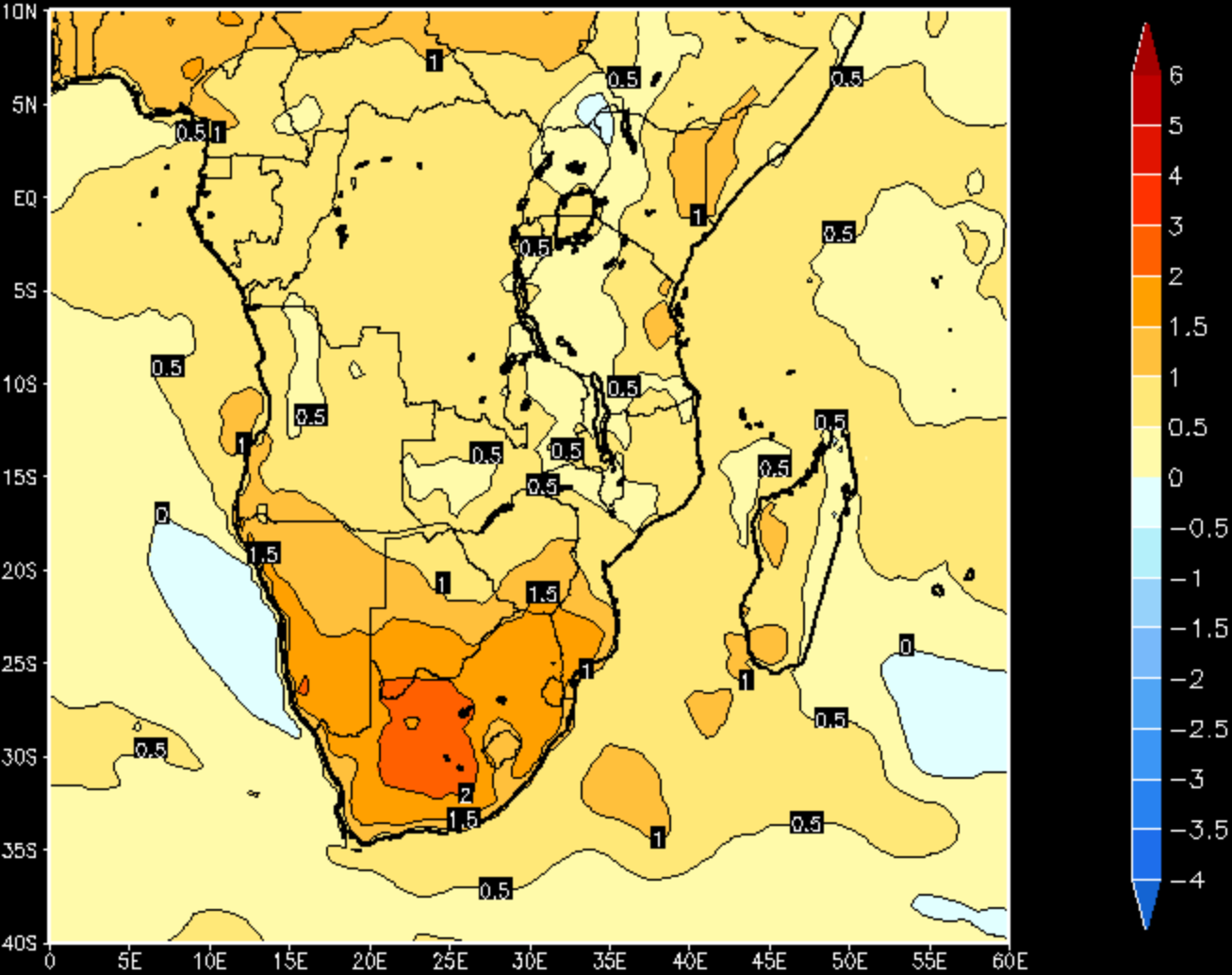
Temp anomaly 2005



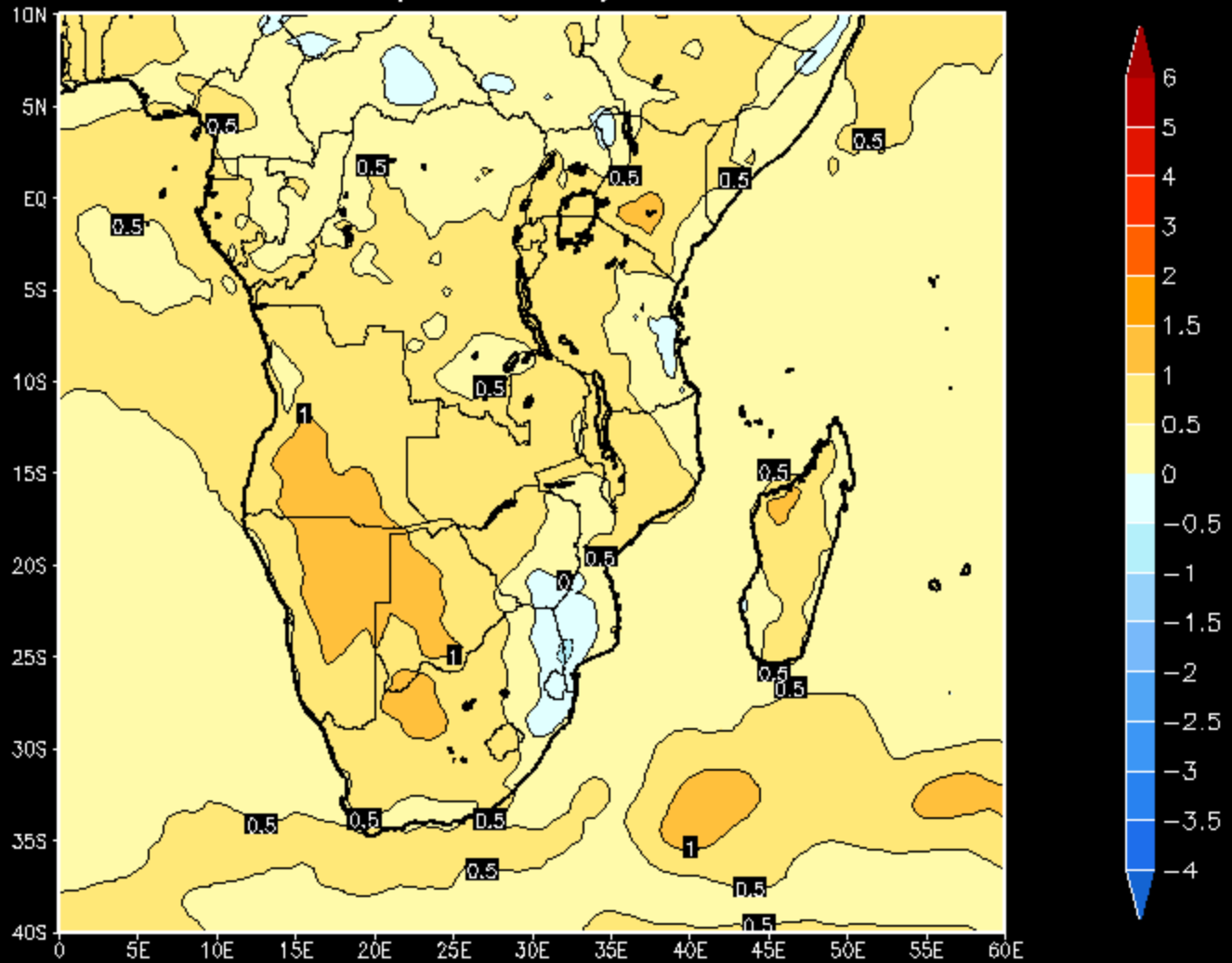
Temp anomaly 2006



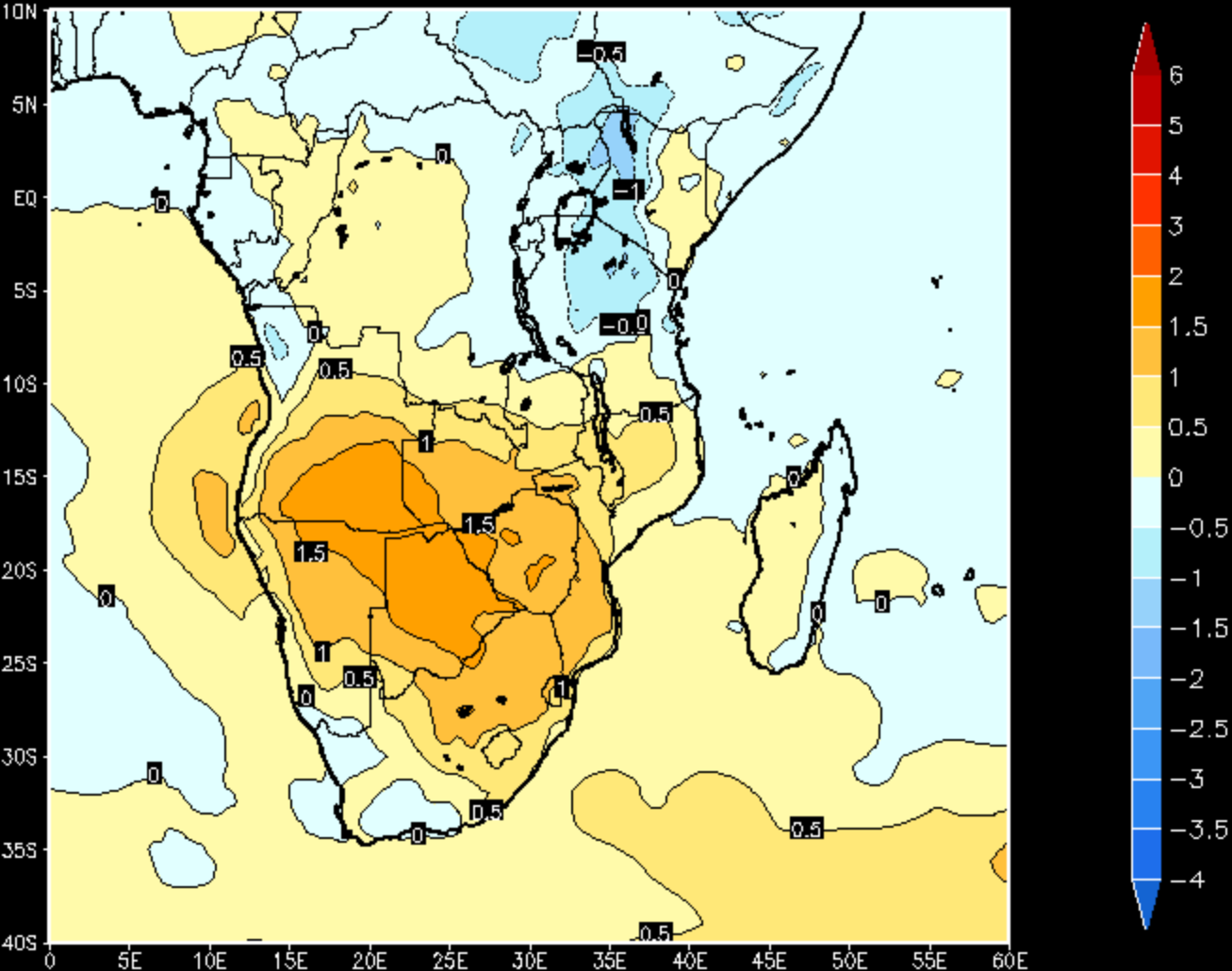
Temp anomaly 2007



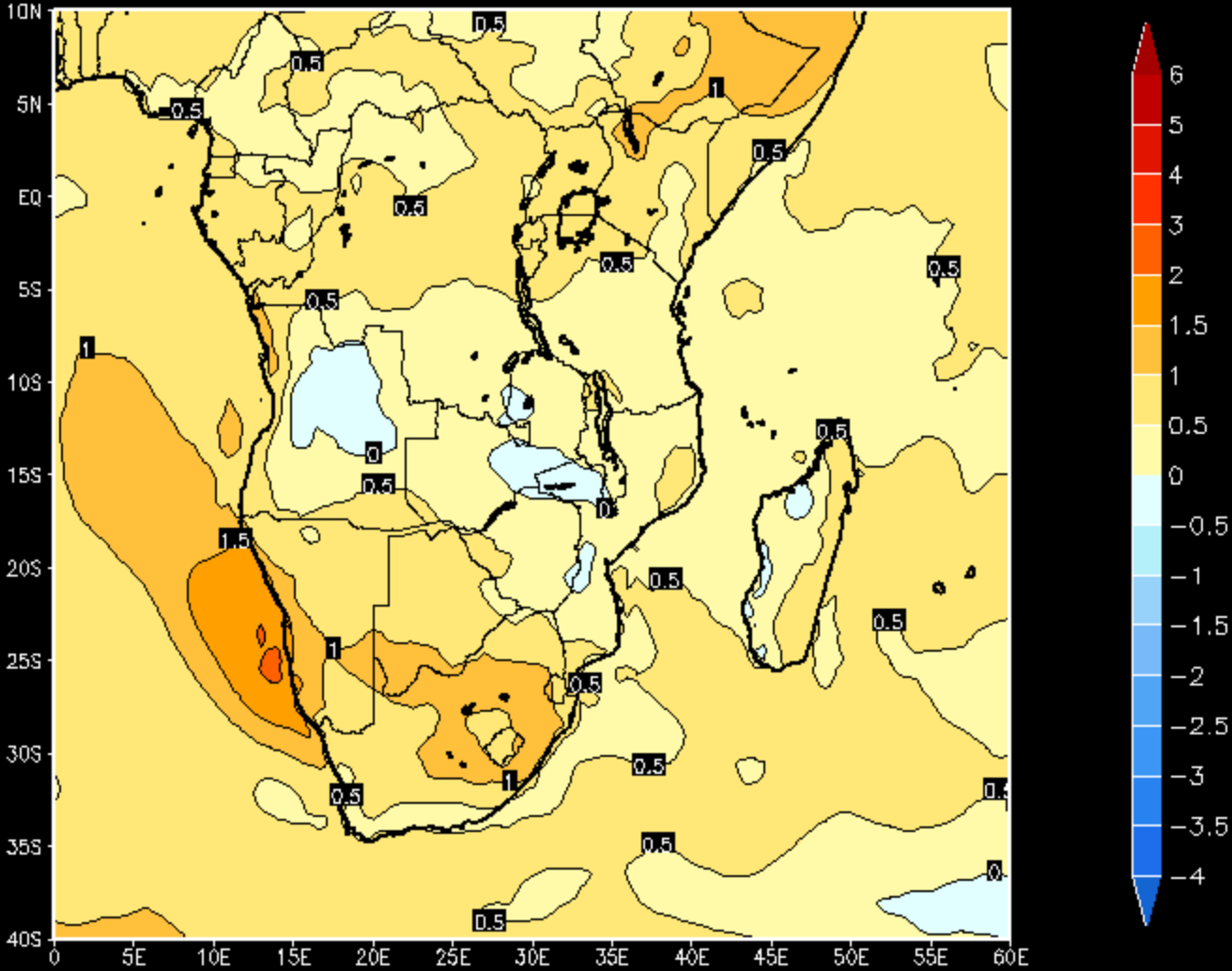
Temp anomaly 2009



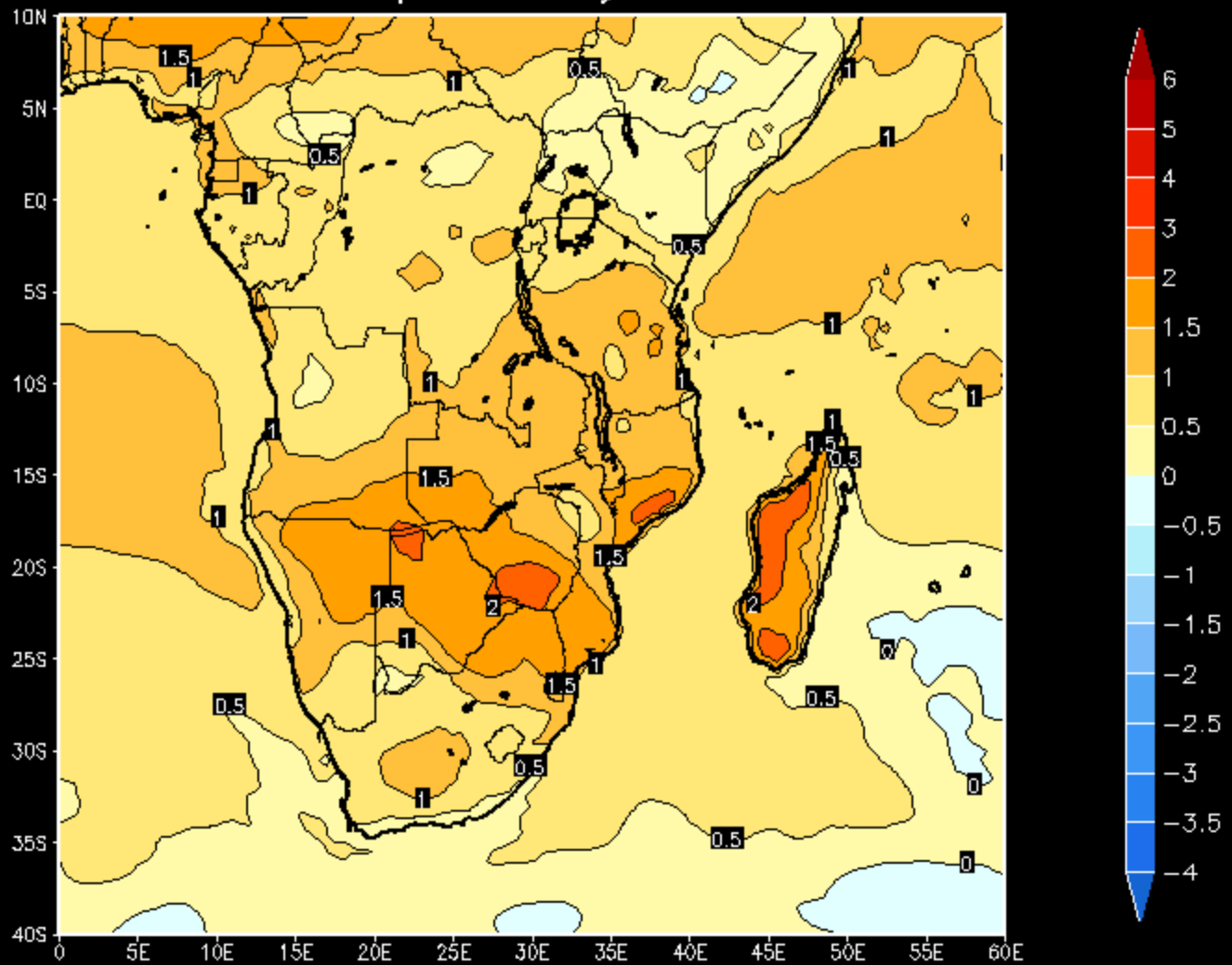
Temp anomaly 2010



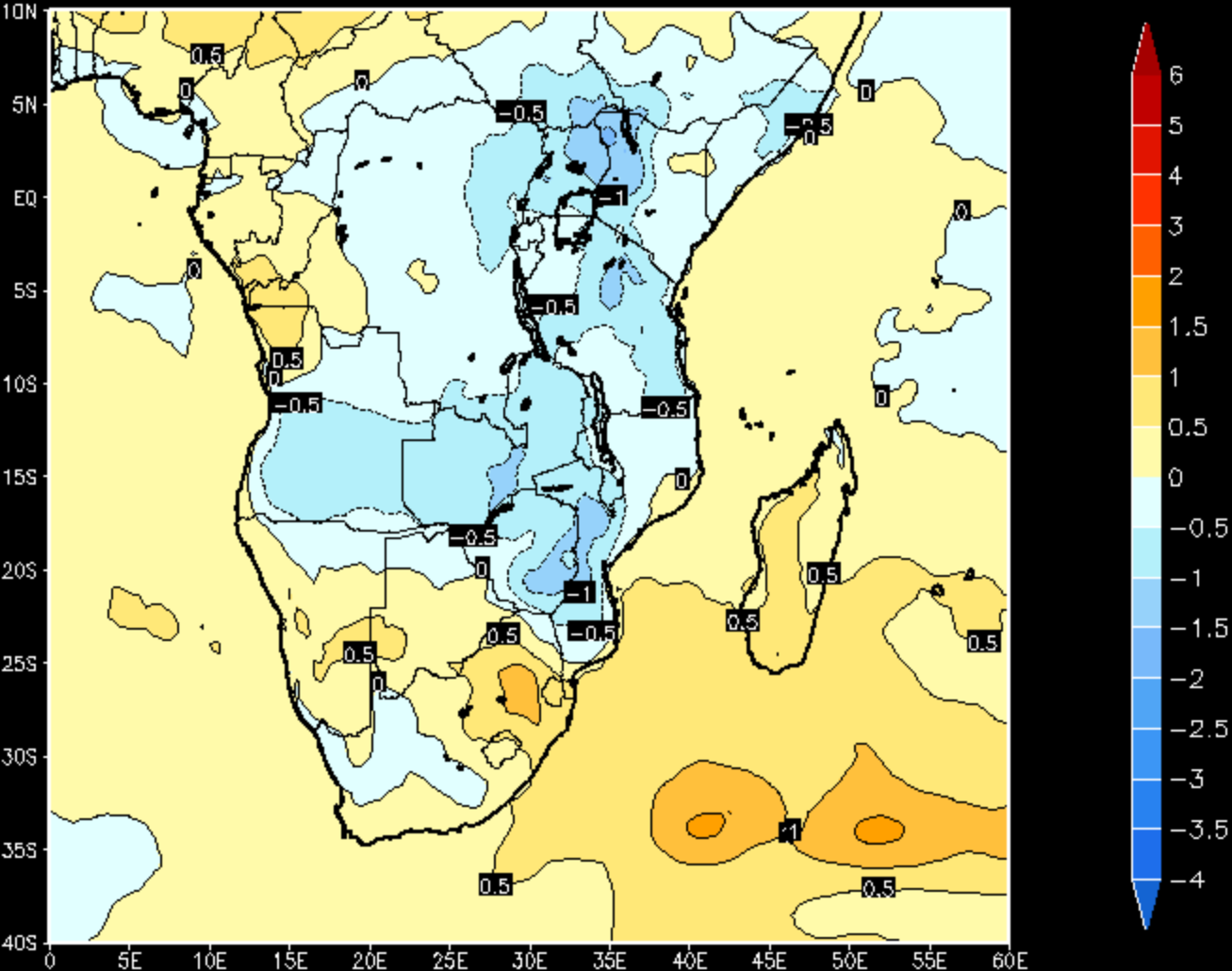
Temp anomaly 2011



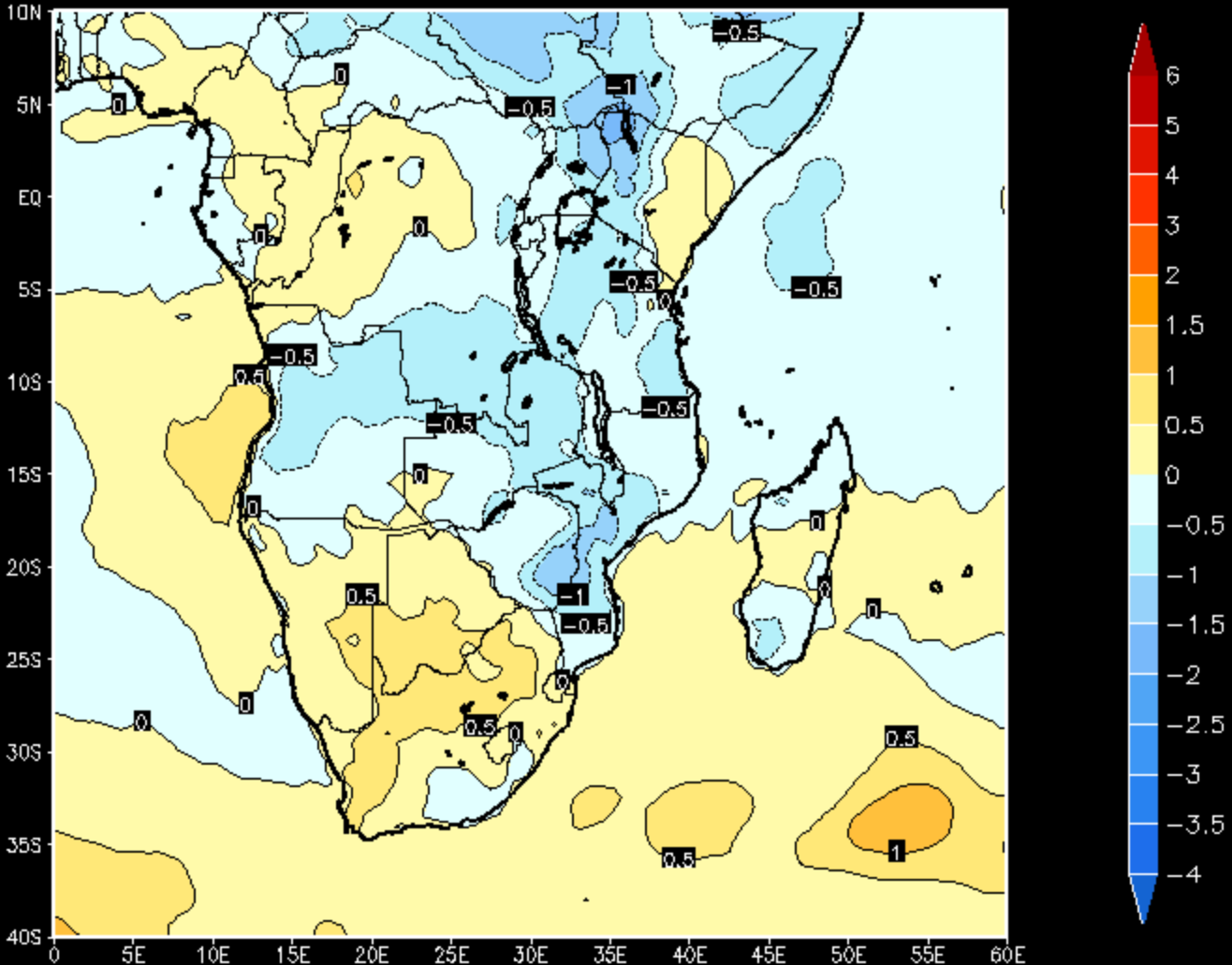
Temp anomaly 2012



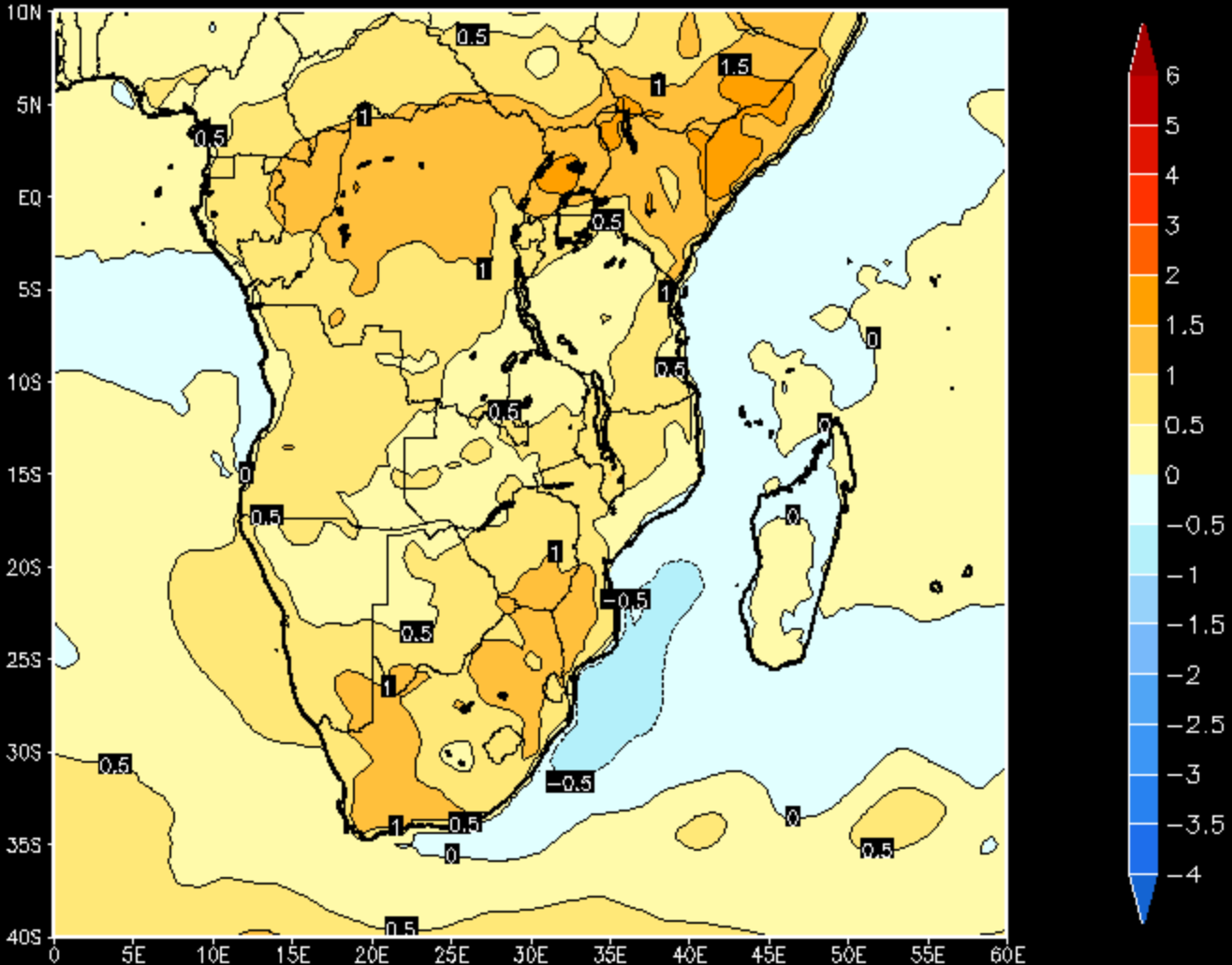
Temp anomaly 2013



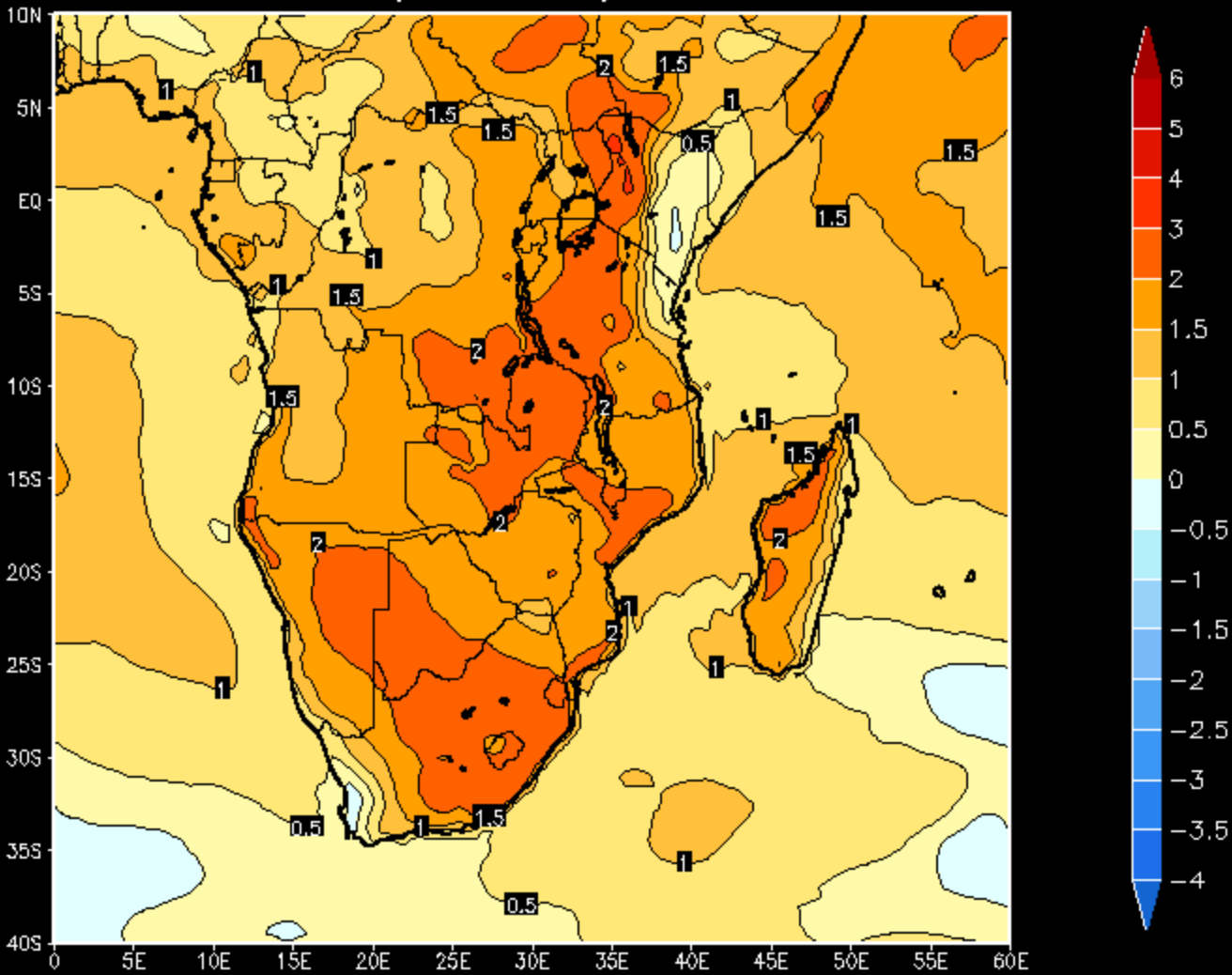
Temp anomaly 2014



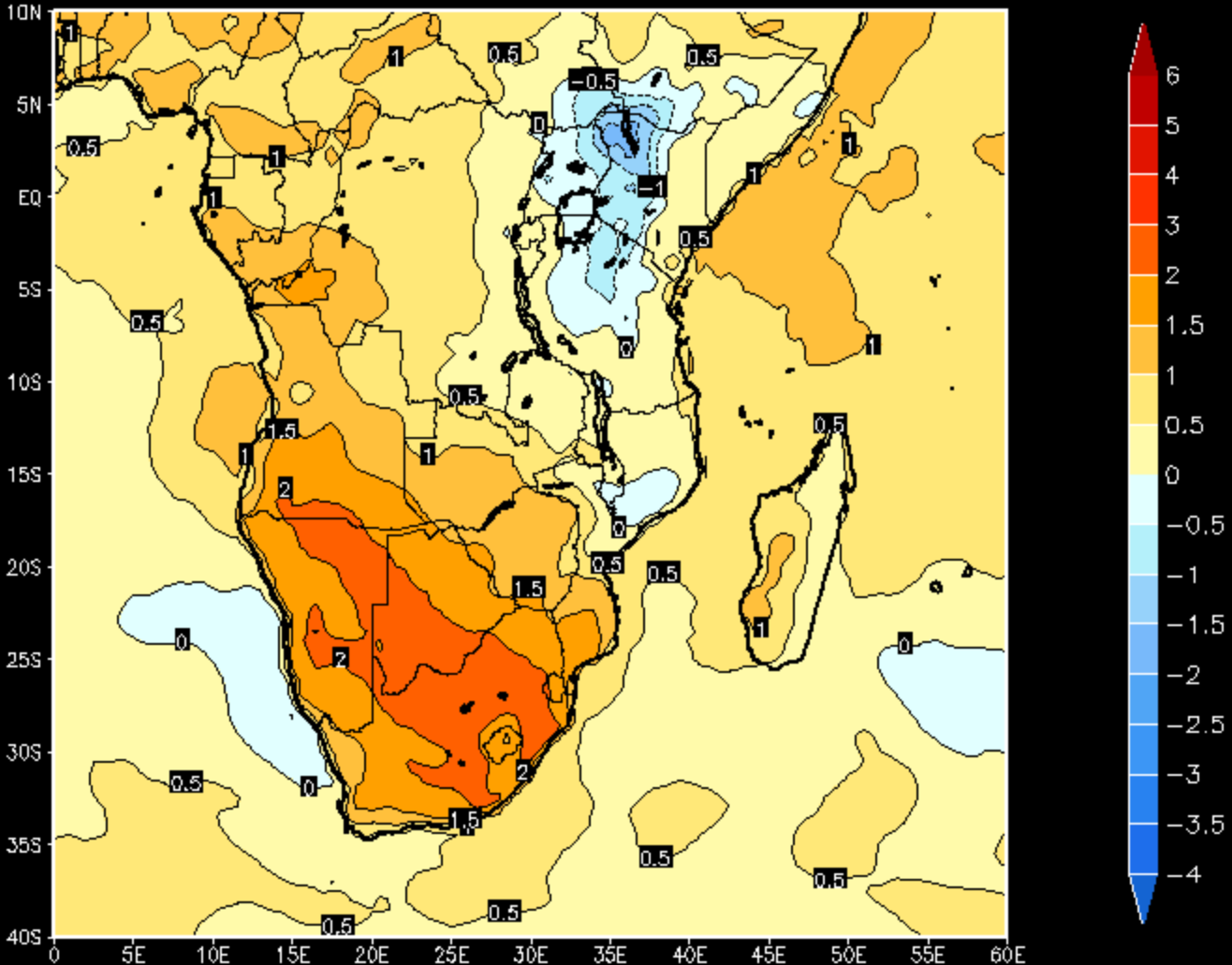
Temp anomaly 2015



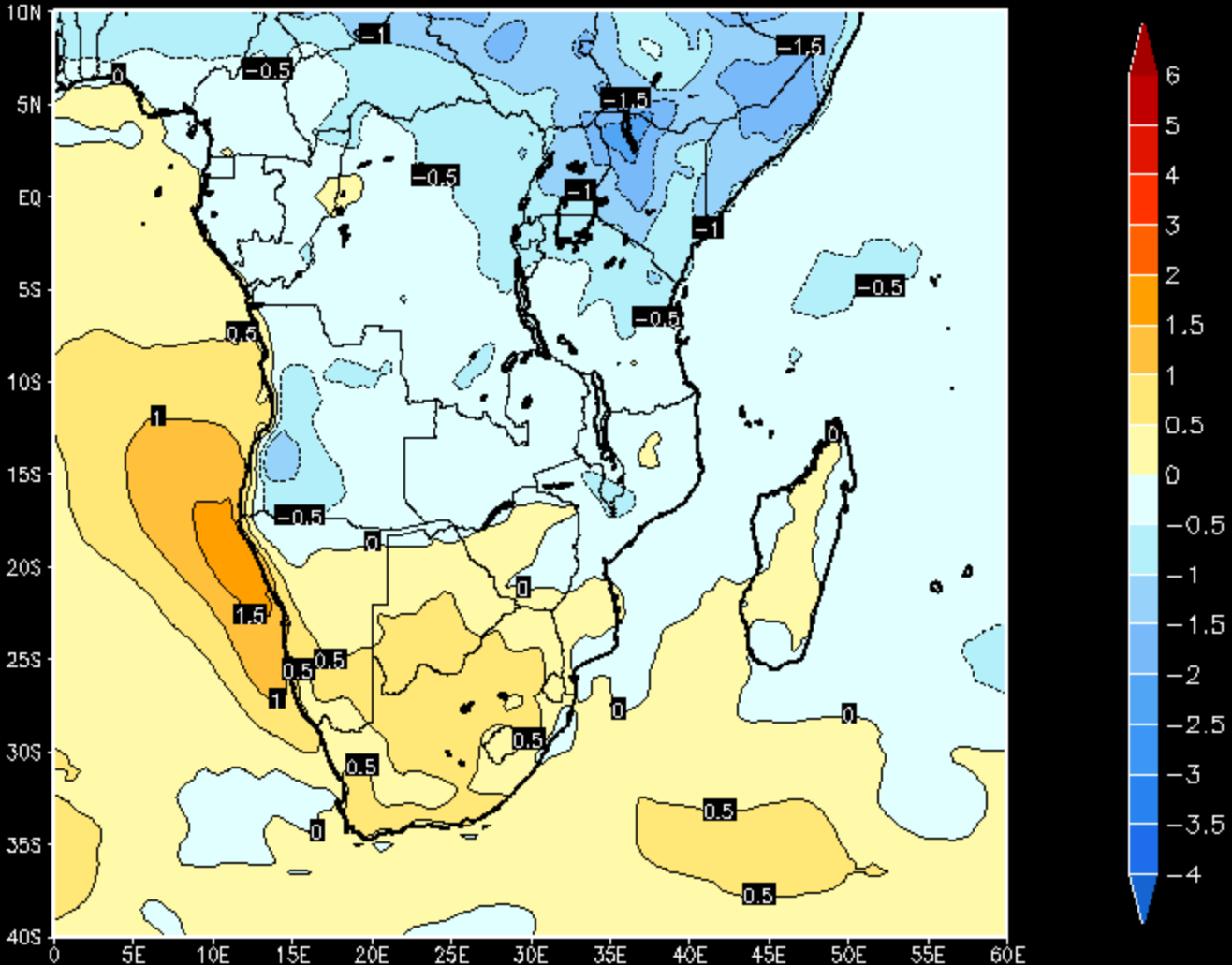
Temp anomaly 2016



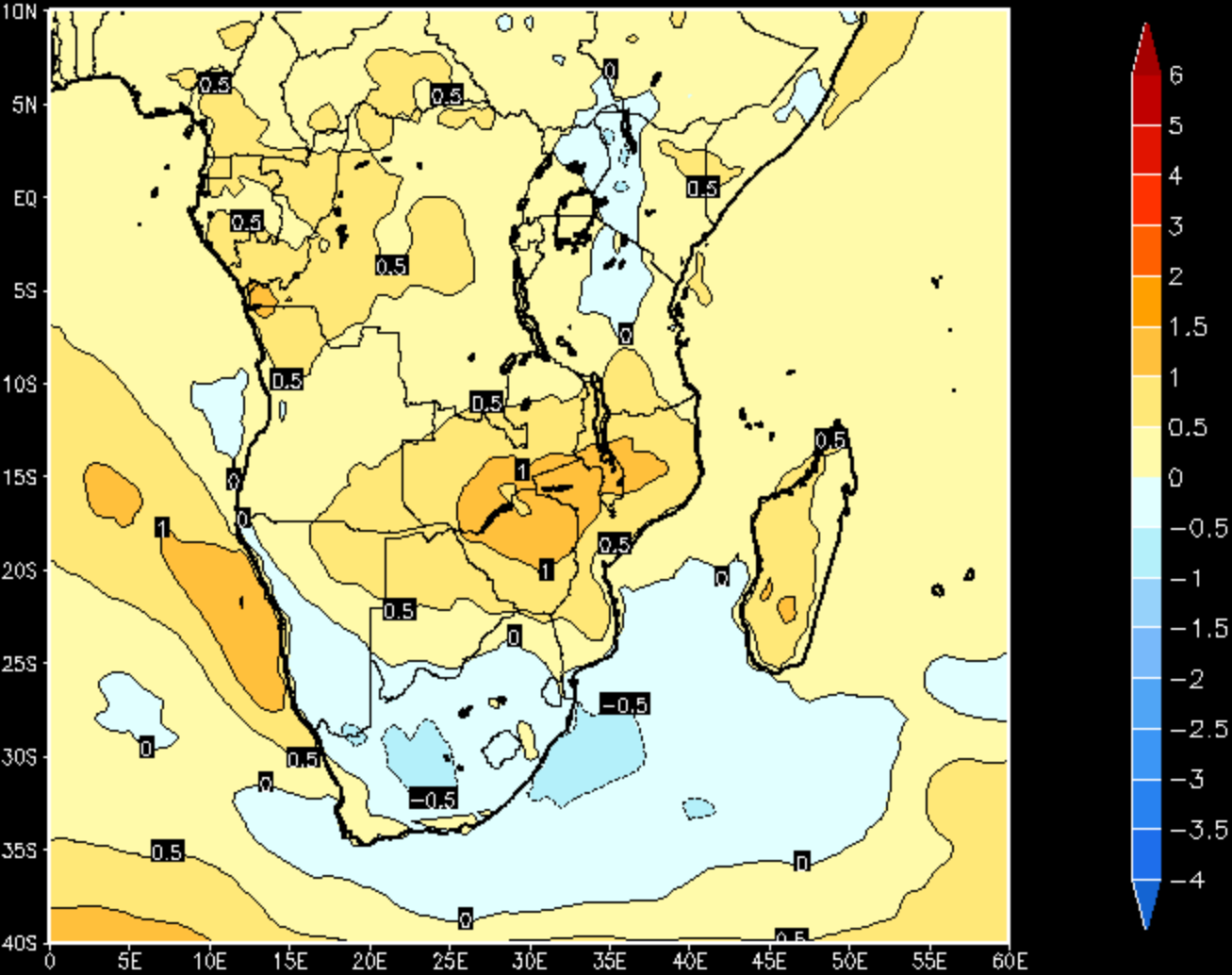
Temp anomaly 2017



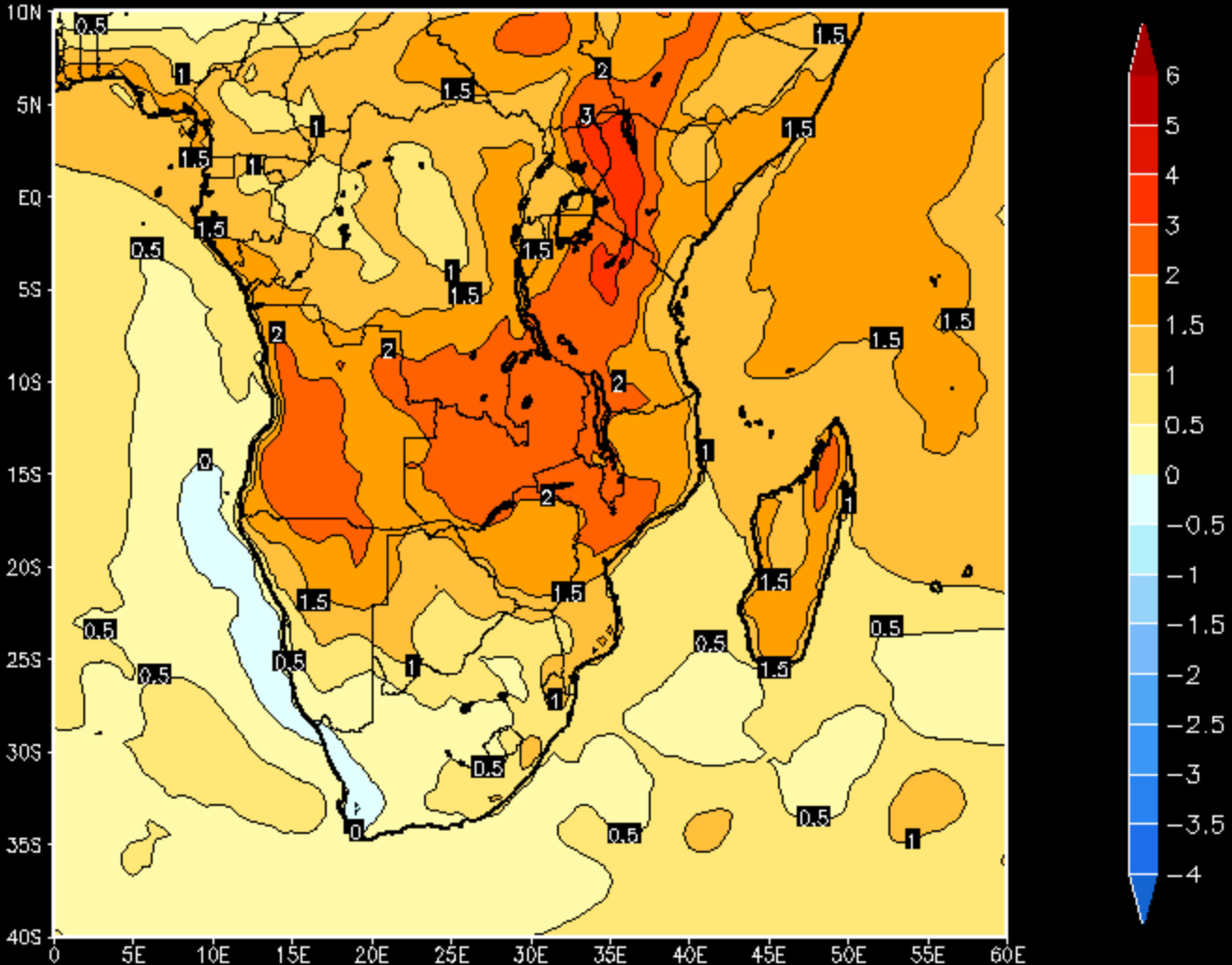
Temp anomaly 2018



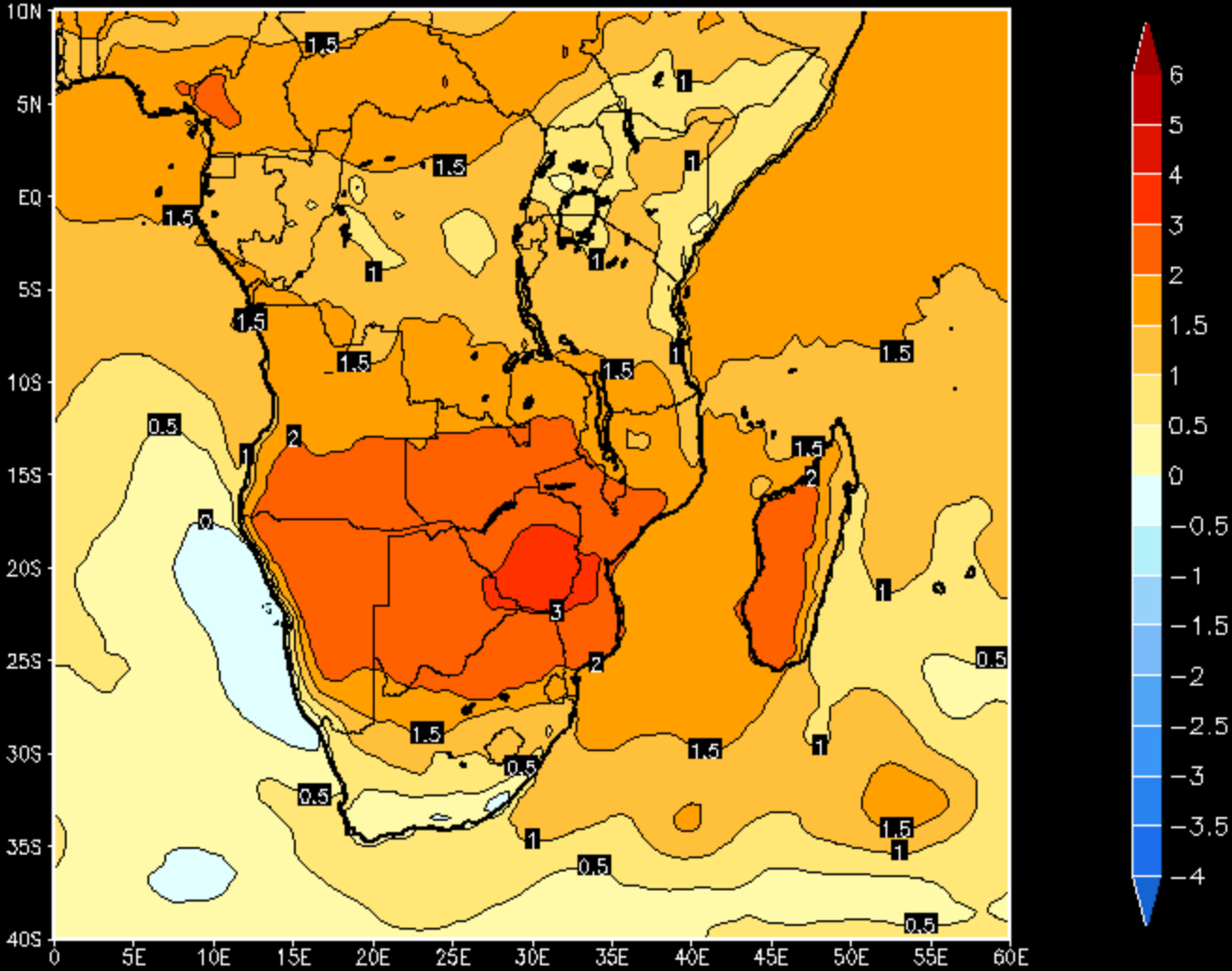
Temp anomaly 2019



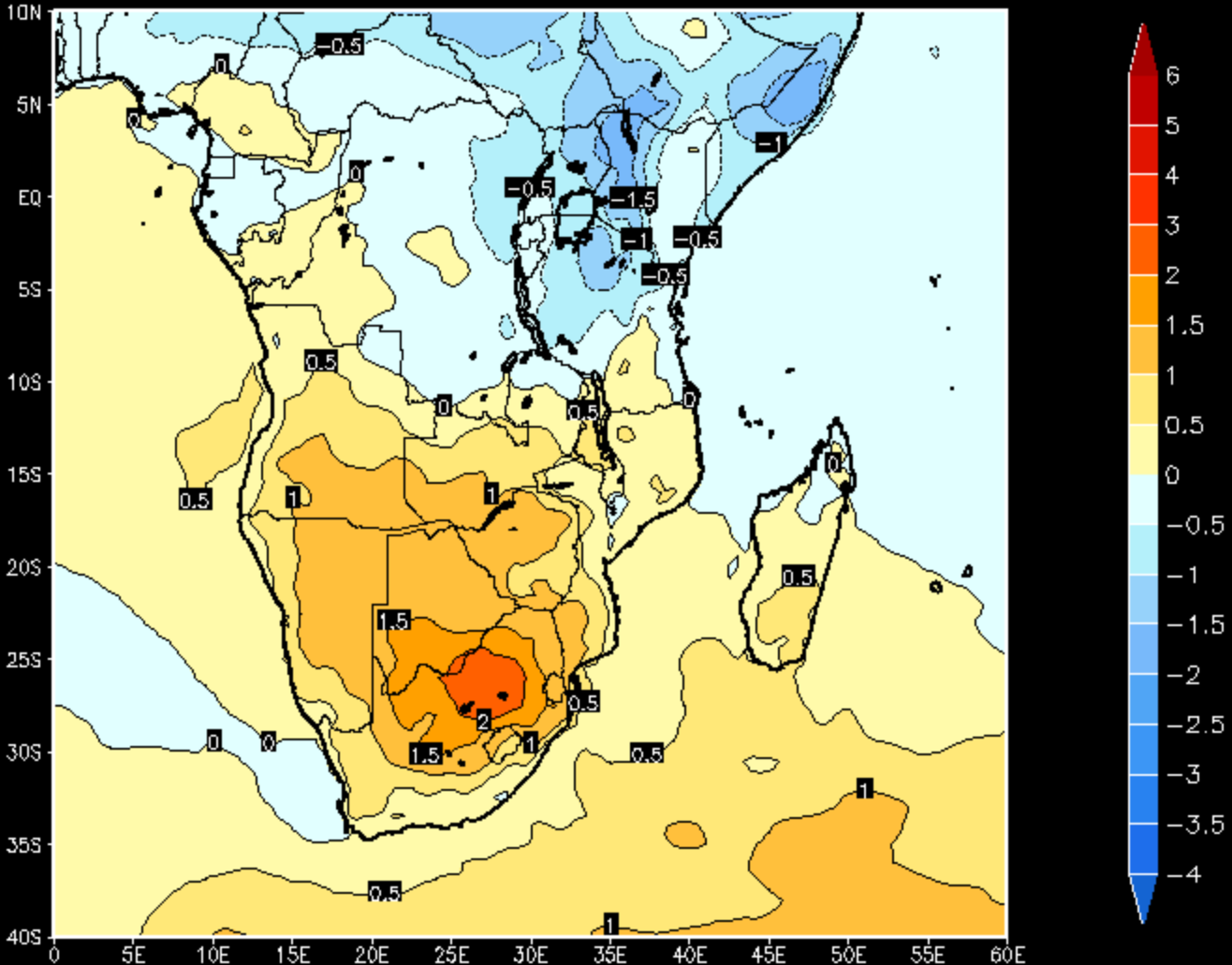
Temp anomaly 2020



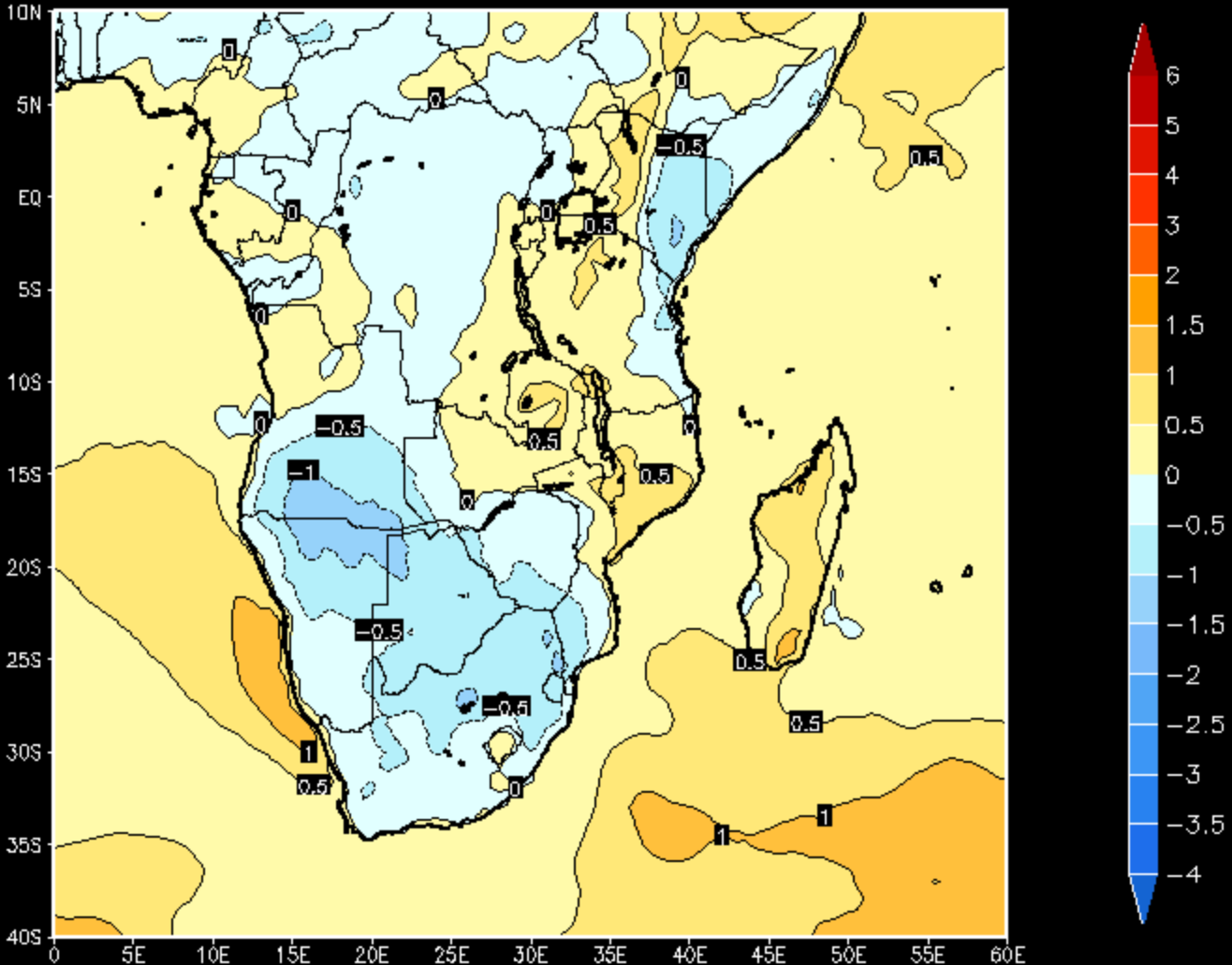
Temp anomaly 2021



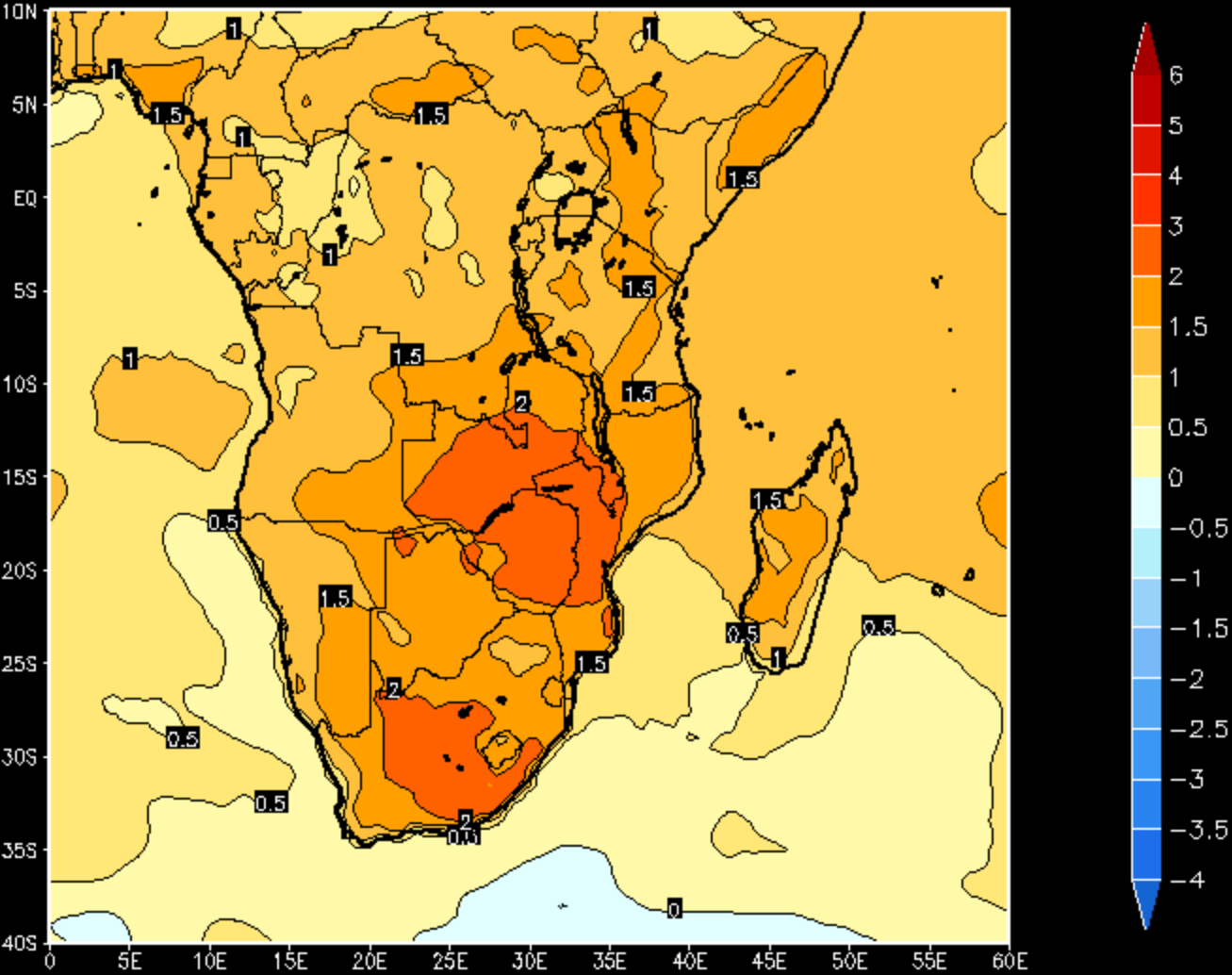
Temp anomaly 2022



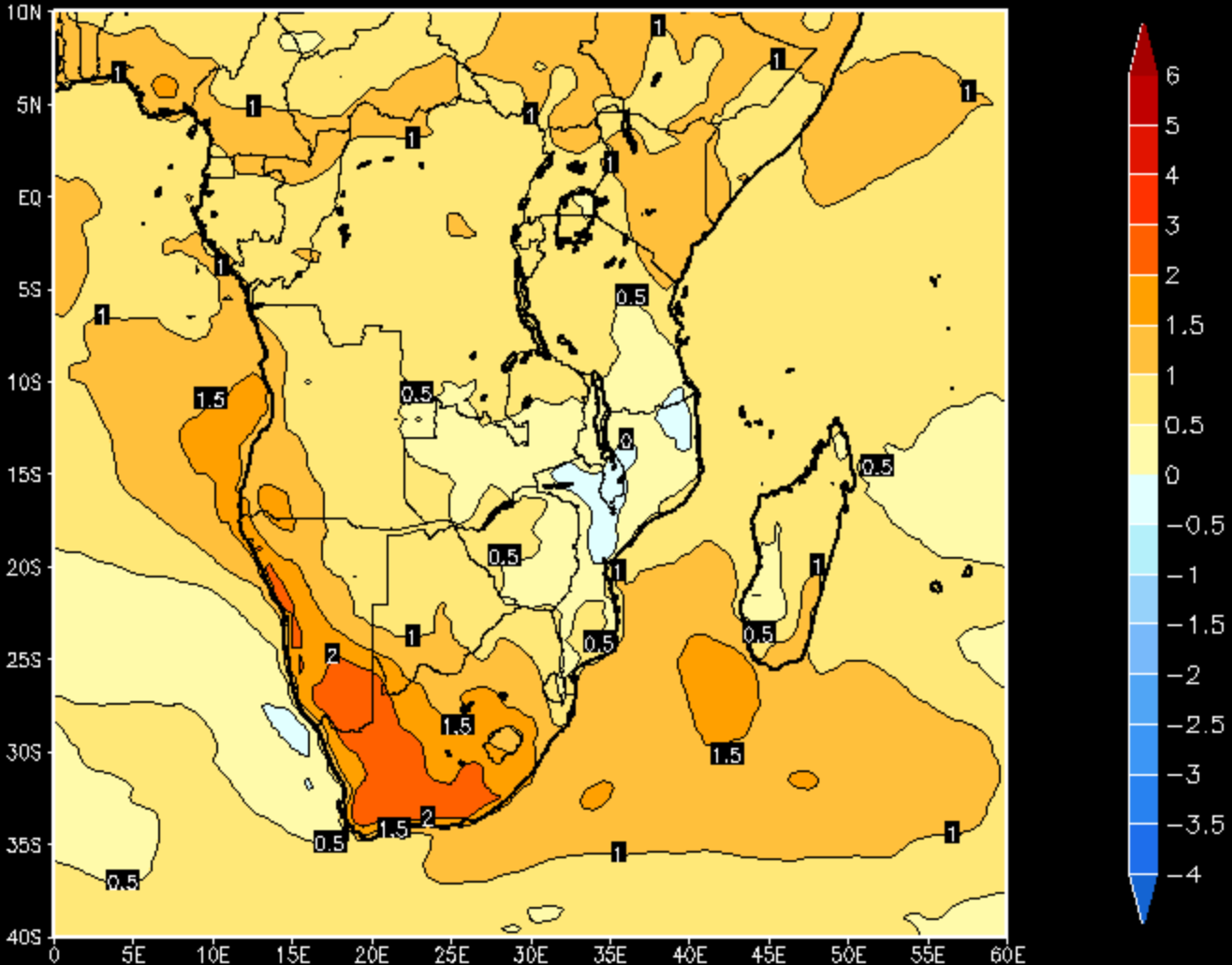
Temp anomaly 2023



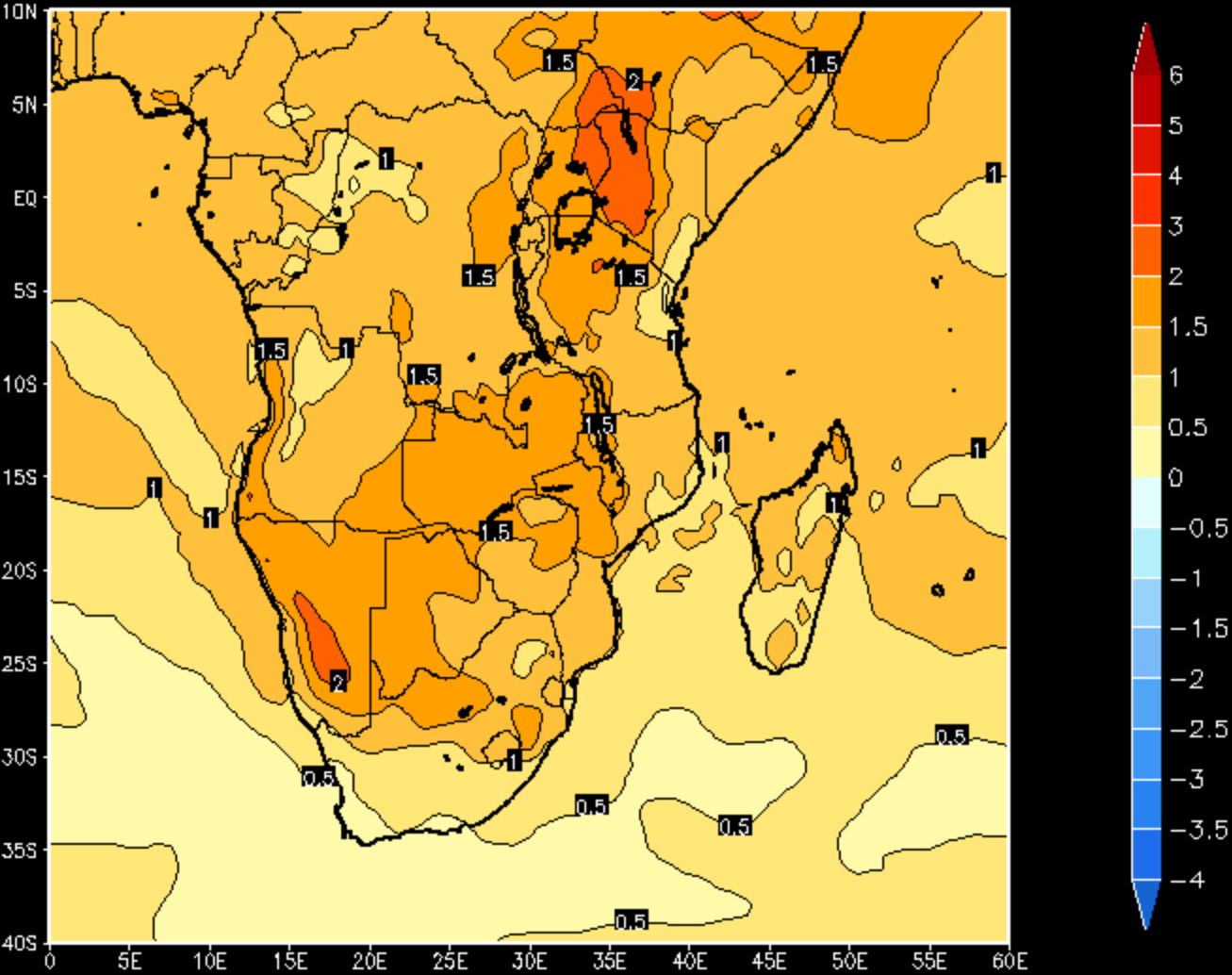
Temp anomaly 2024



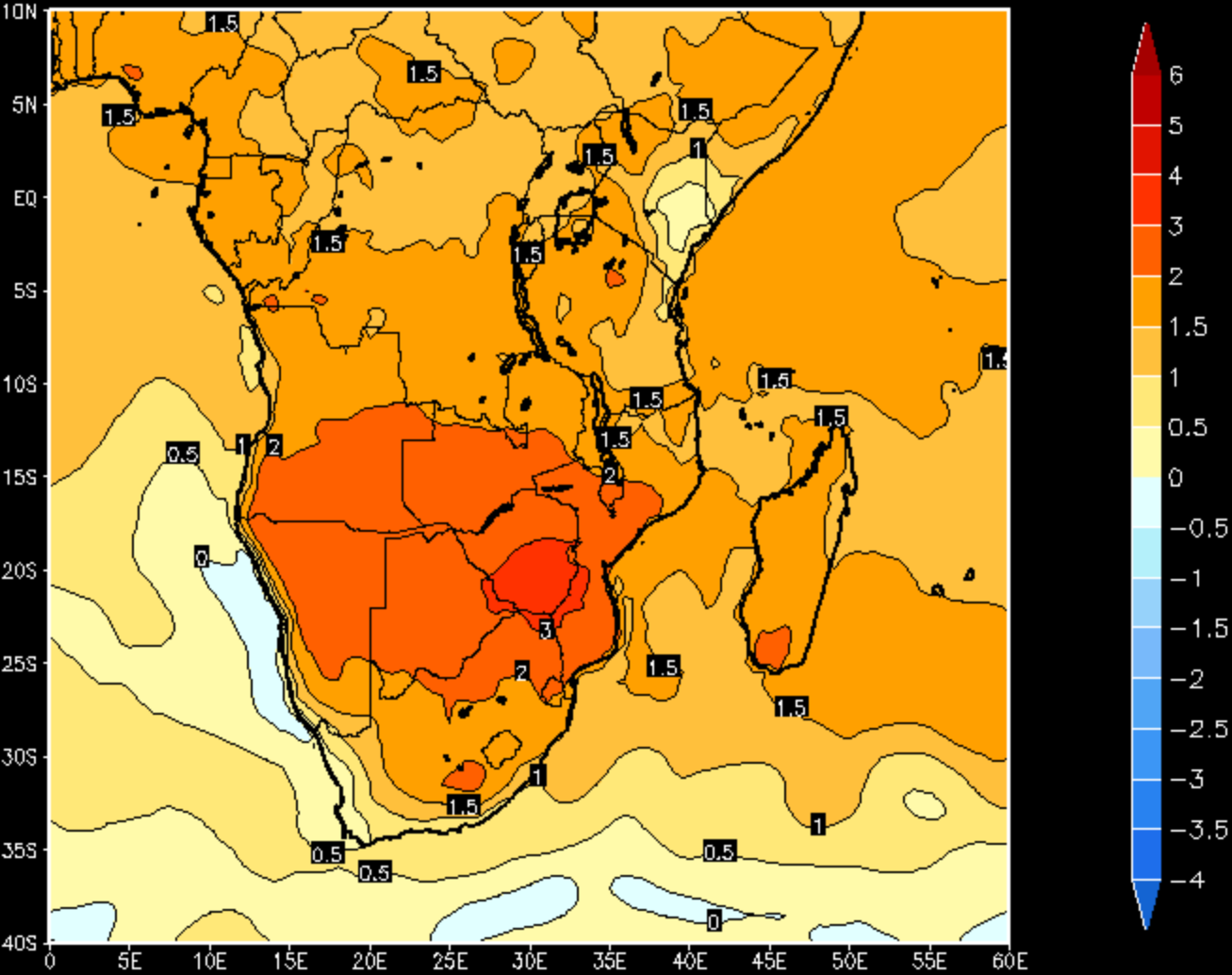
Temp anomaly 2025



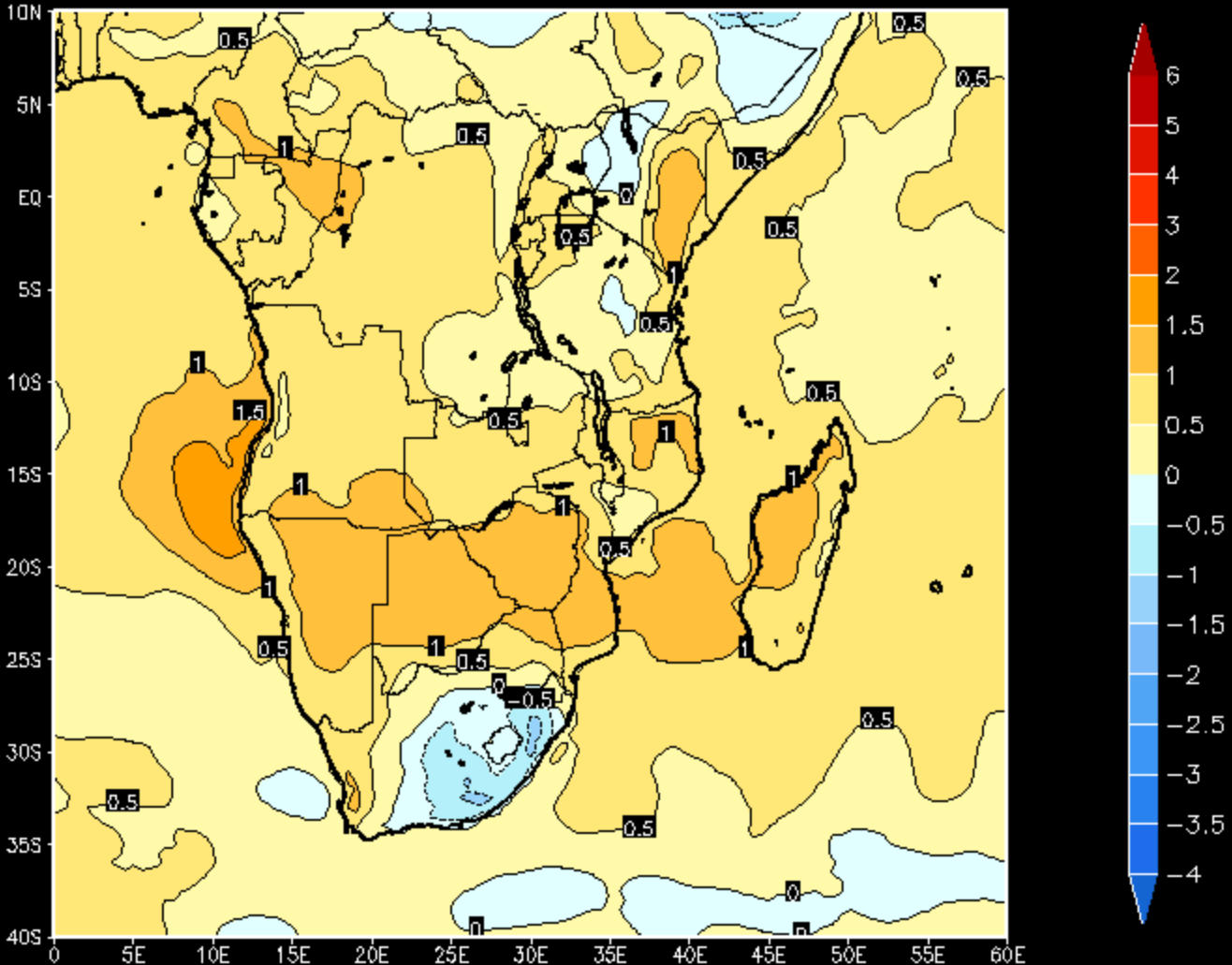
Temp anomaly 2026



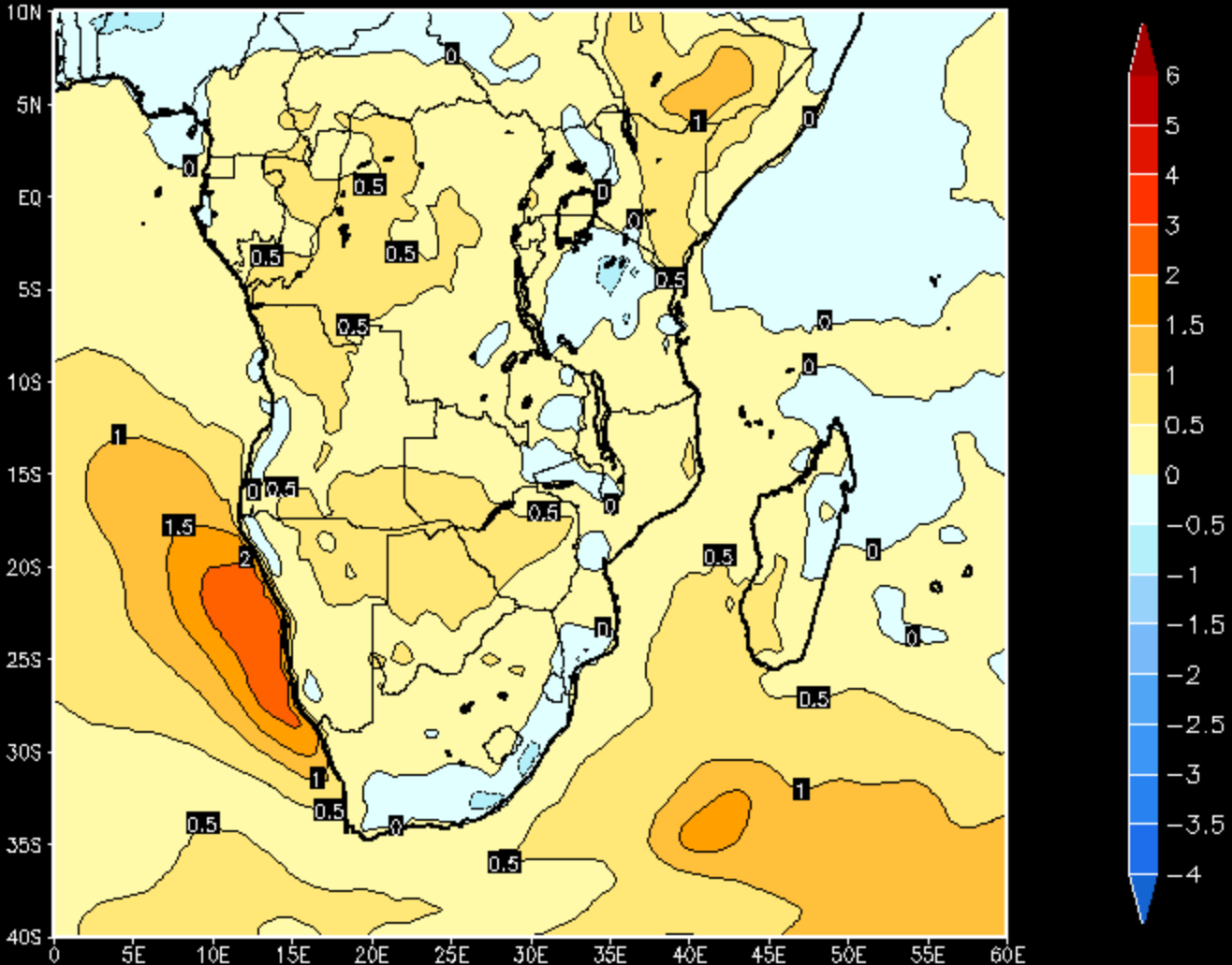
Temp anomaly 2027



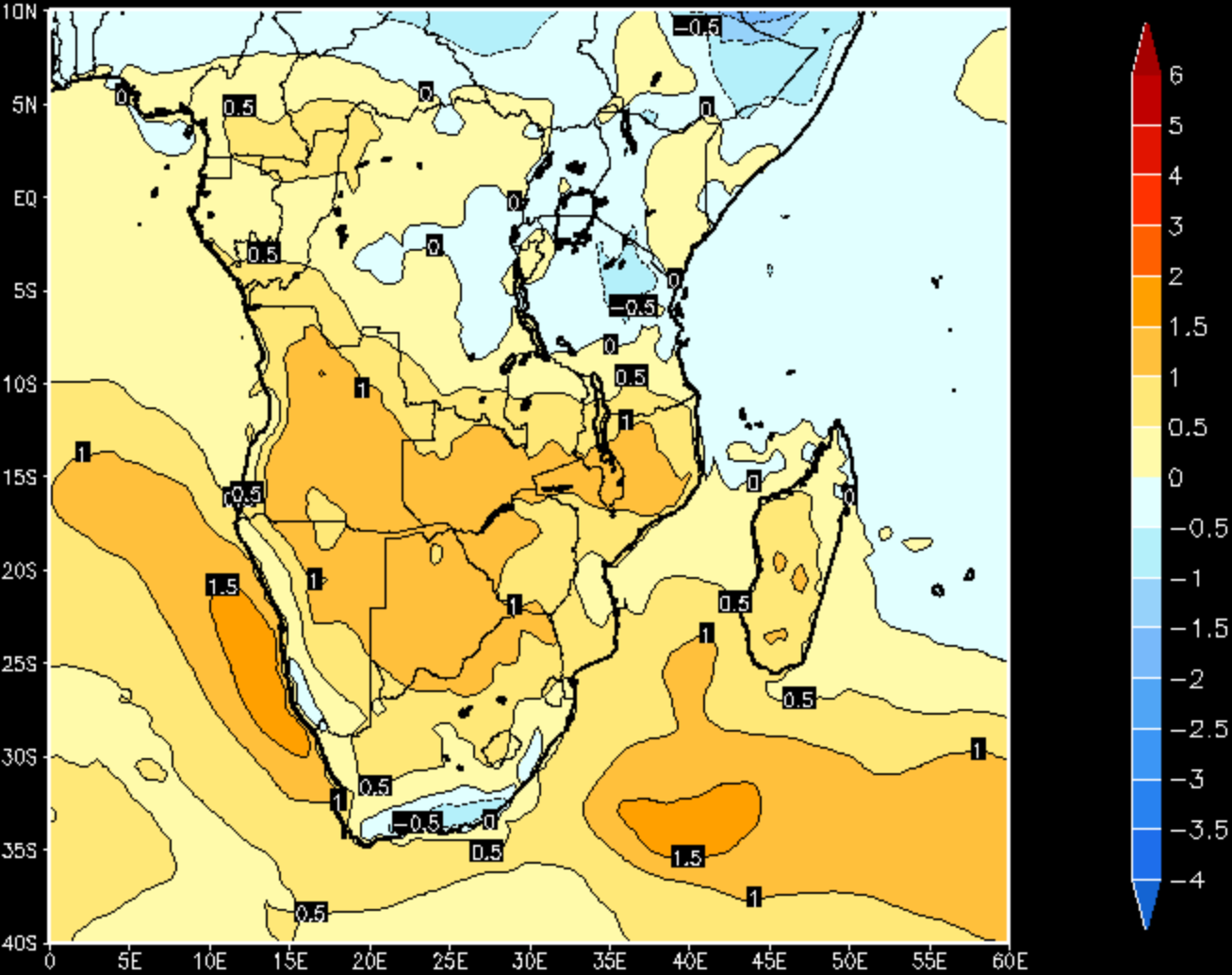
Temp anomaly 2028



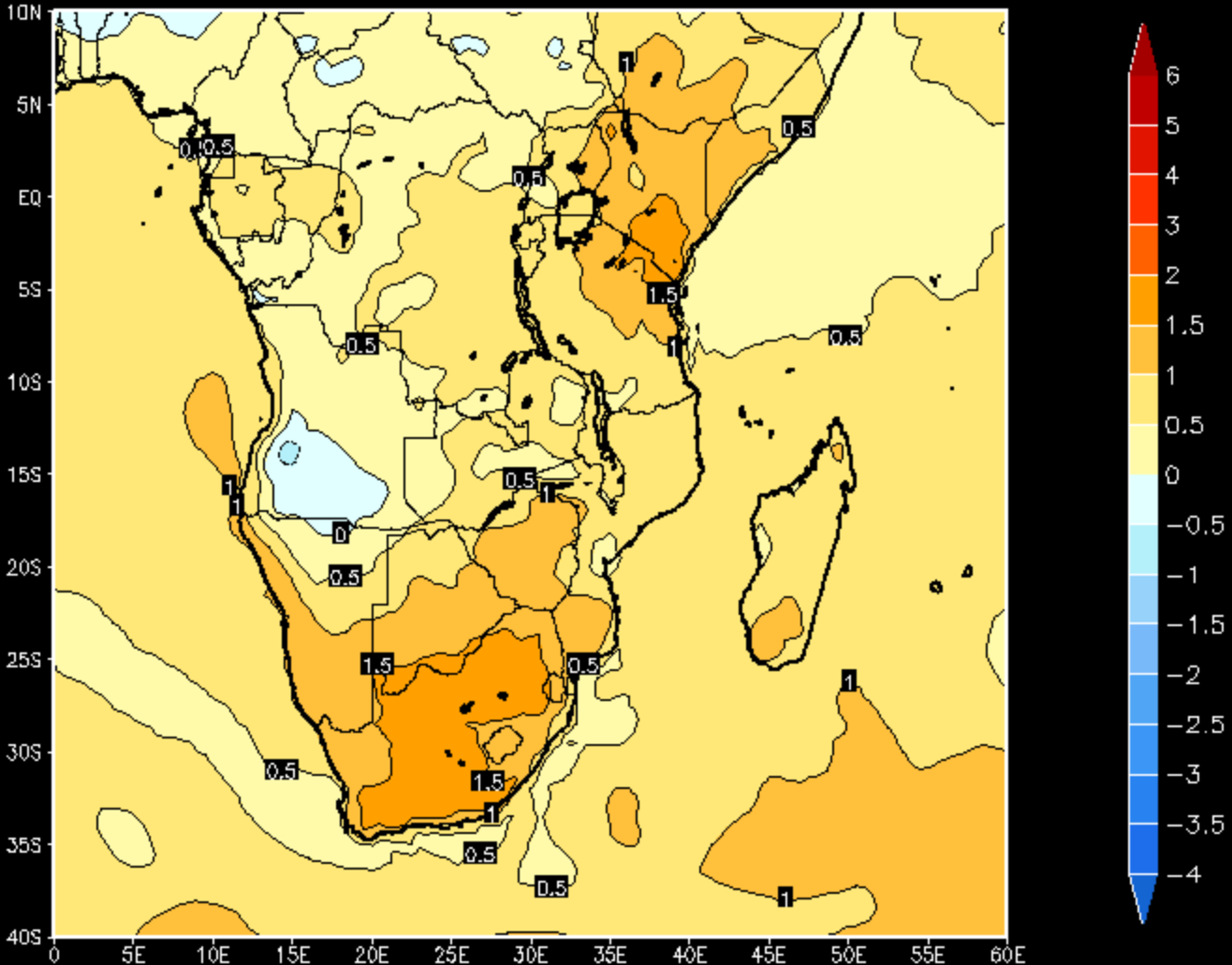
Temp anomaly 2030



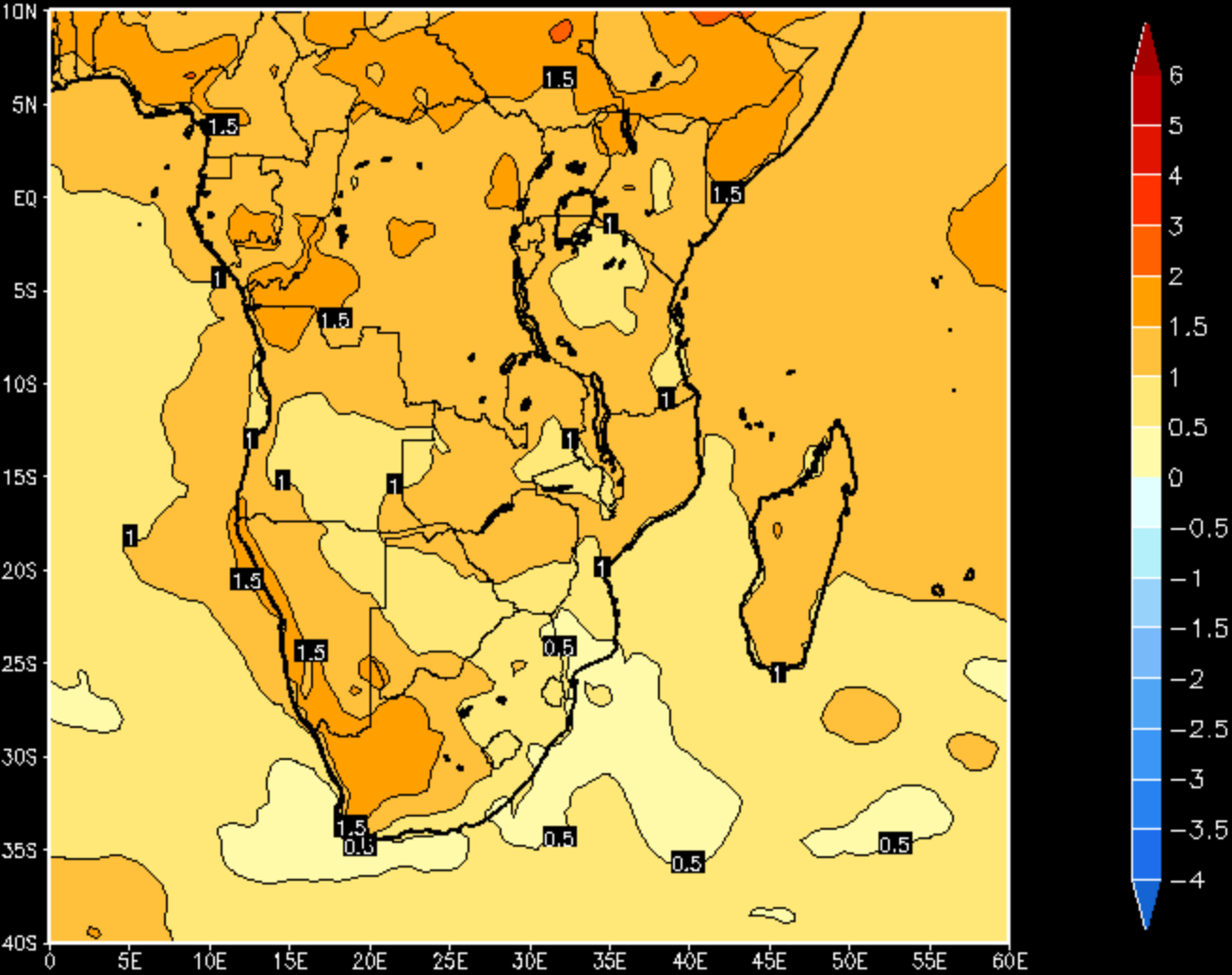
Temp anomaly 2031



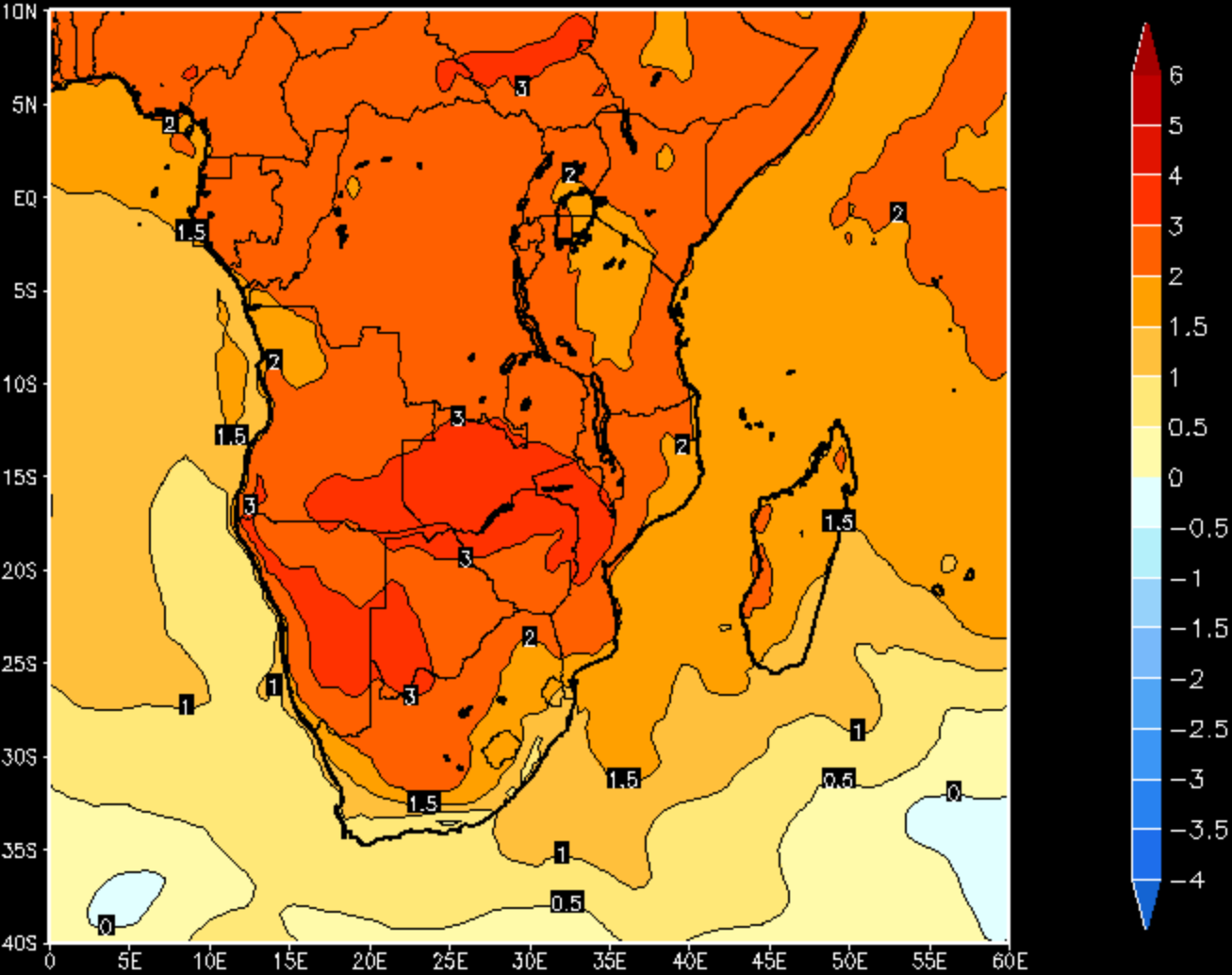
Temp anomaly 2032



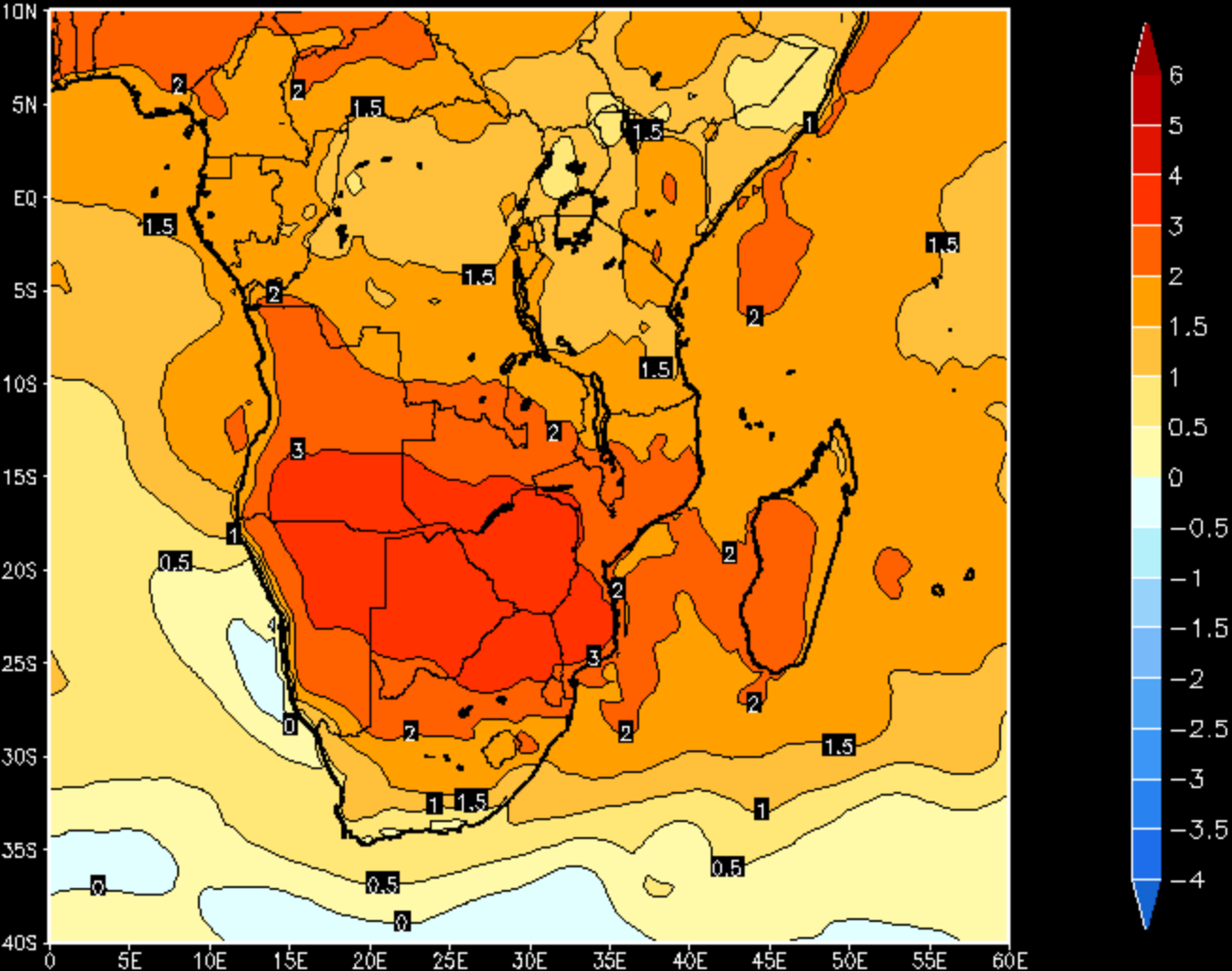
Temp anomaly 2033



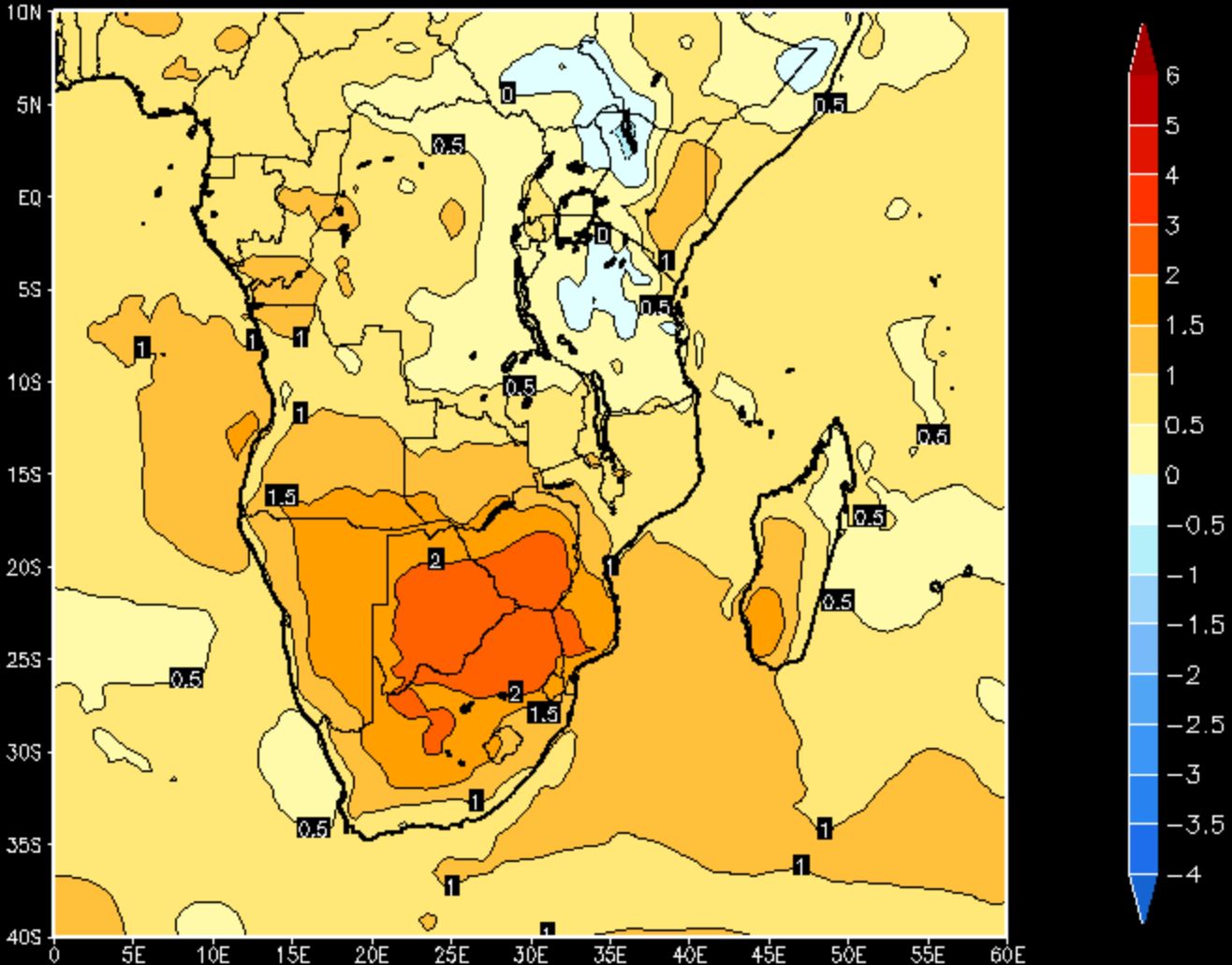
Temp anomaly 2034



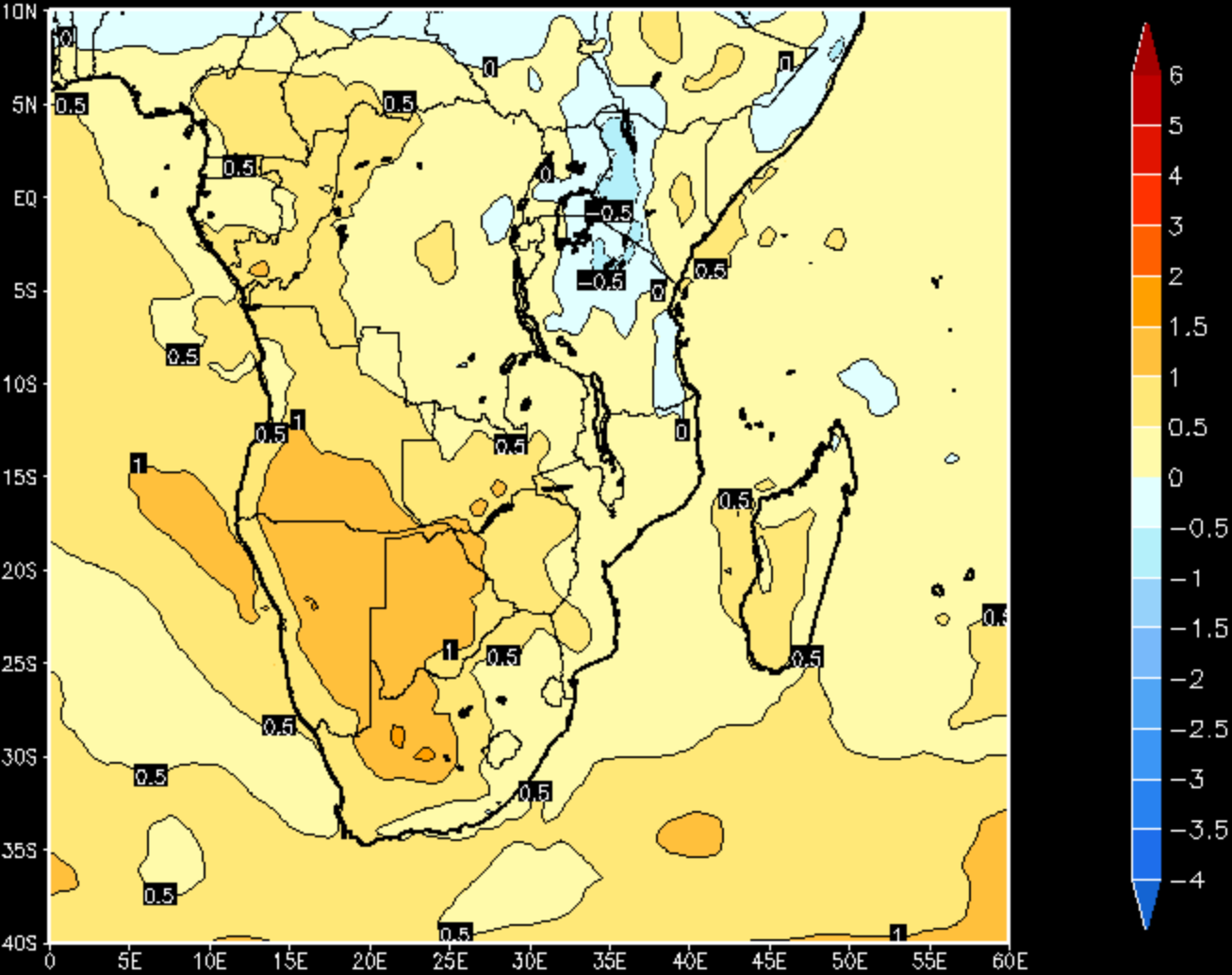
Temp anomaly 2035



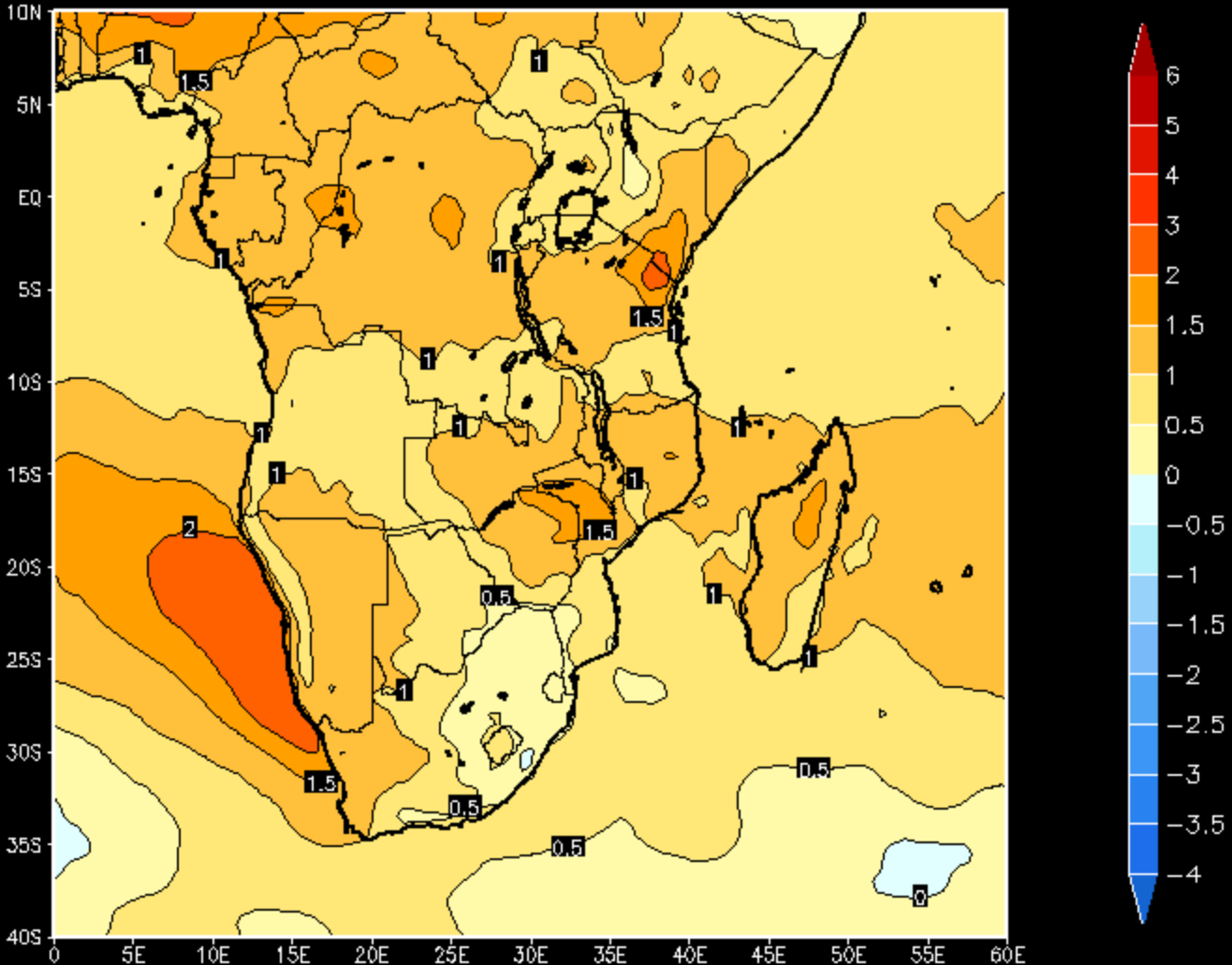
Temp anomaly 2036



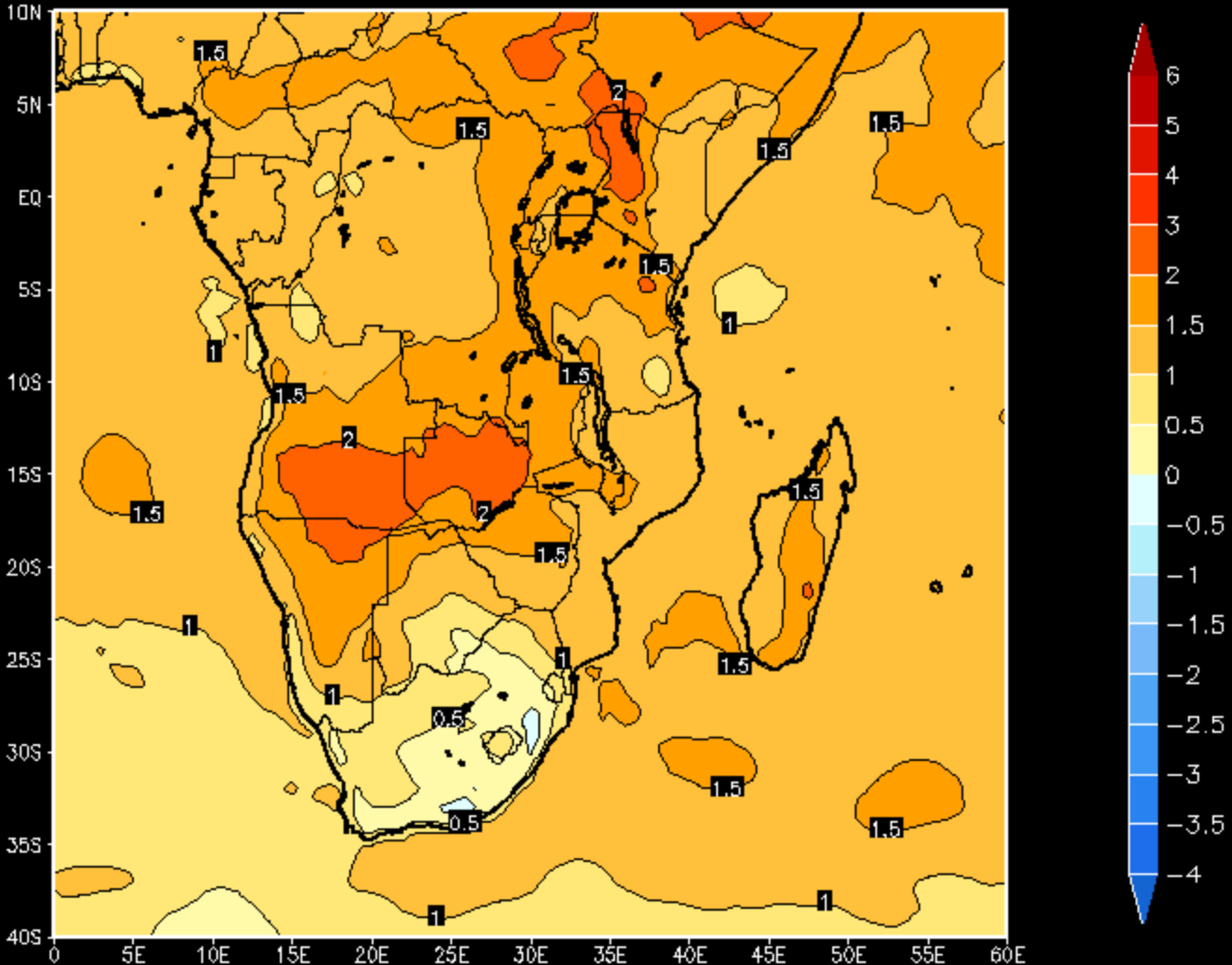
Temp anomaly 2037



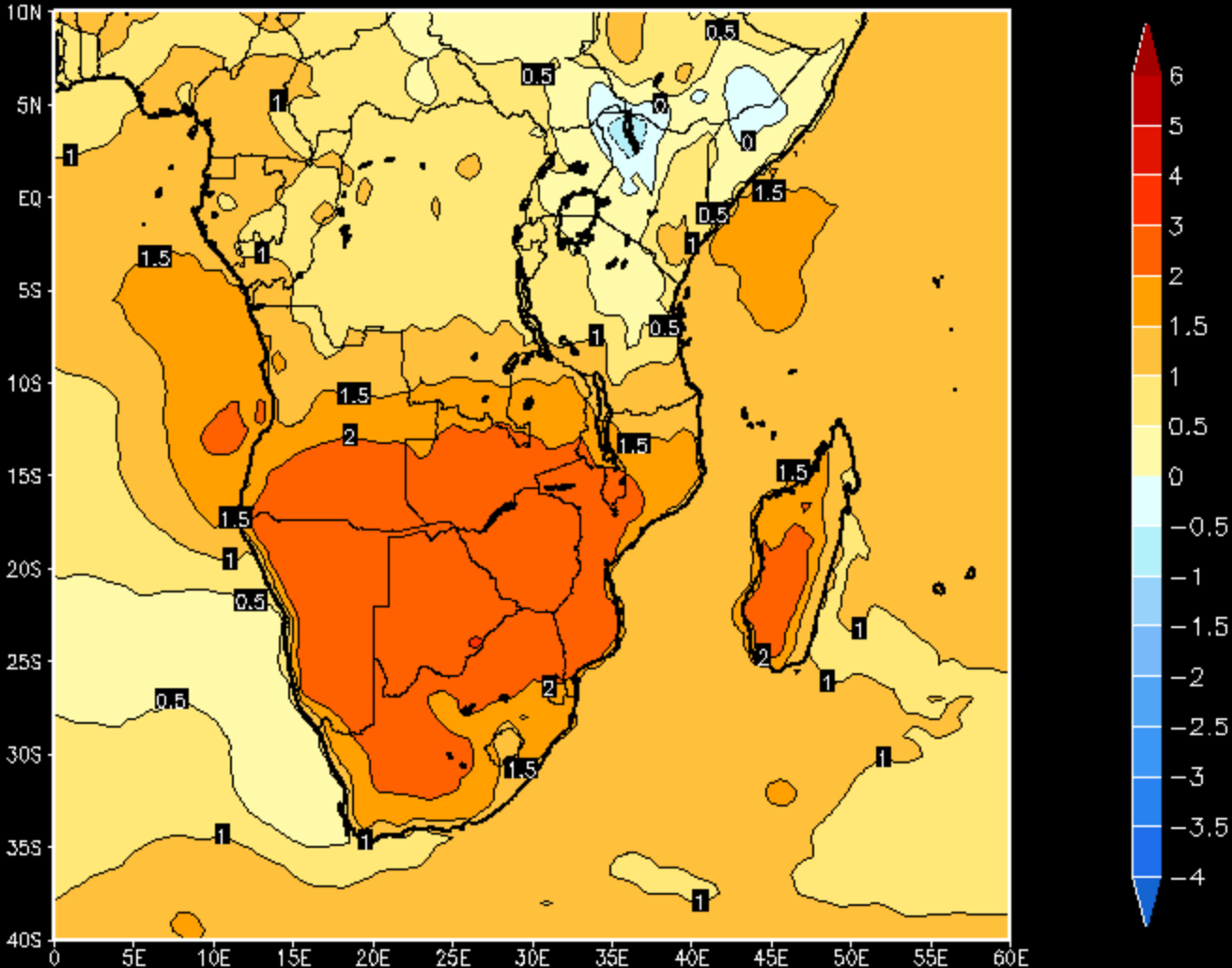
Temp anomaly 2038



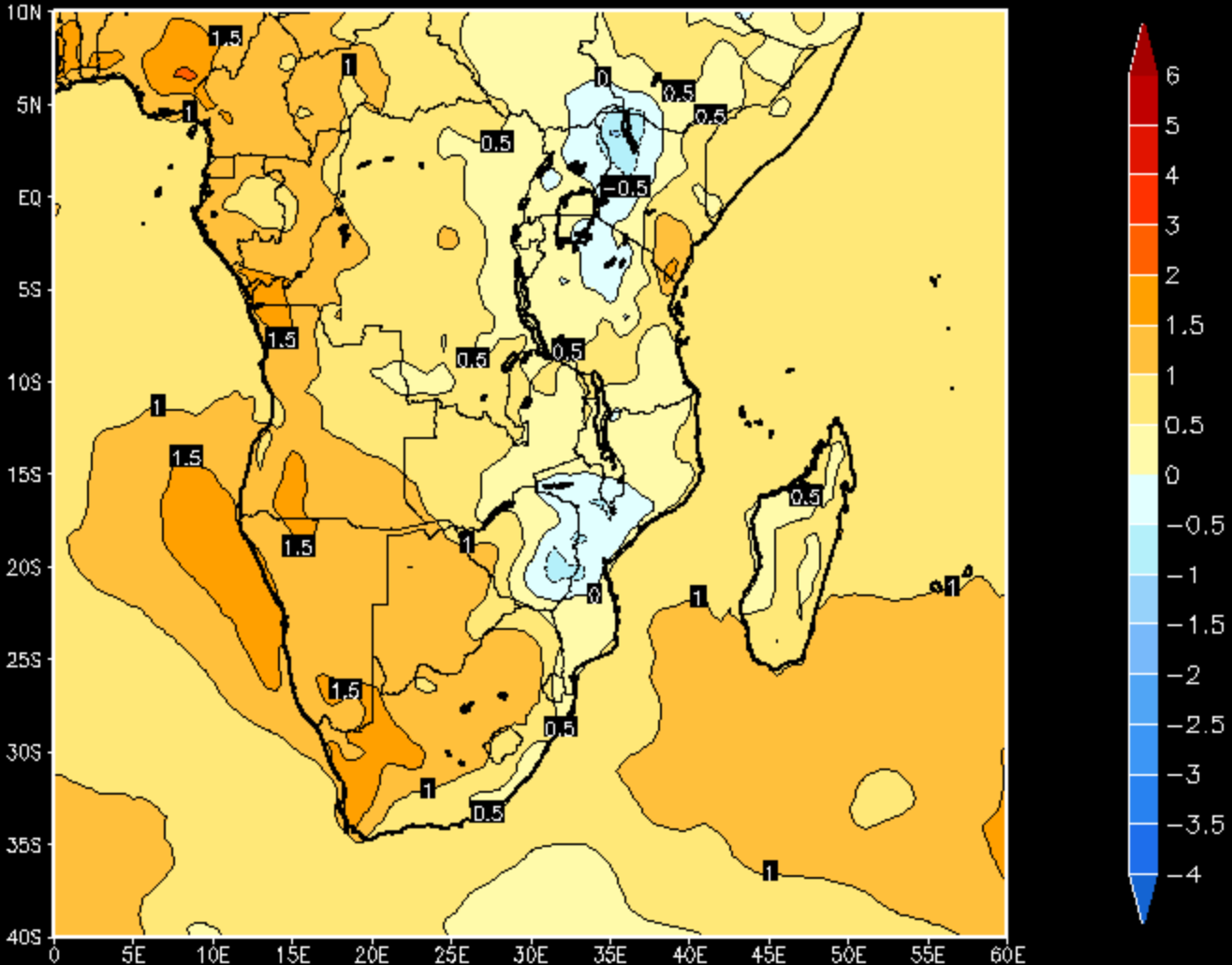
Temp anomaly 2039



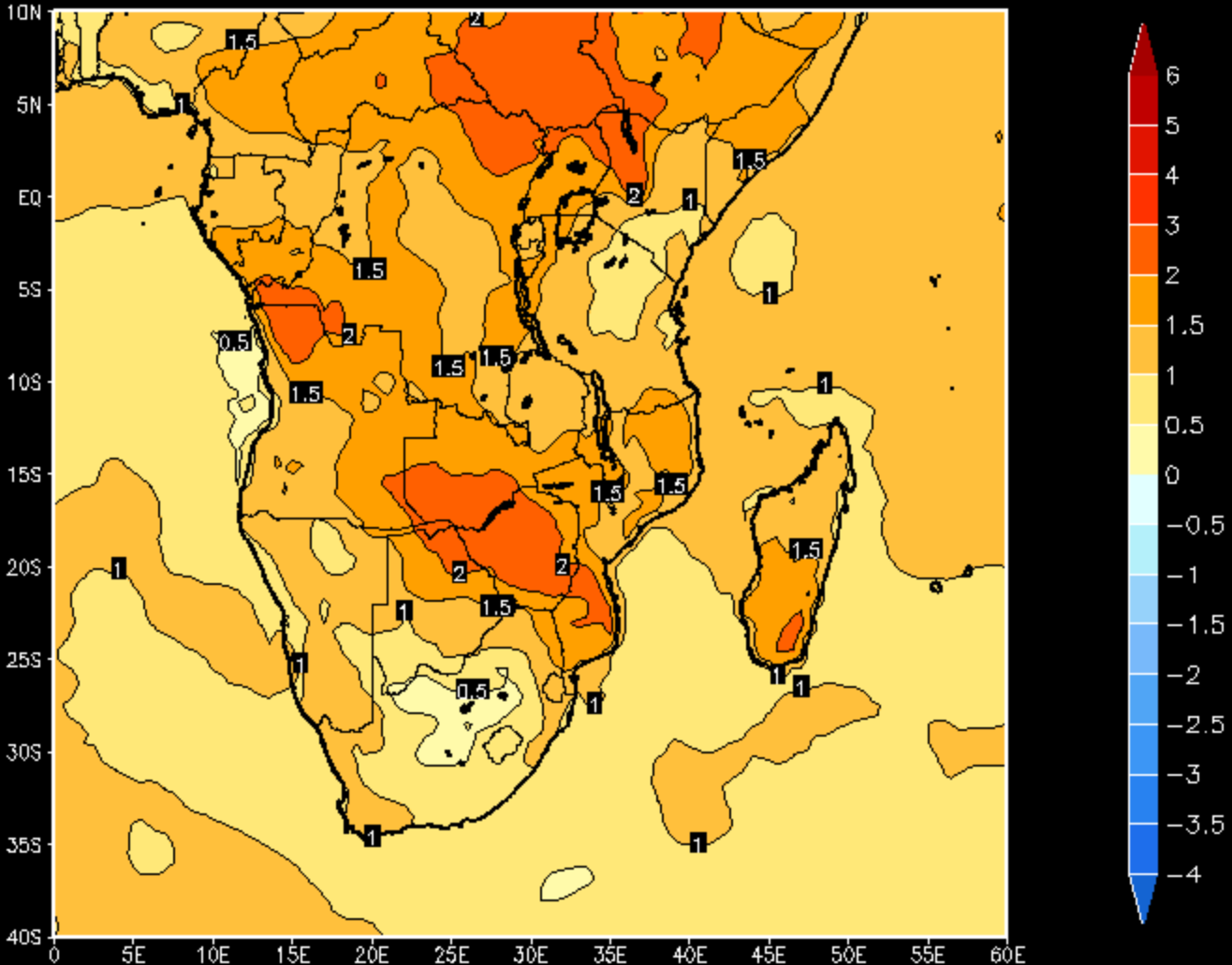
Temp anomaly 2041



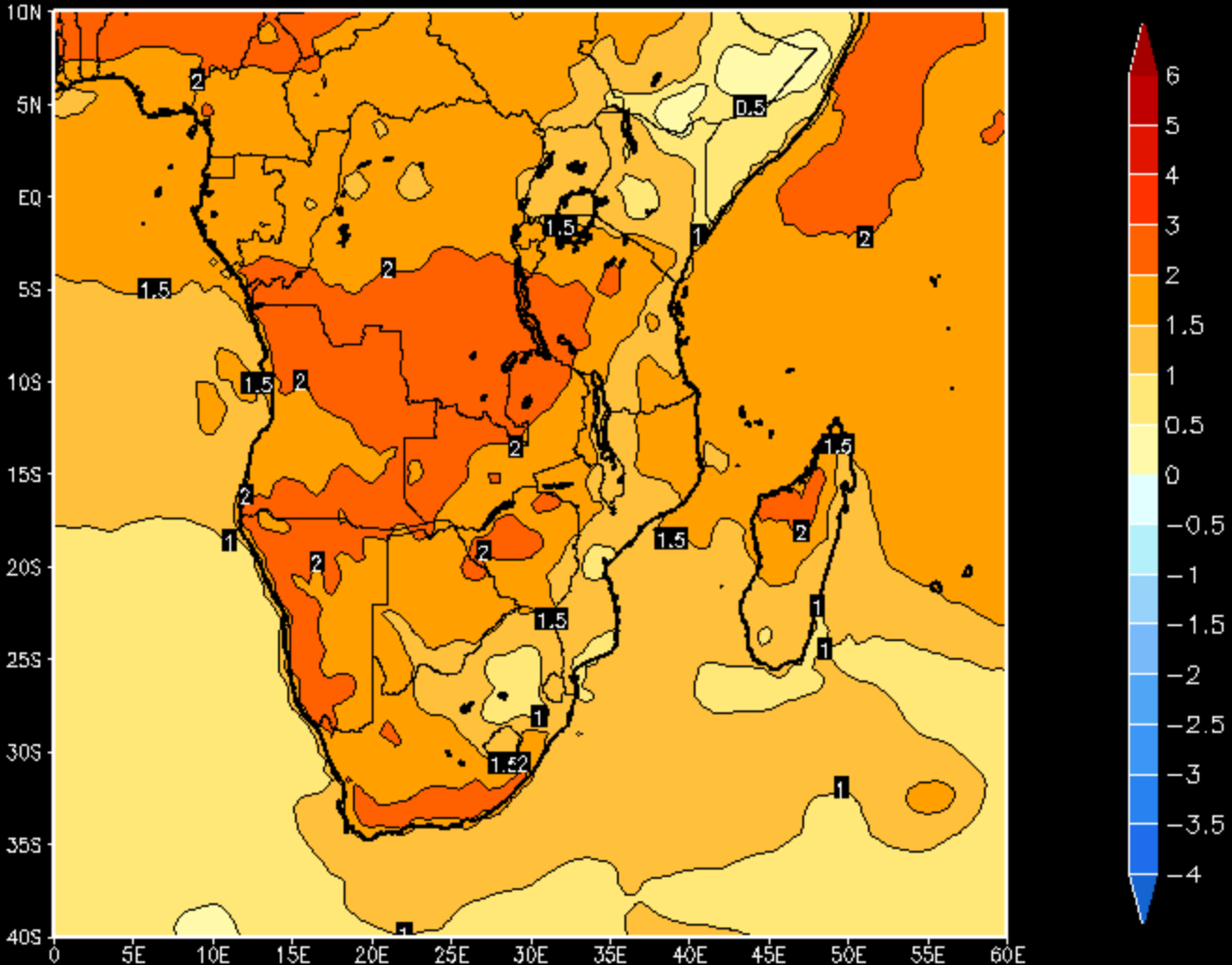
Temp anomaly 2042



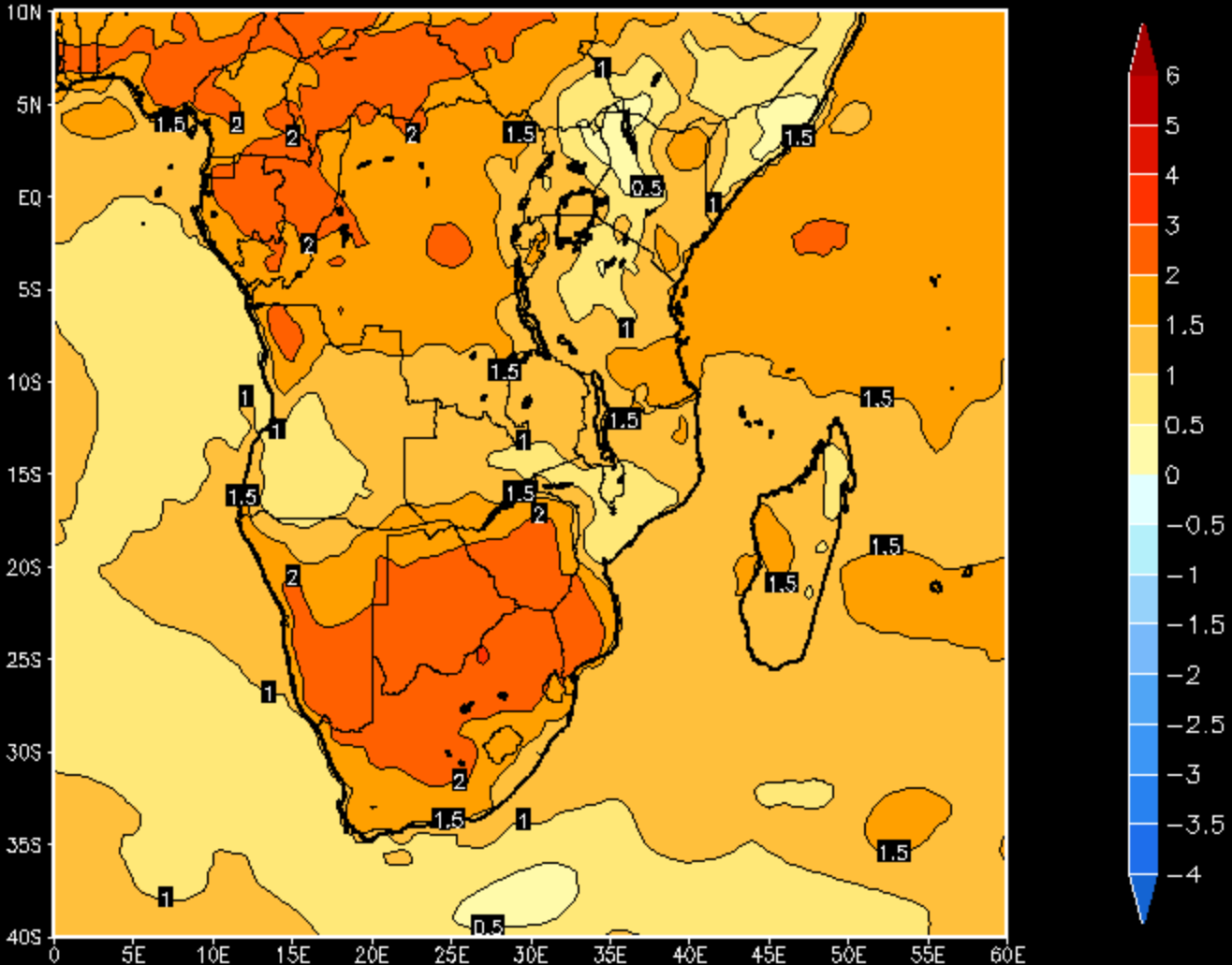
Temp anomaly 2043



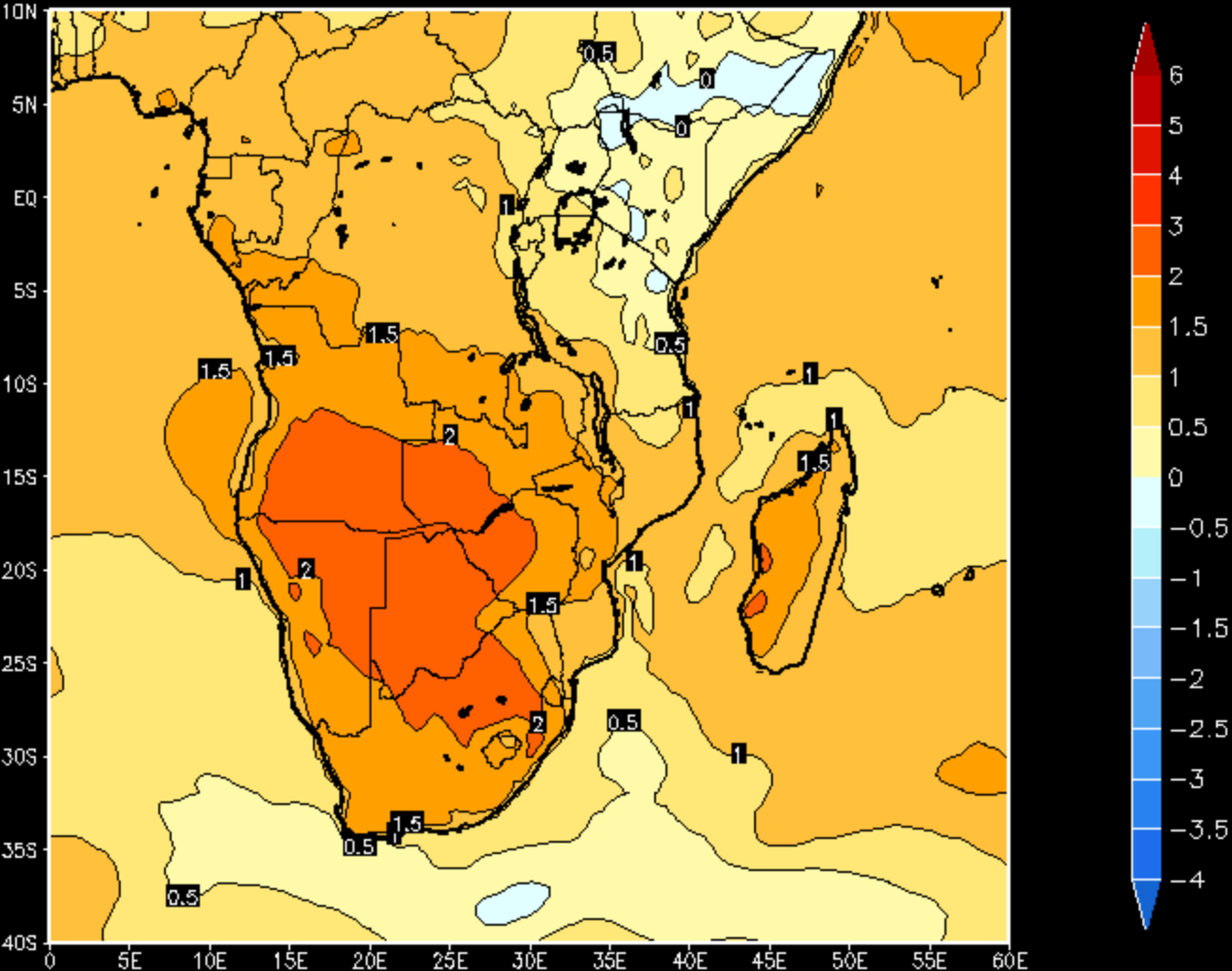
Temp anomaly 2044



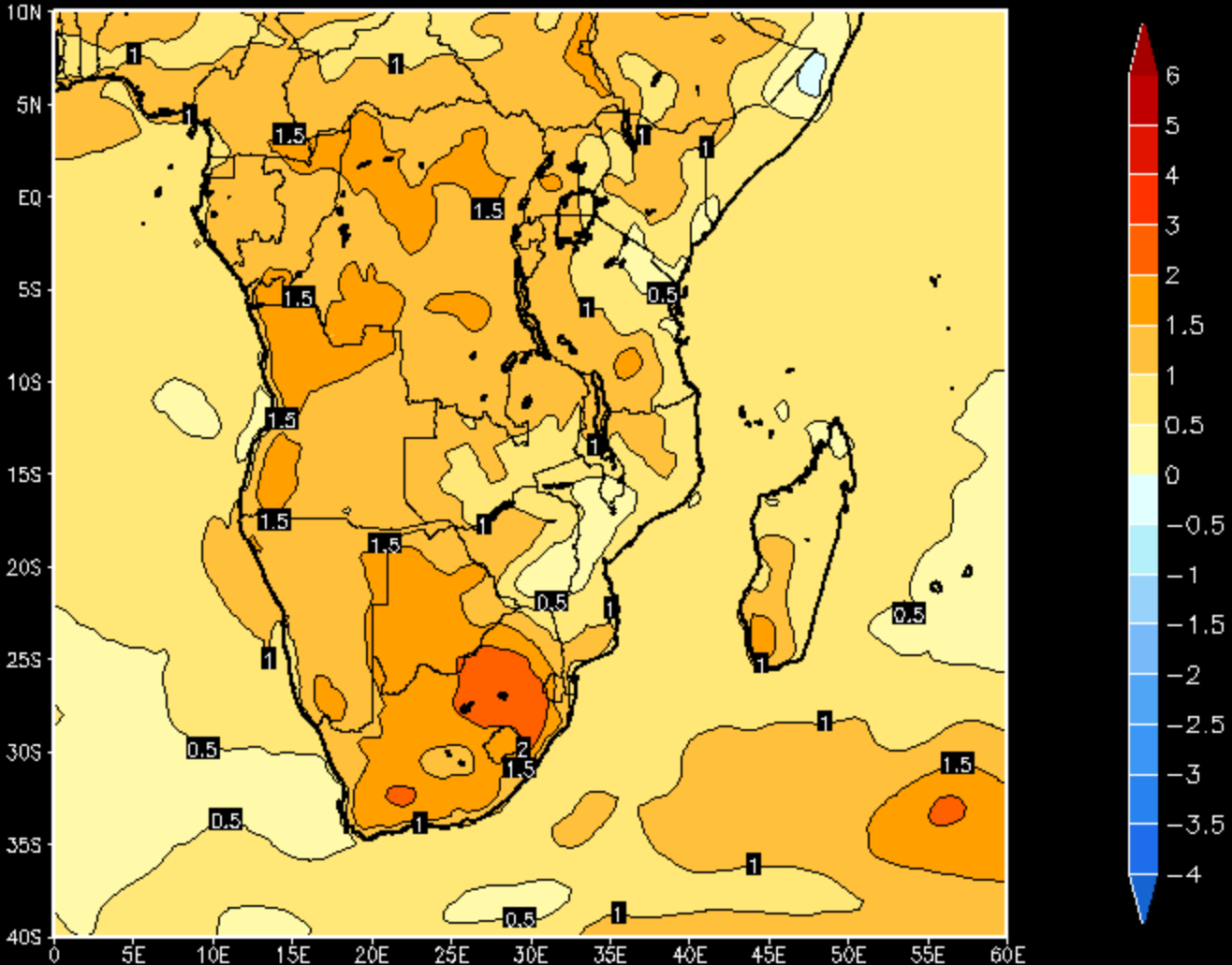
Temp anomaly 2045



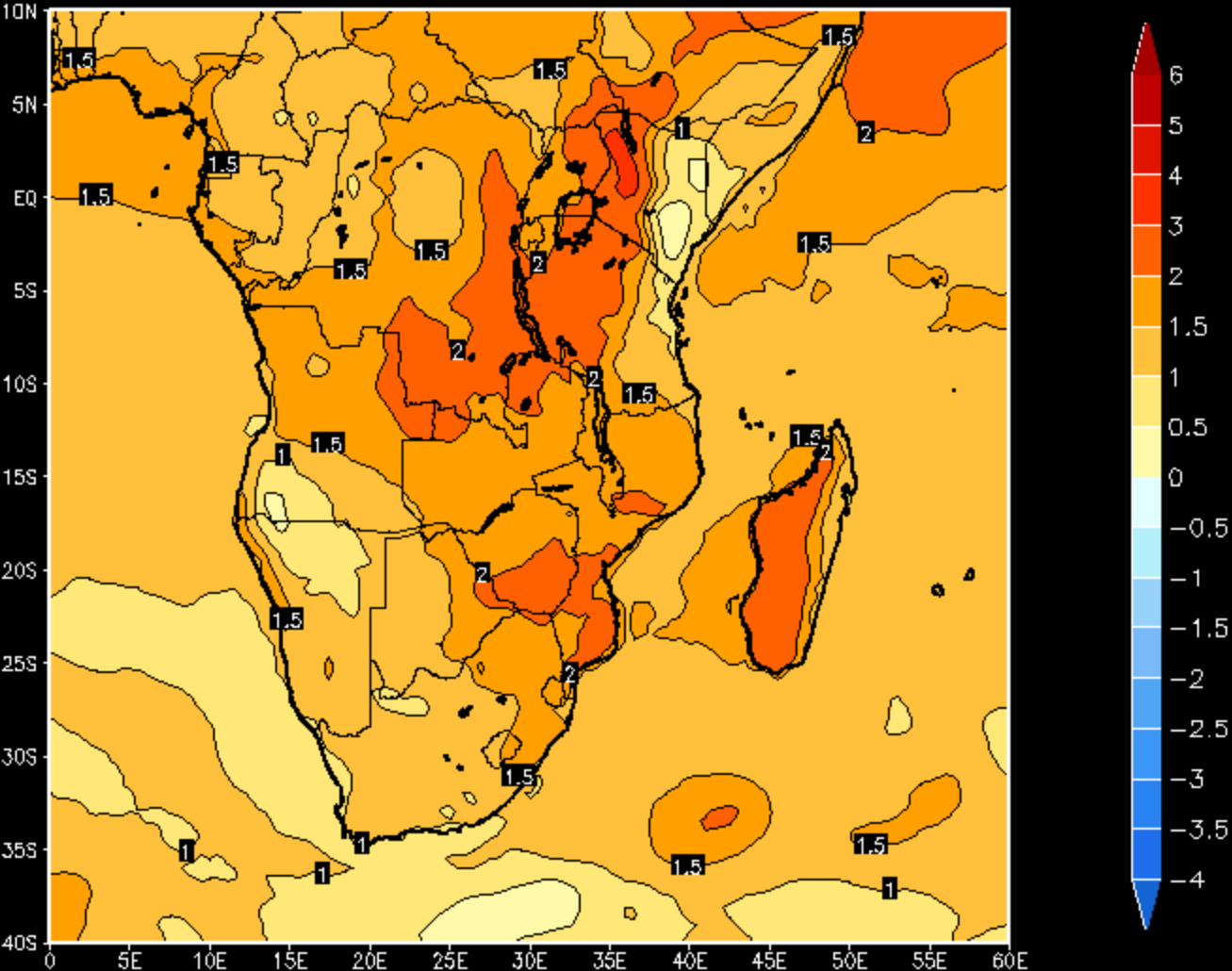
Temp anomaly 2047



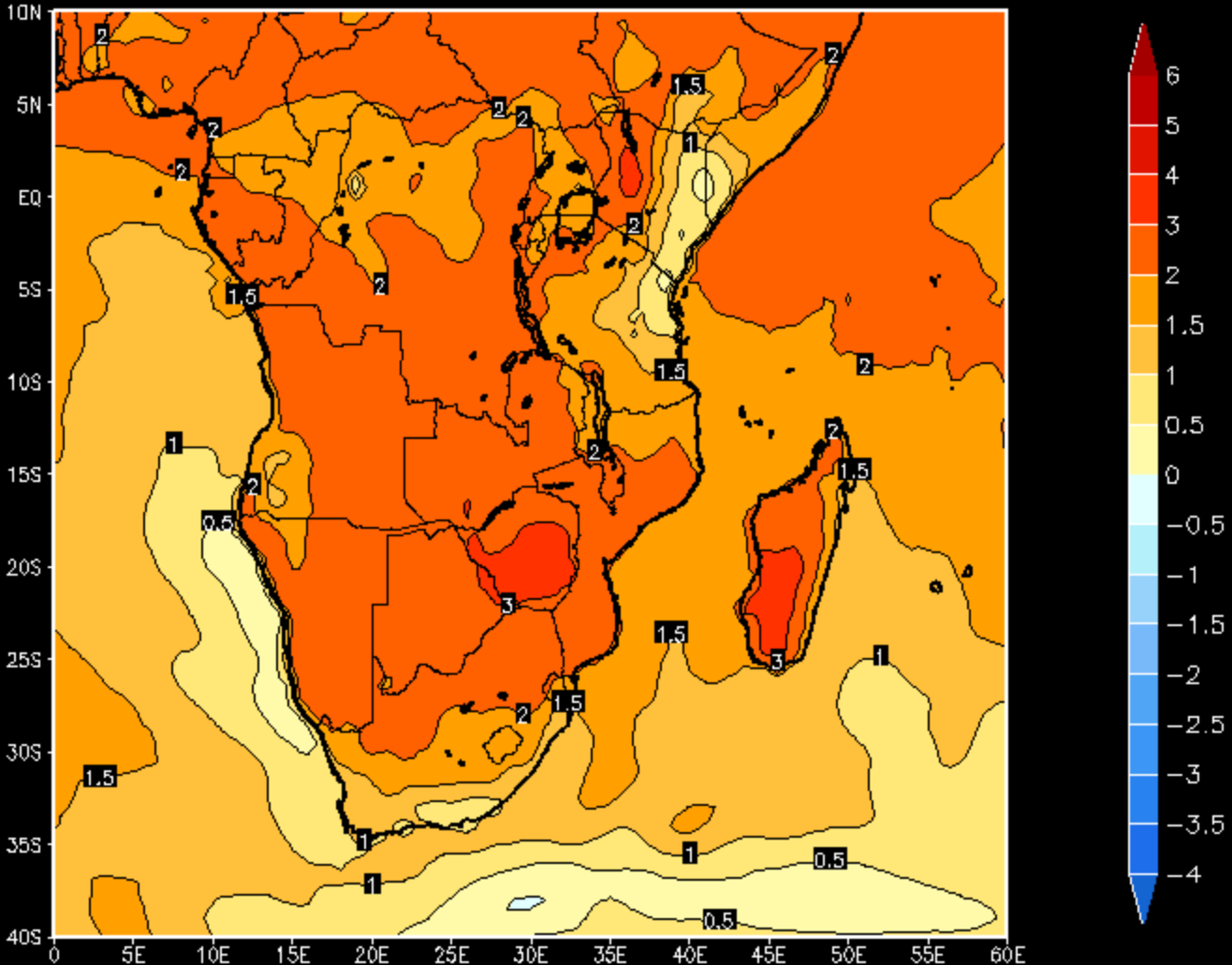
Temp anomaly 2048



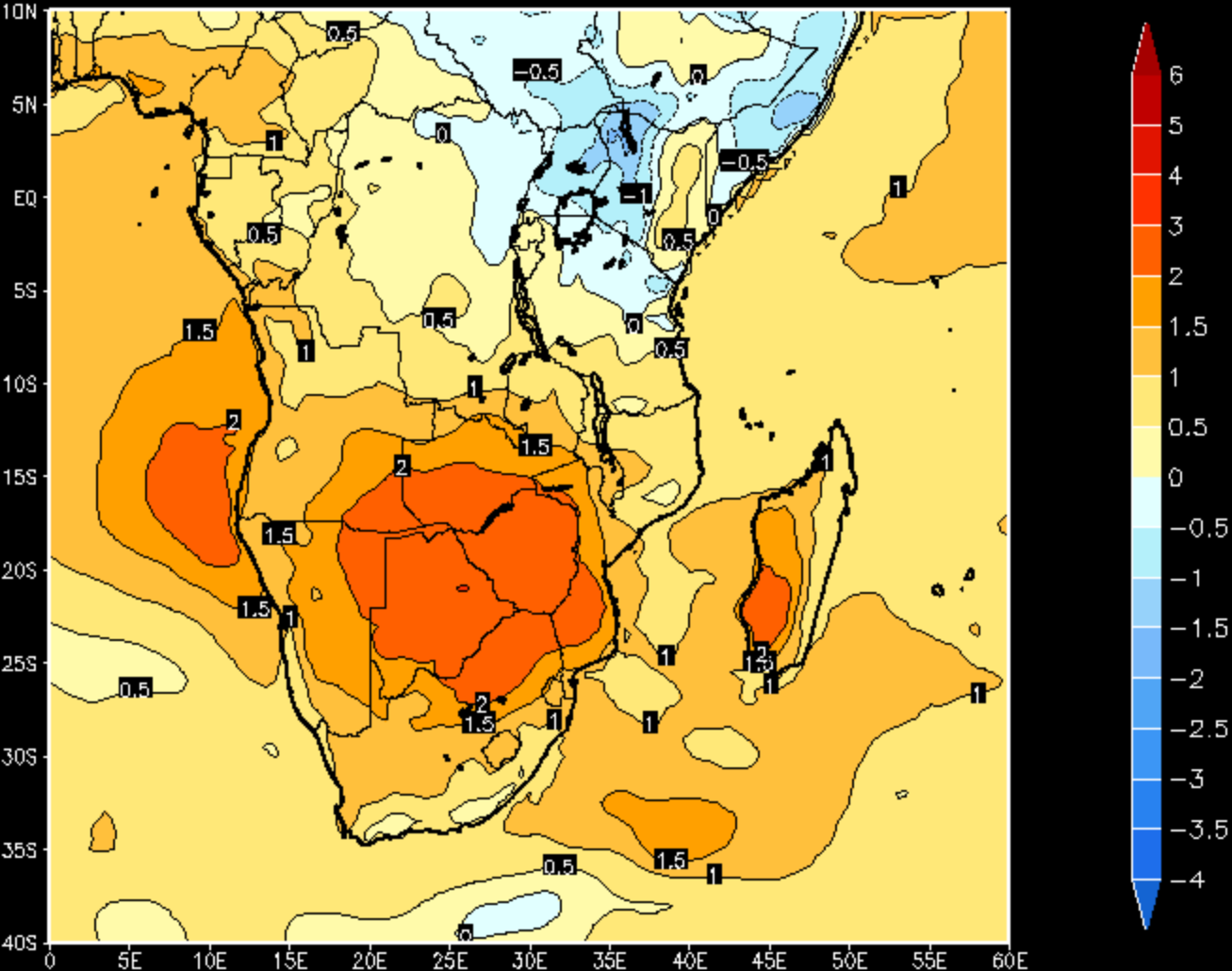
Temp anomaly 2049



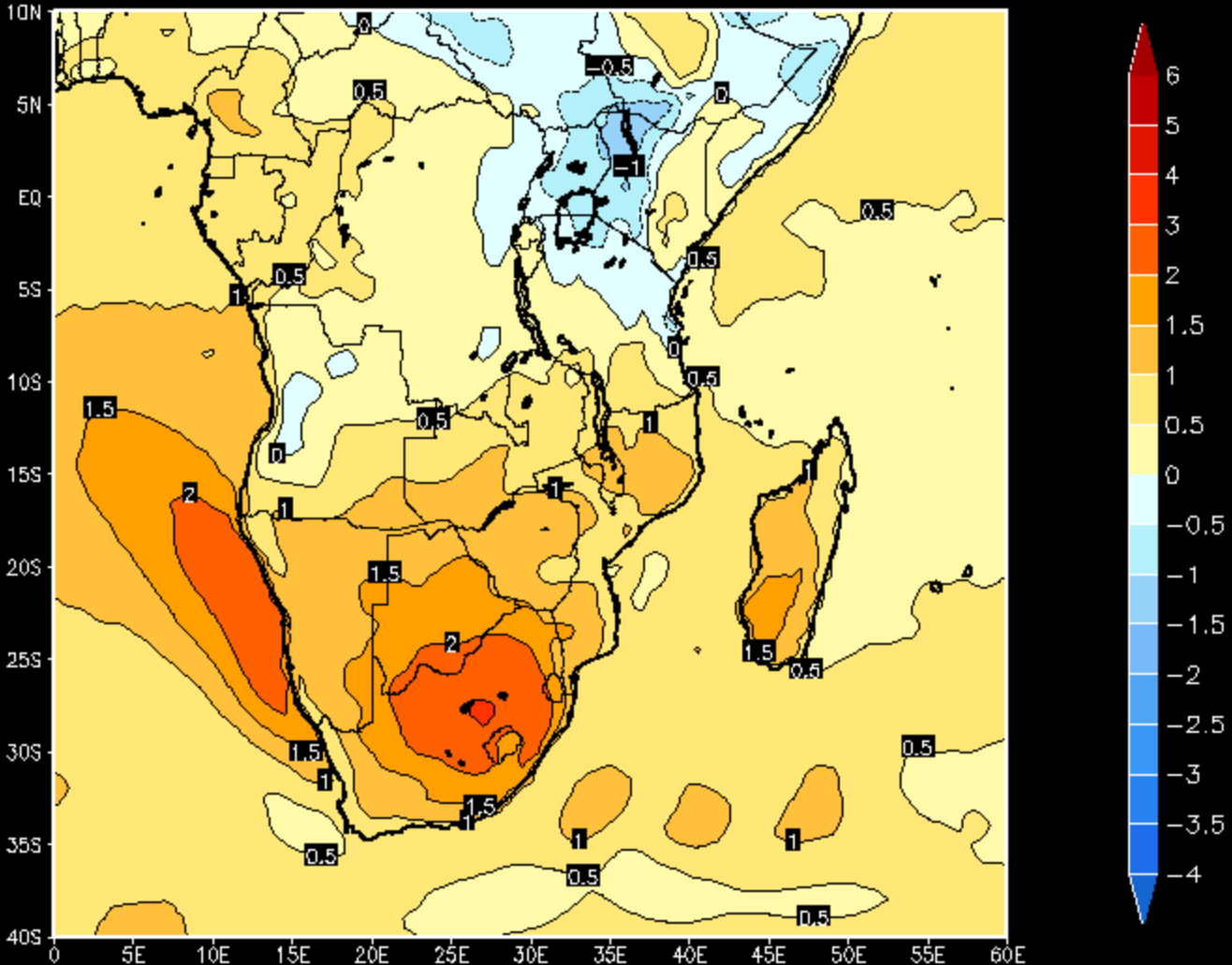
Temp anomaly 2050



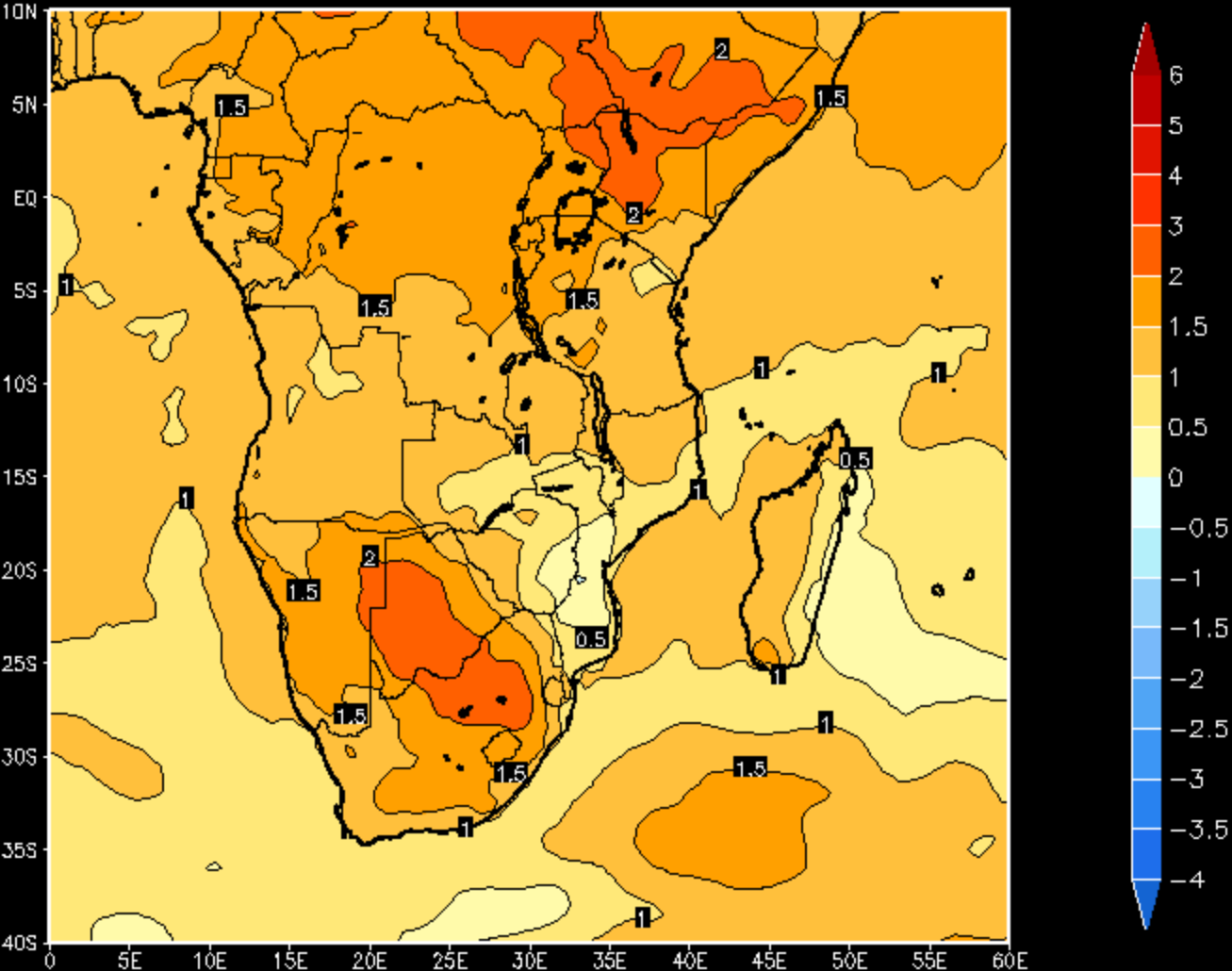
Temp anomaly 2051



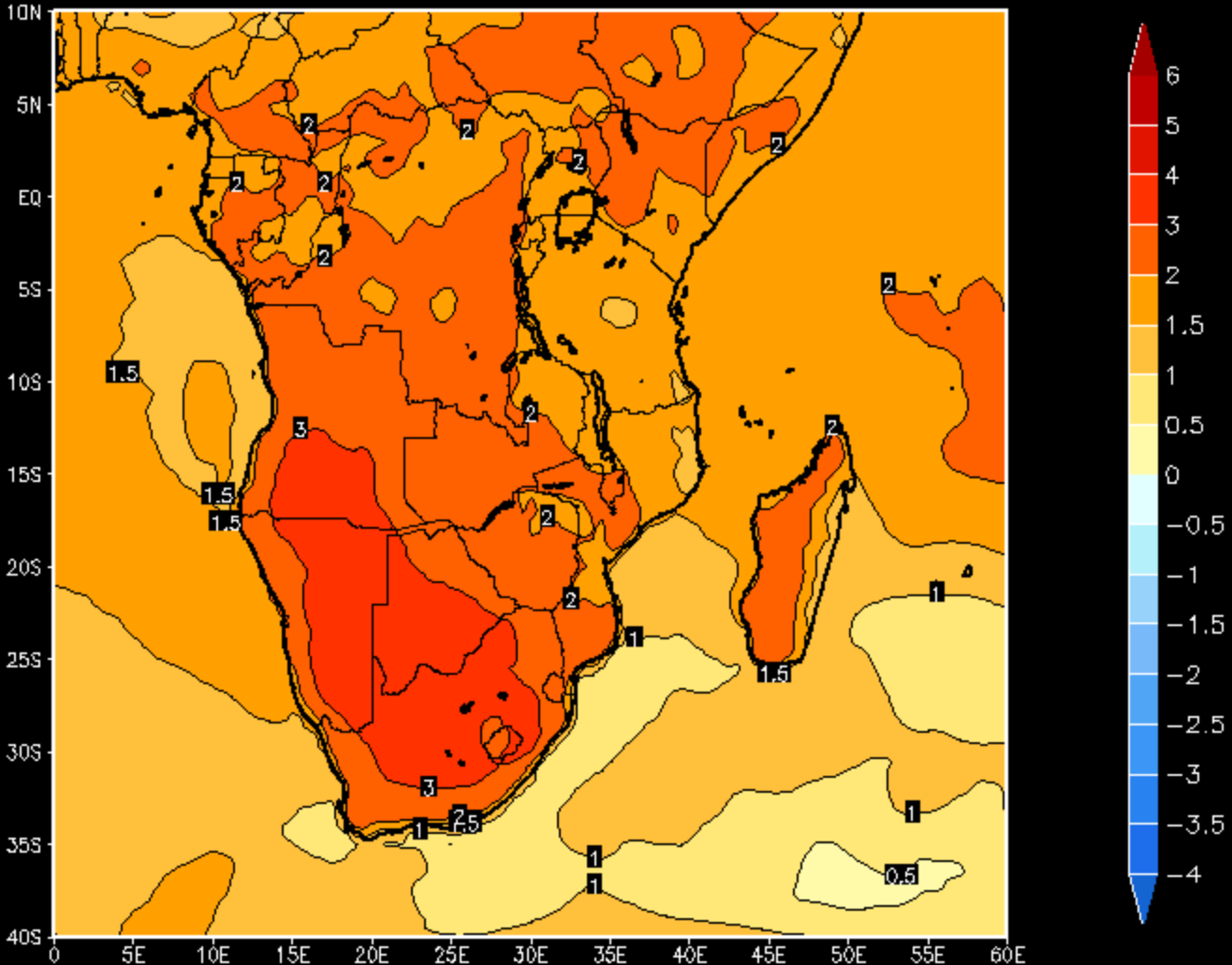
Temp anomaly 2052



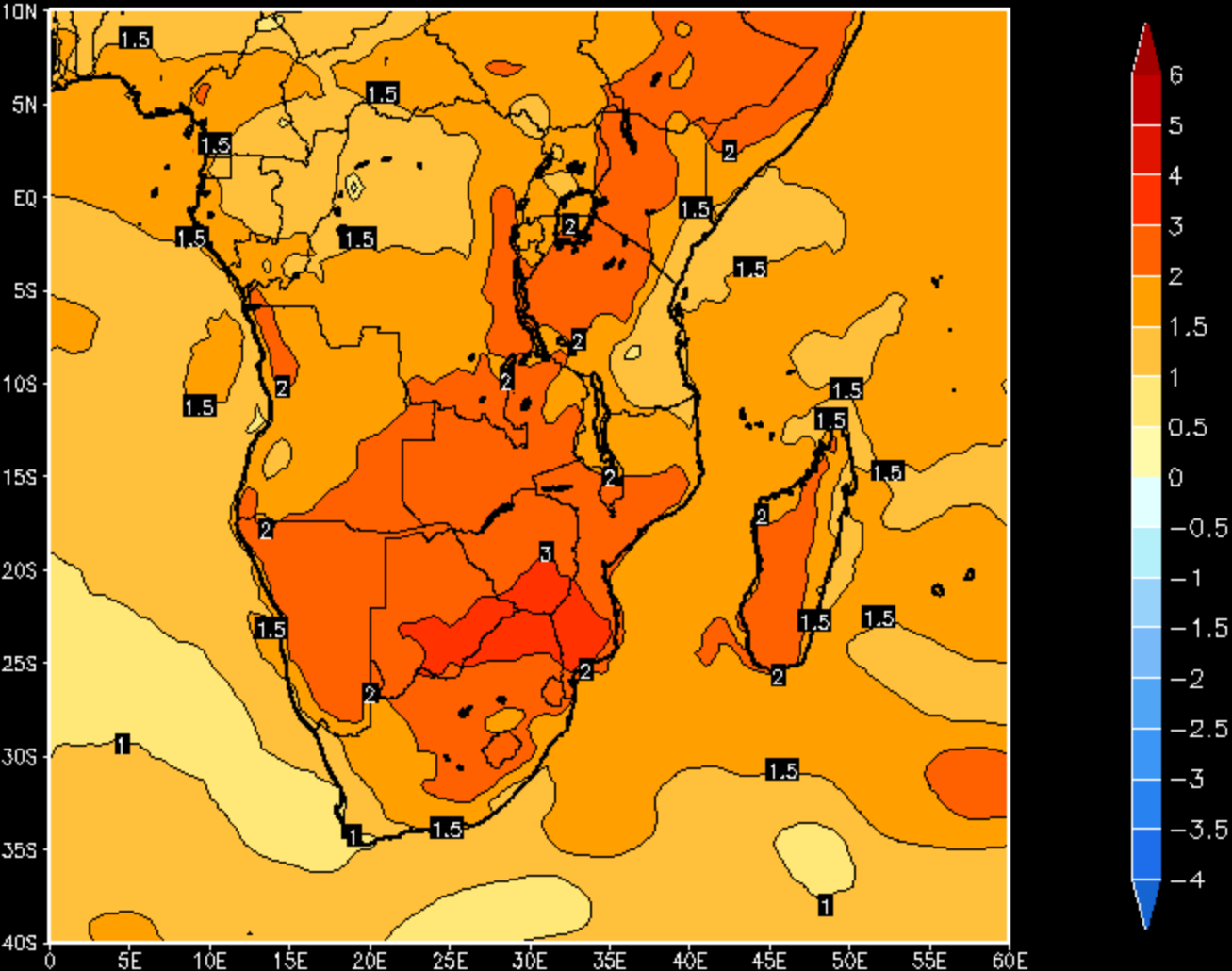
Temp anomaly 2053



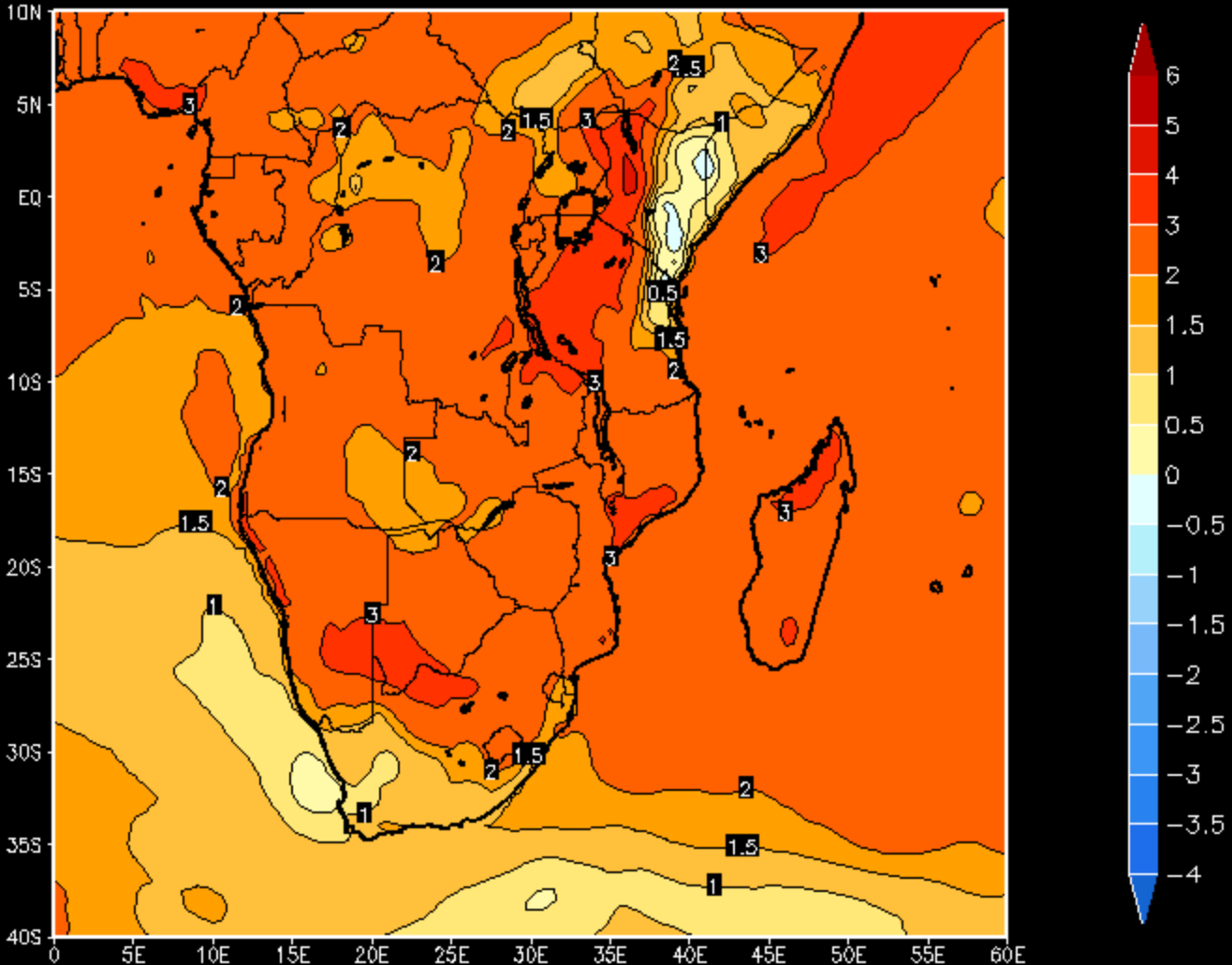
Temp anomaly 2054



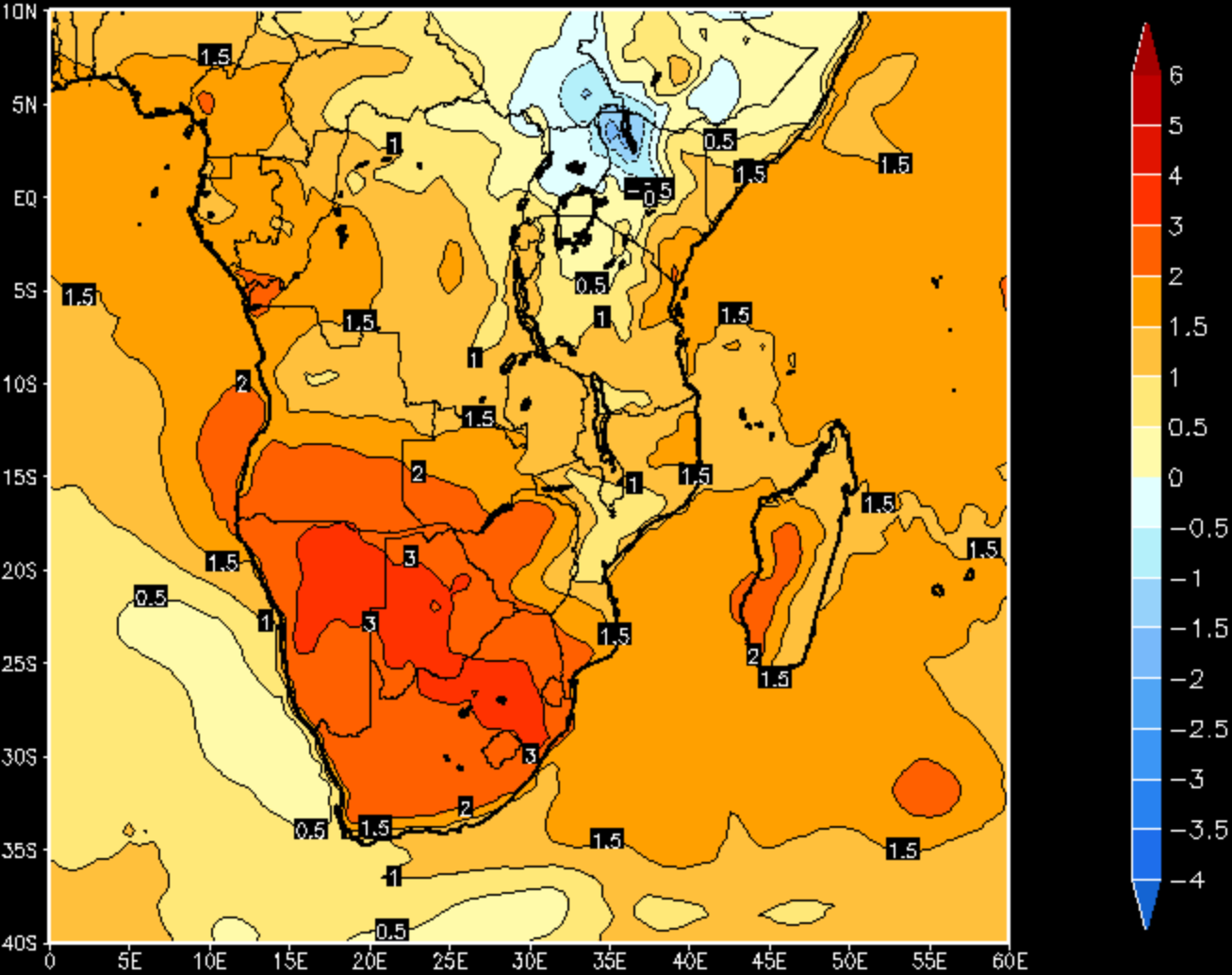
Temp anomaly 2056



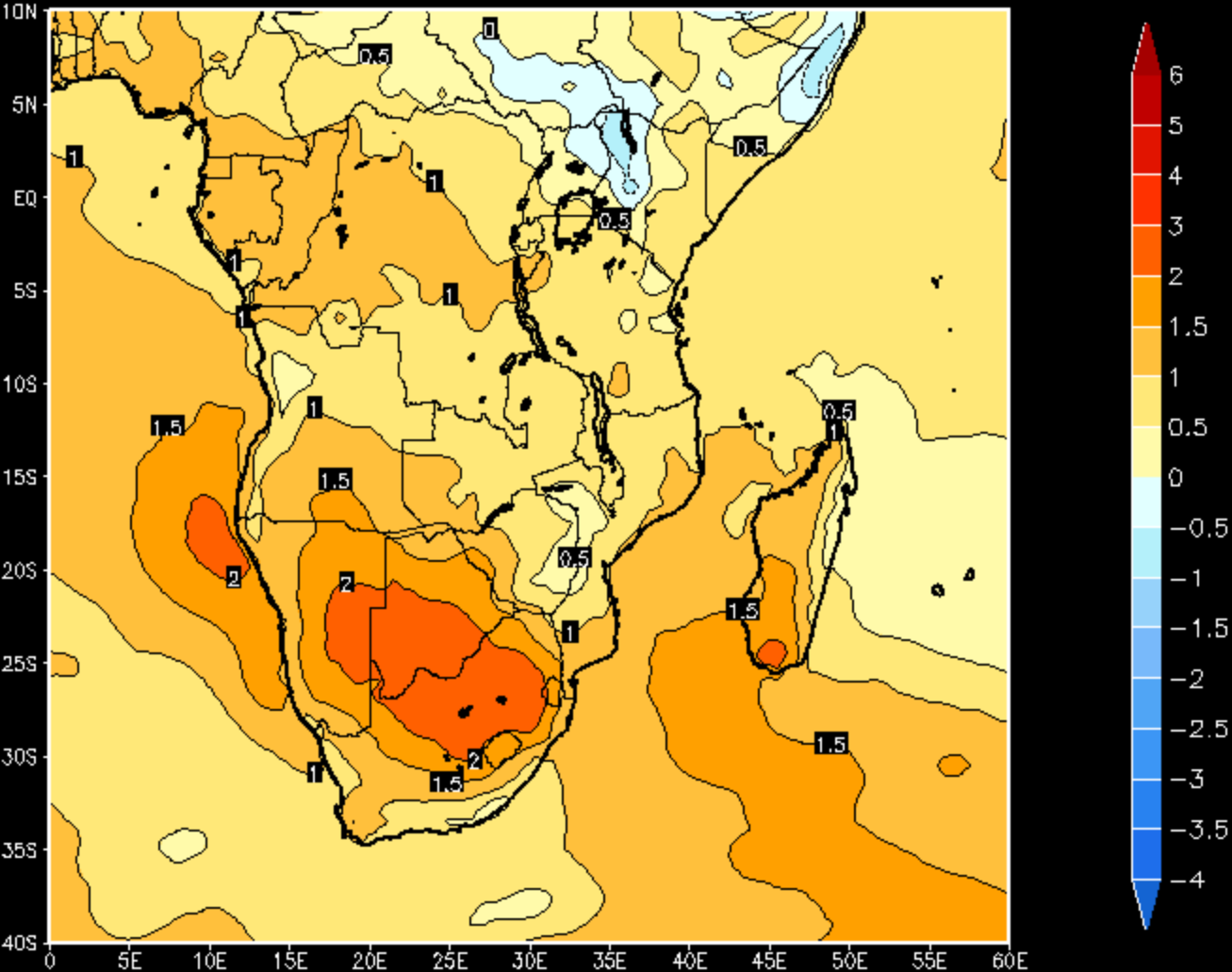
Temp anomaly 2057



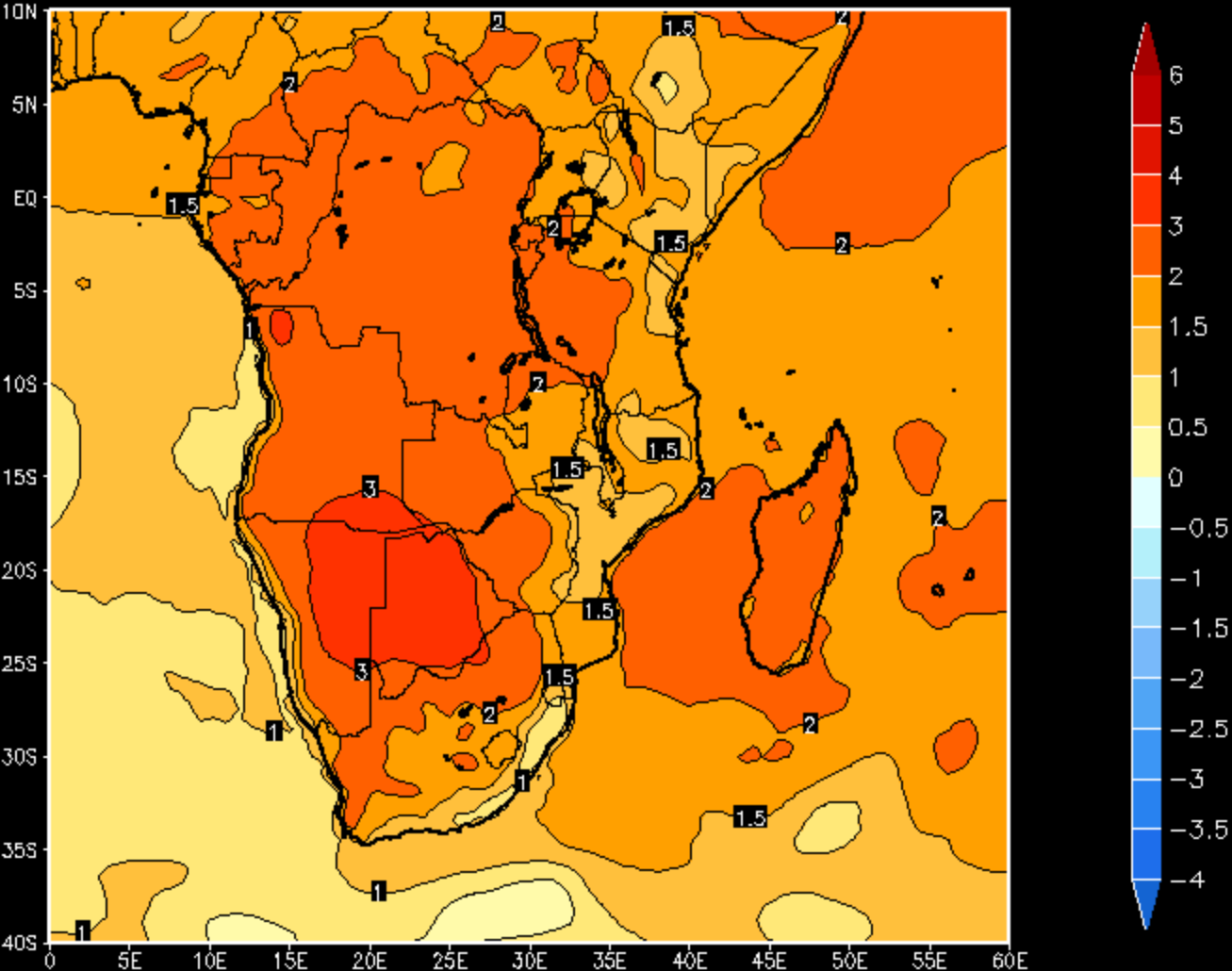
Temp anomaly 2058



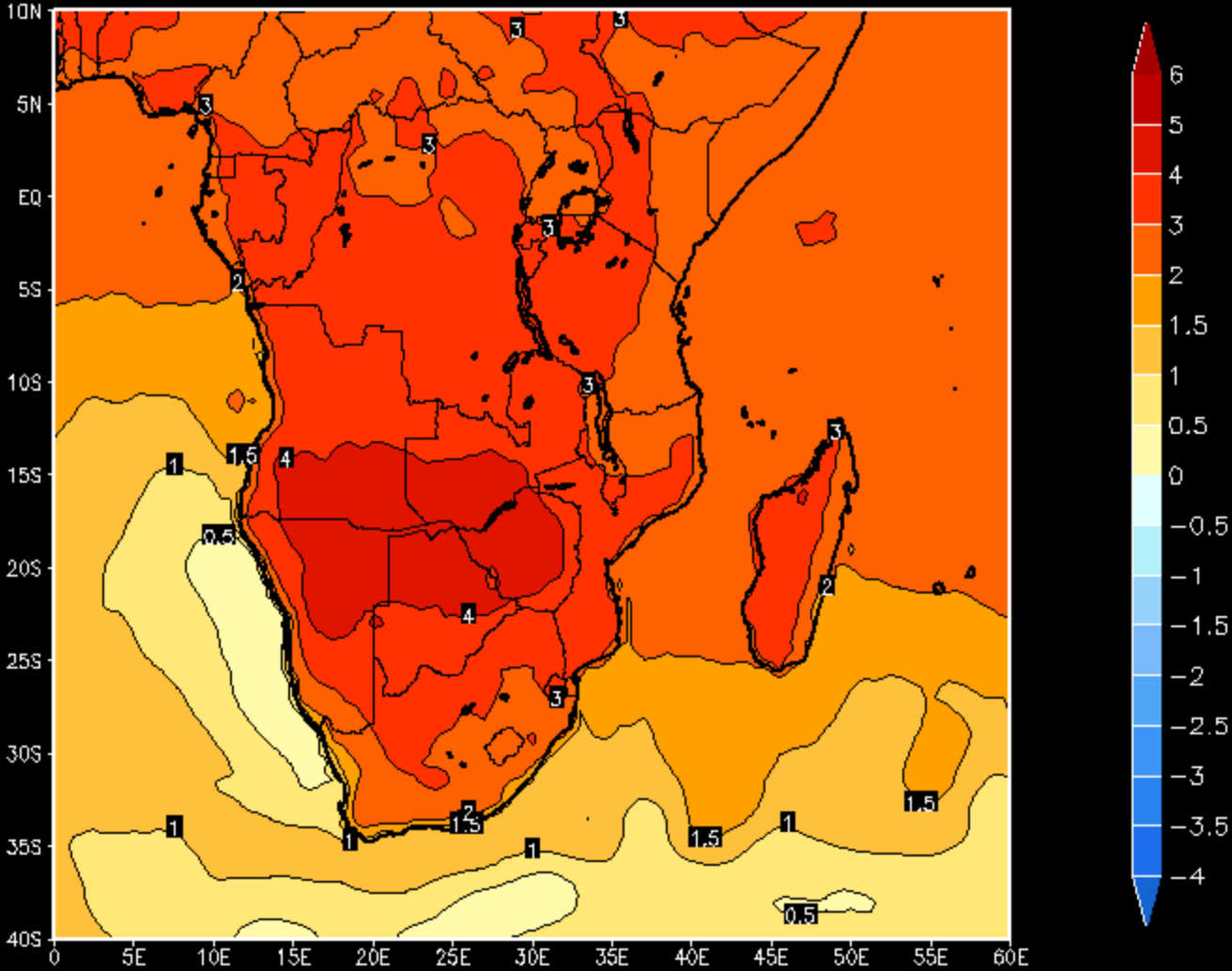
Temp anomaly 2059



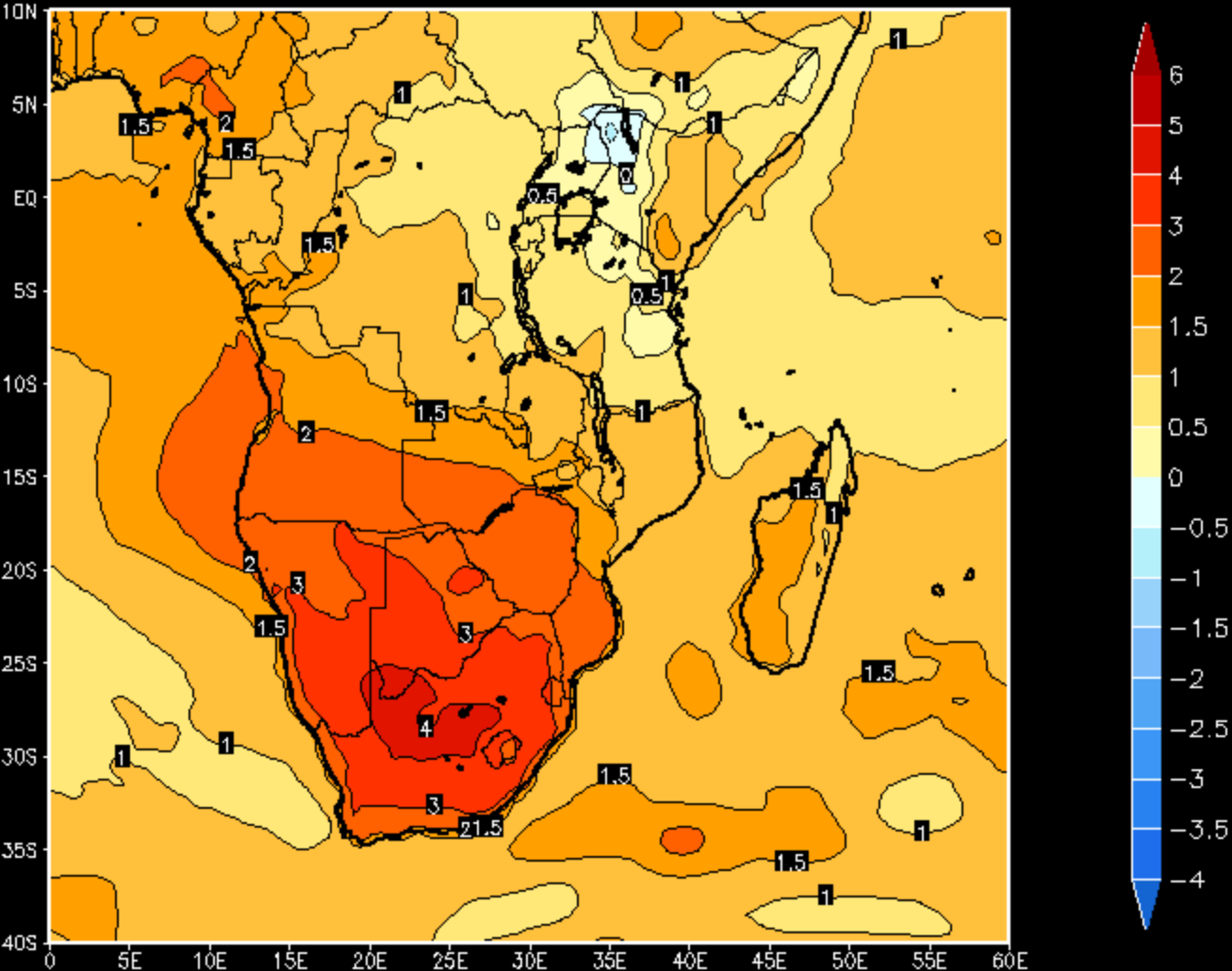
Temp anomaly 2060



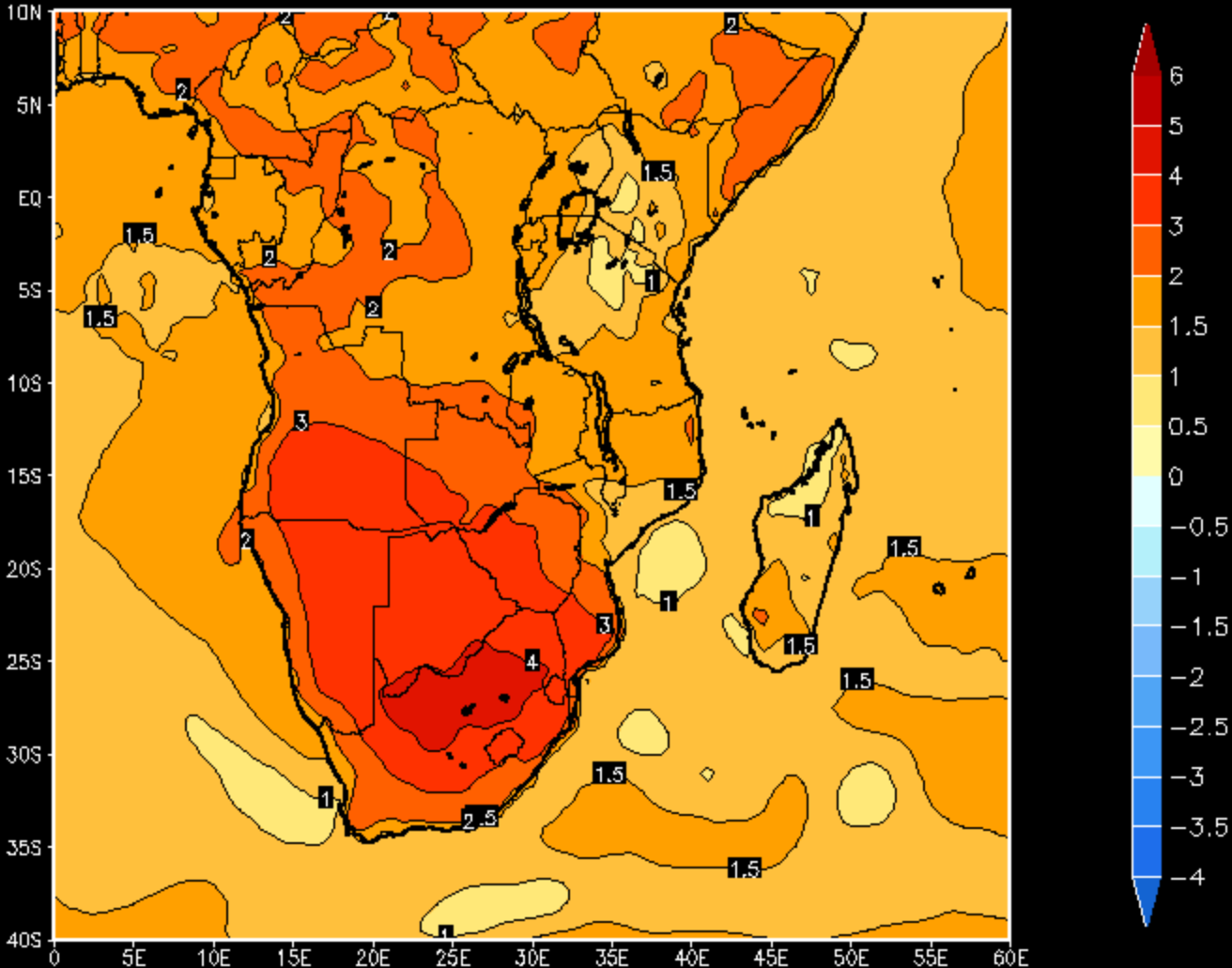
Temp anomaly 2061



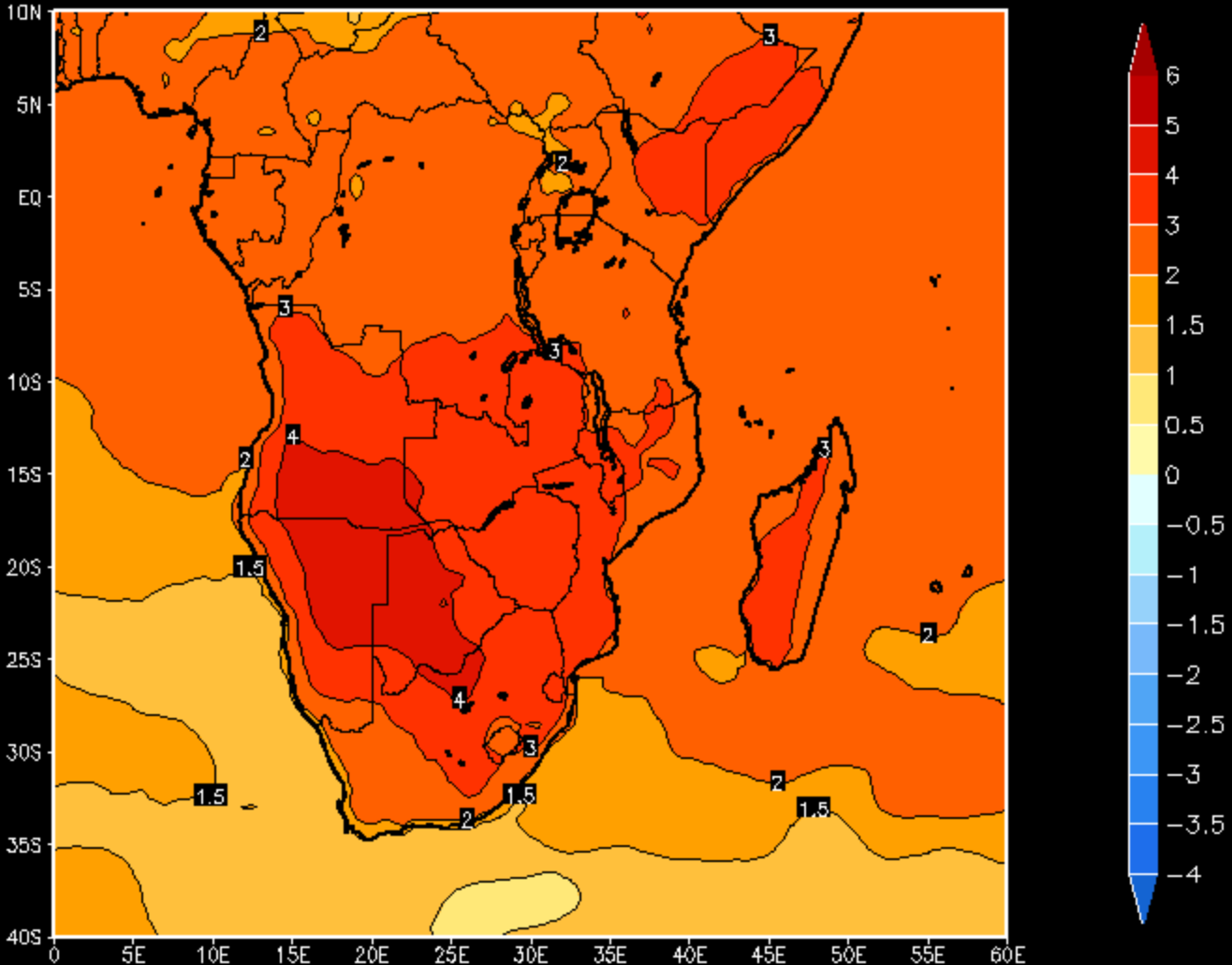
Temp anomaly 2062



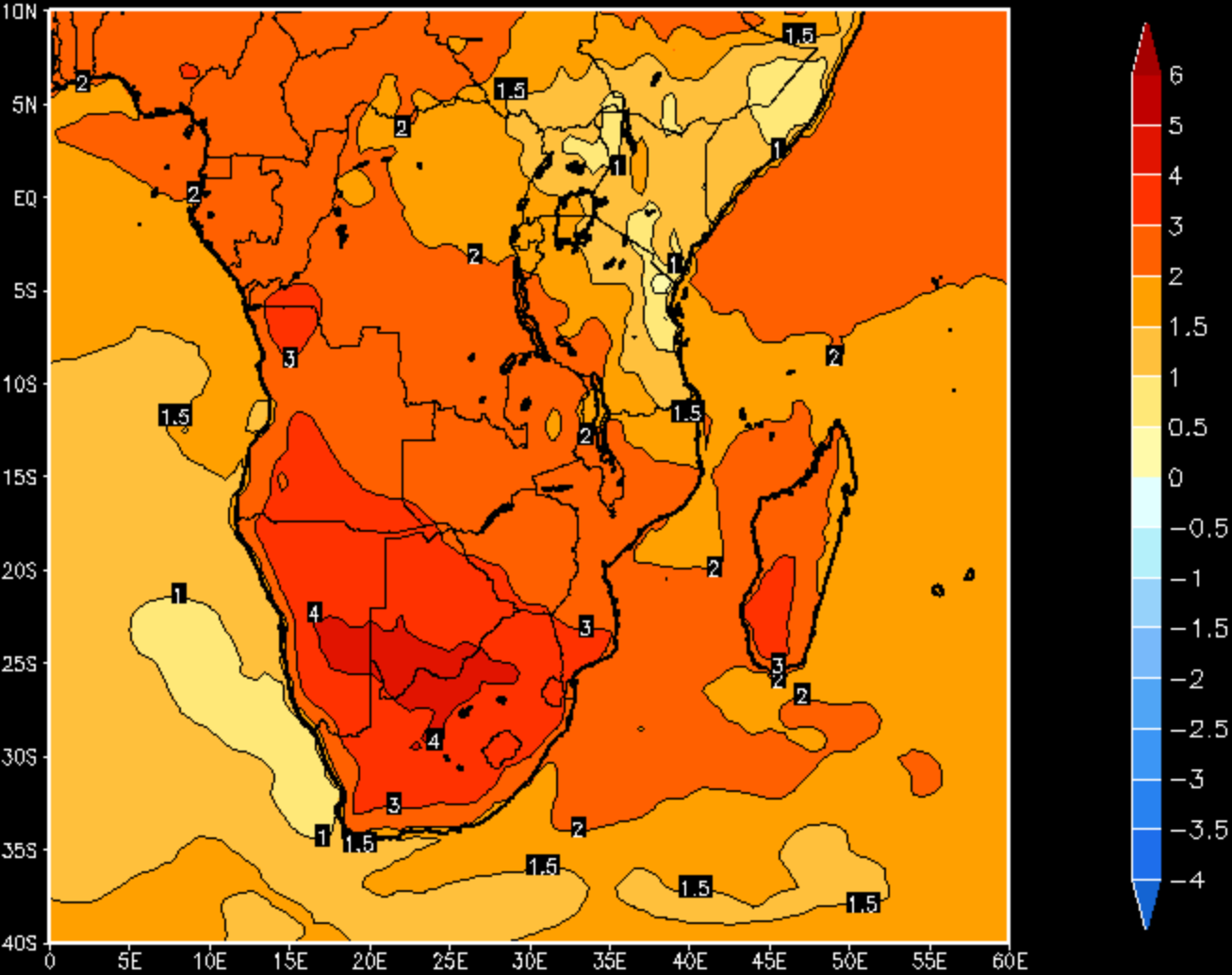
Temp anomaly 2063



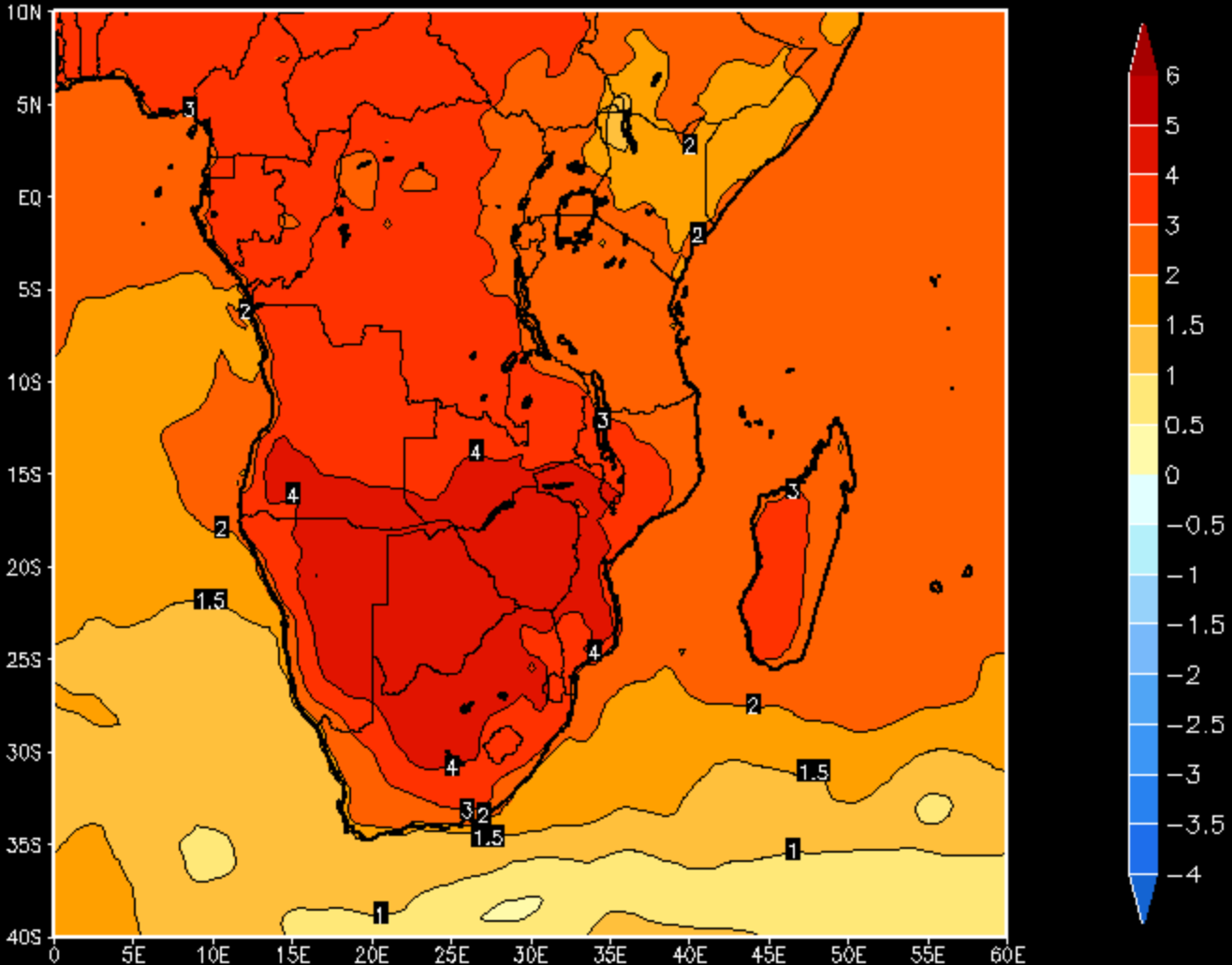
Temp anomaly 2064



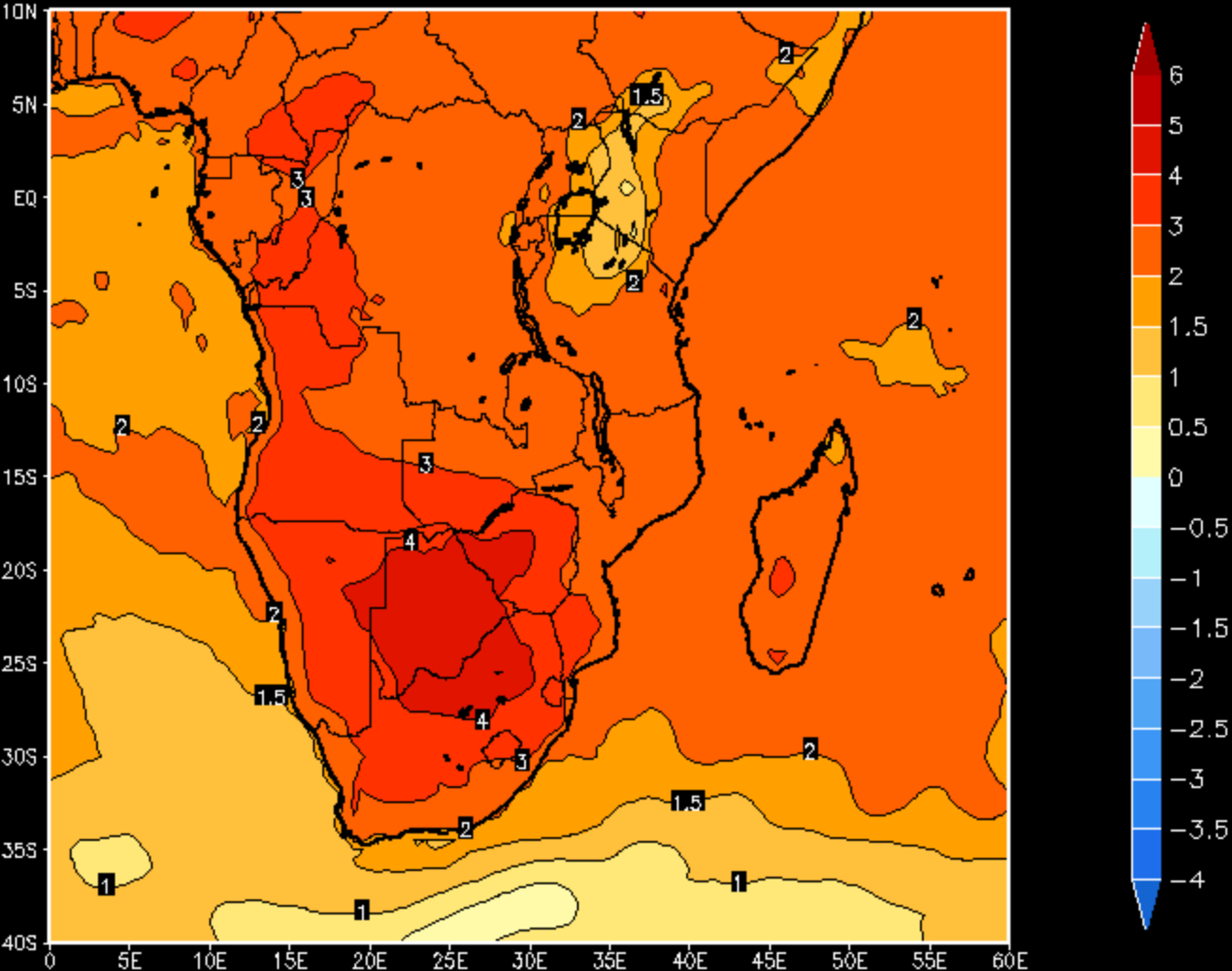
Temp anomaly 2065



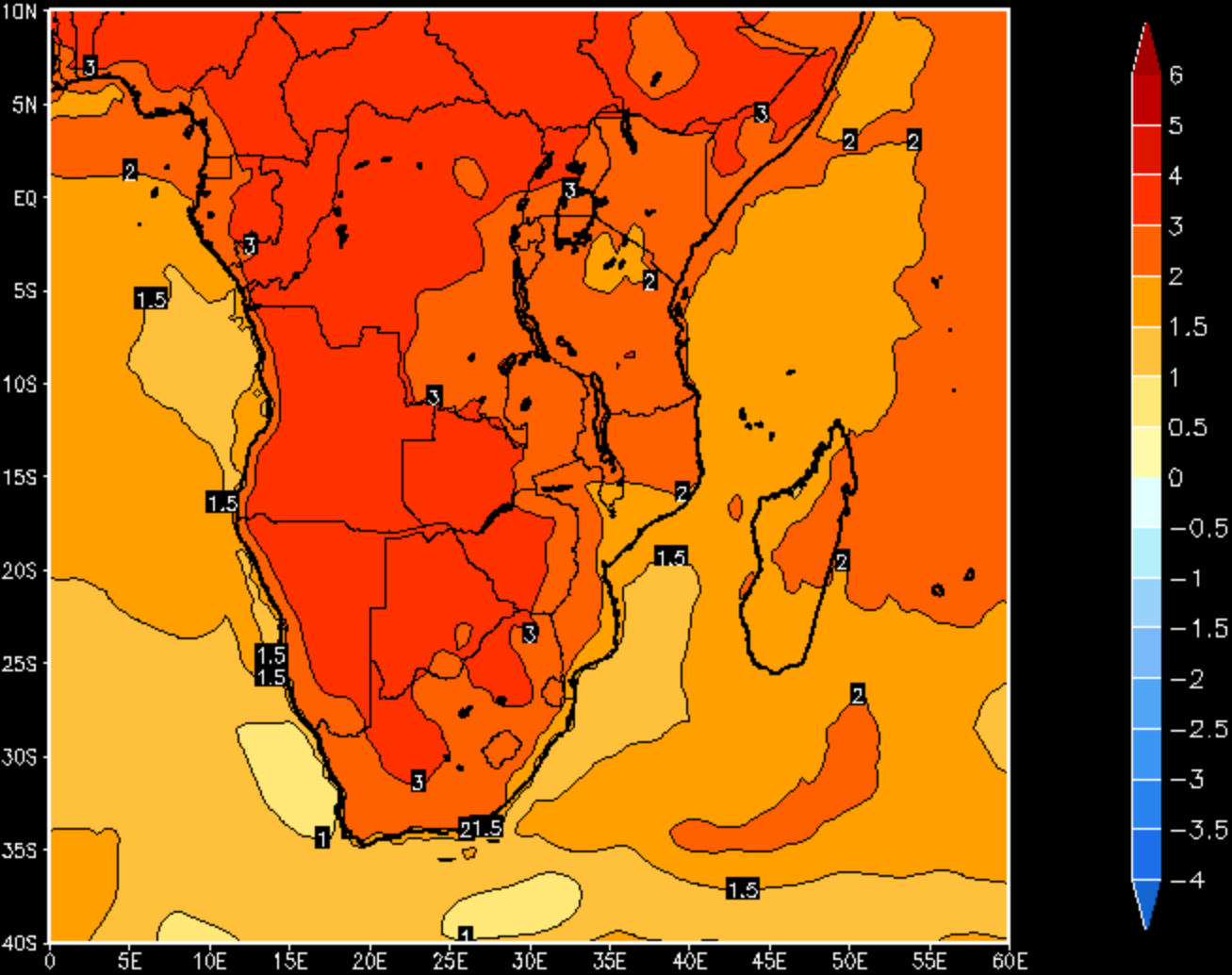
Temp anomaly 2066



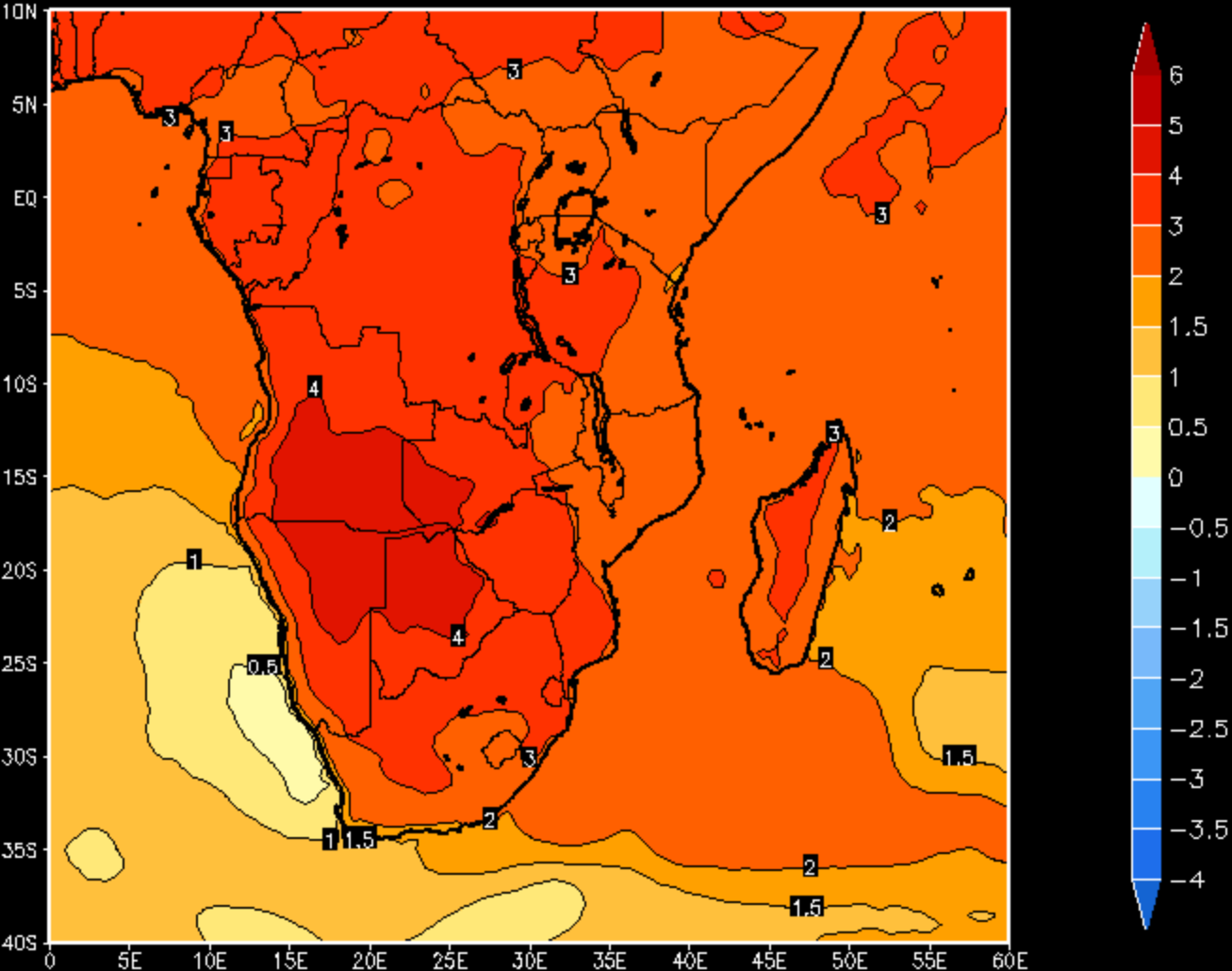
Temp anomaly 2067



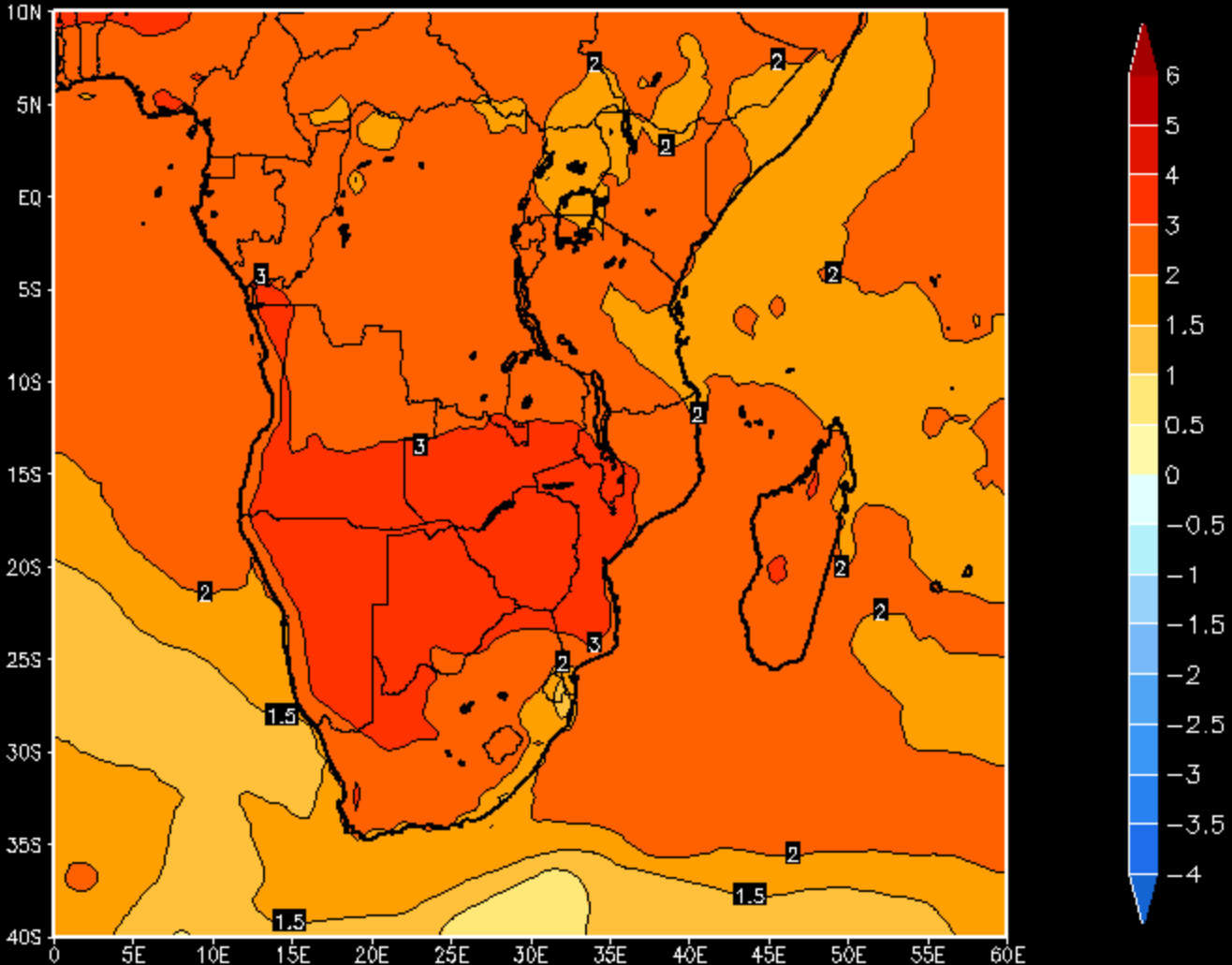
Temp anomaly 2068



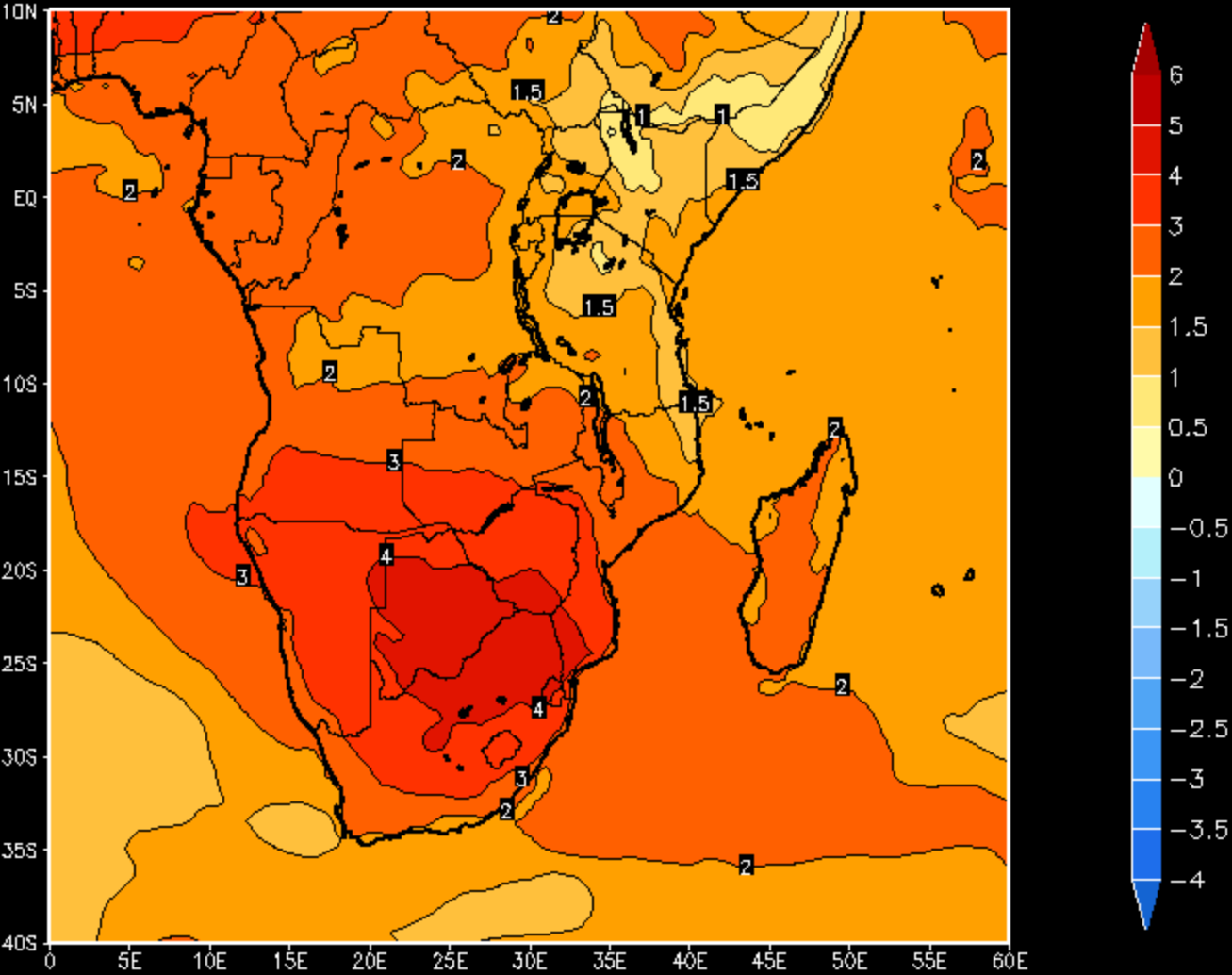
Temp anomaly 2069



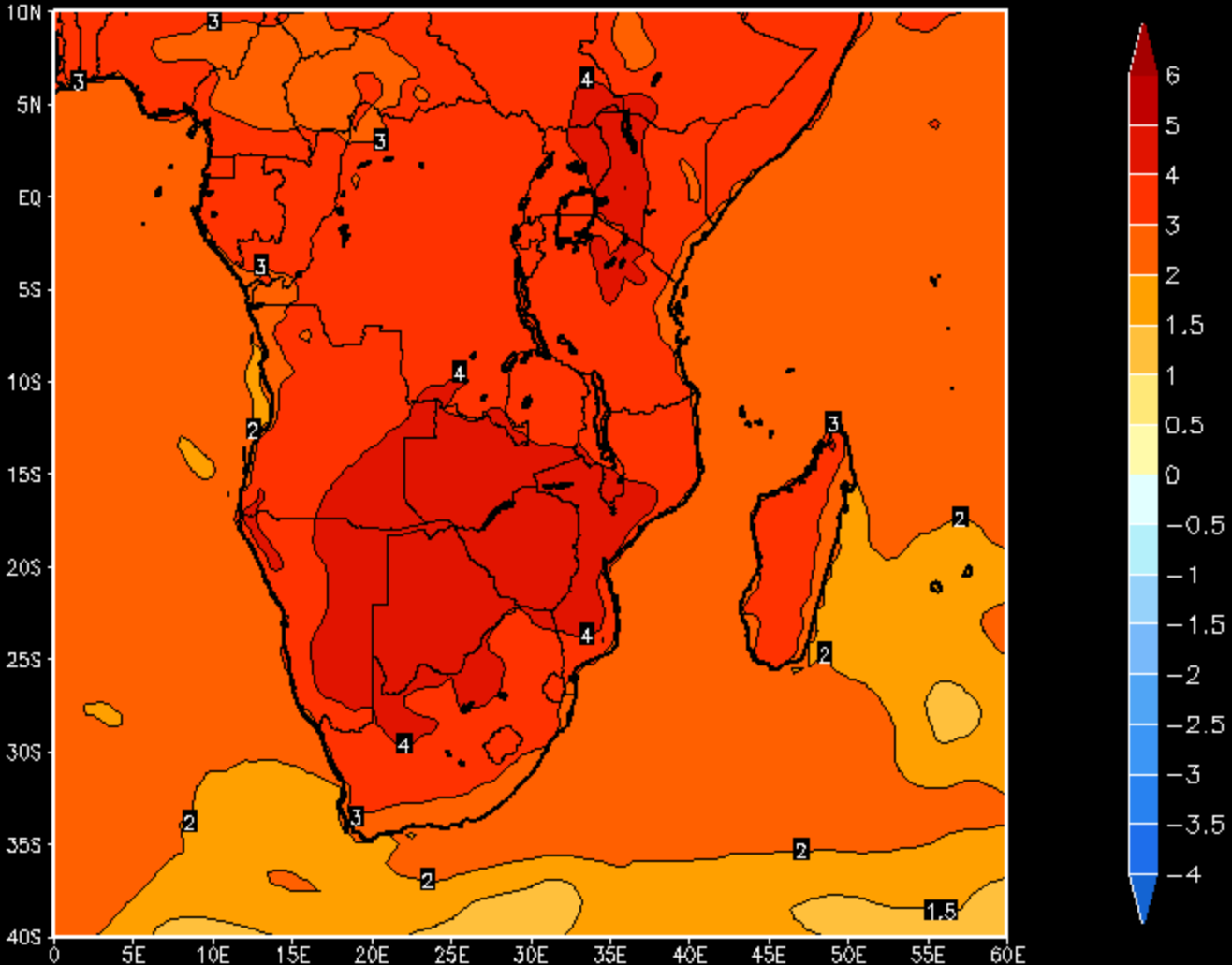
Temp anomaly 2070



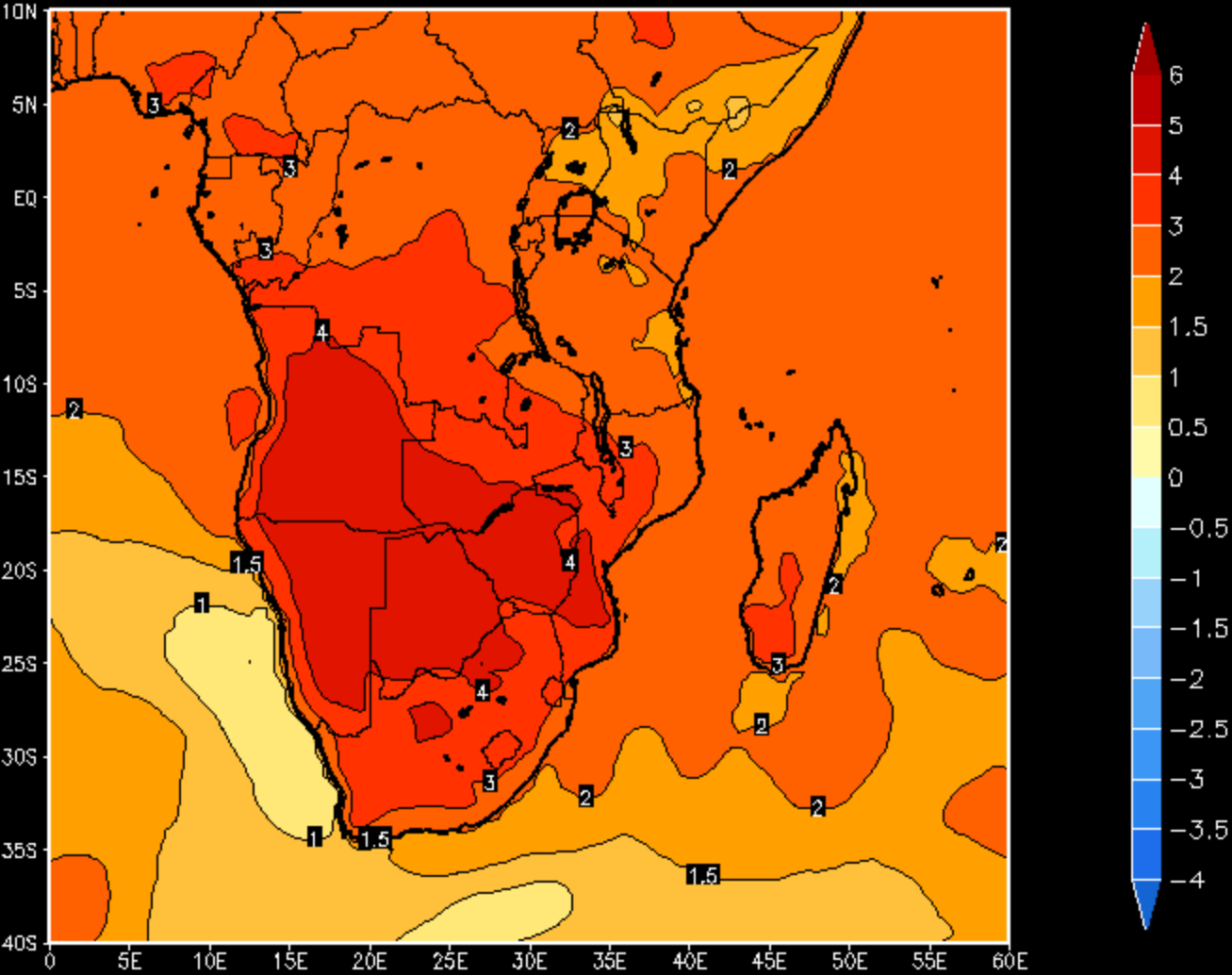
Temp anomaly 2071



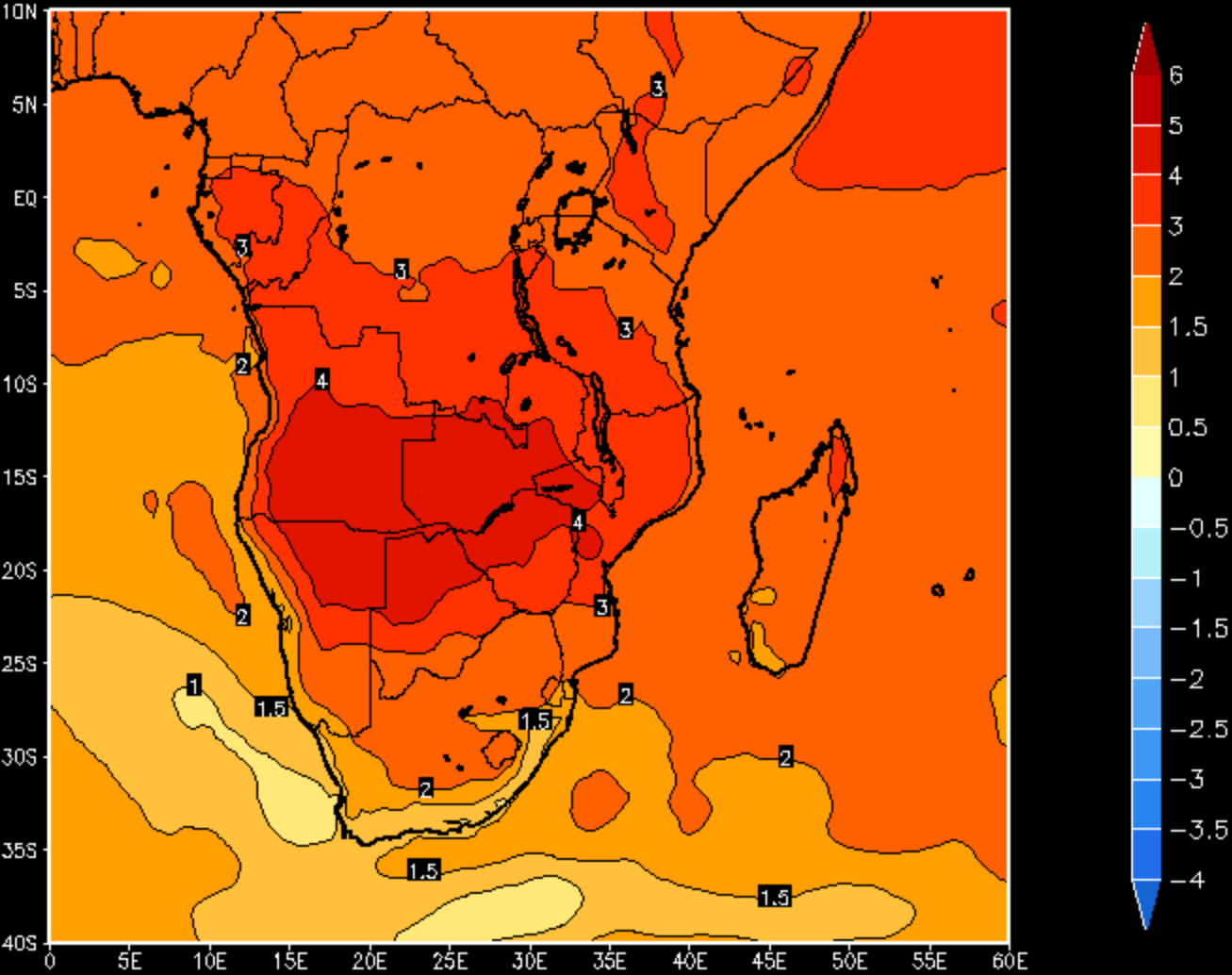
Temp anomaly 2072



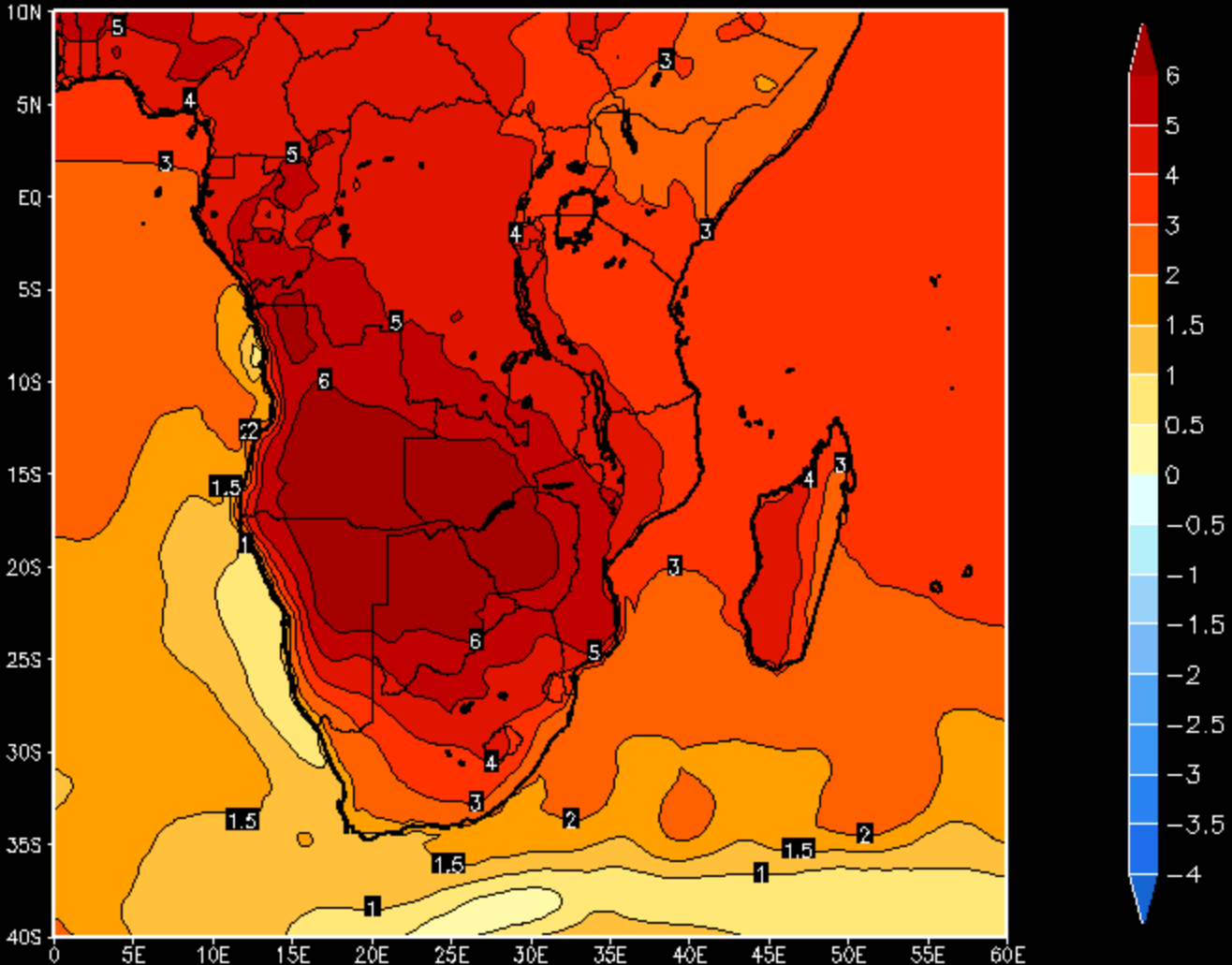
Temp anomaly 2074



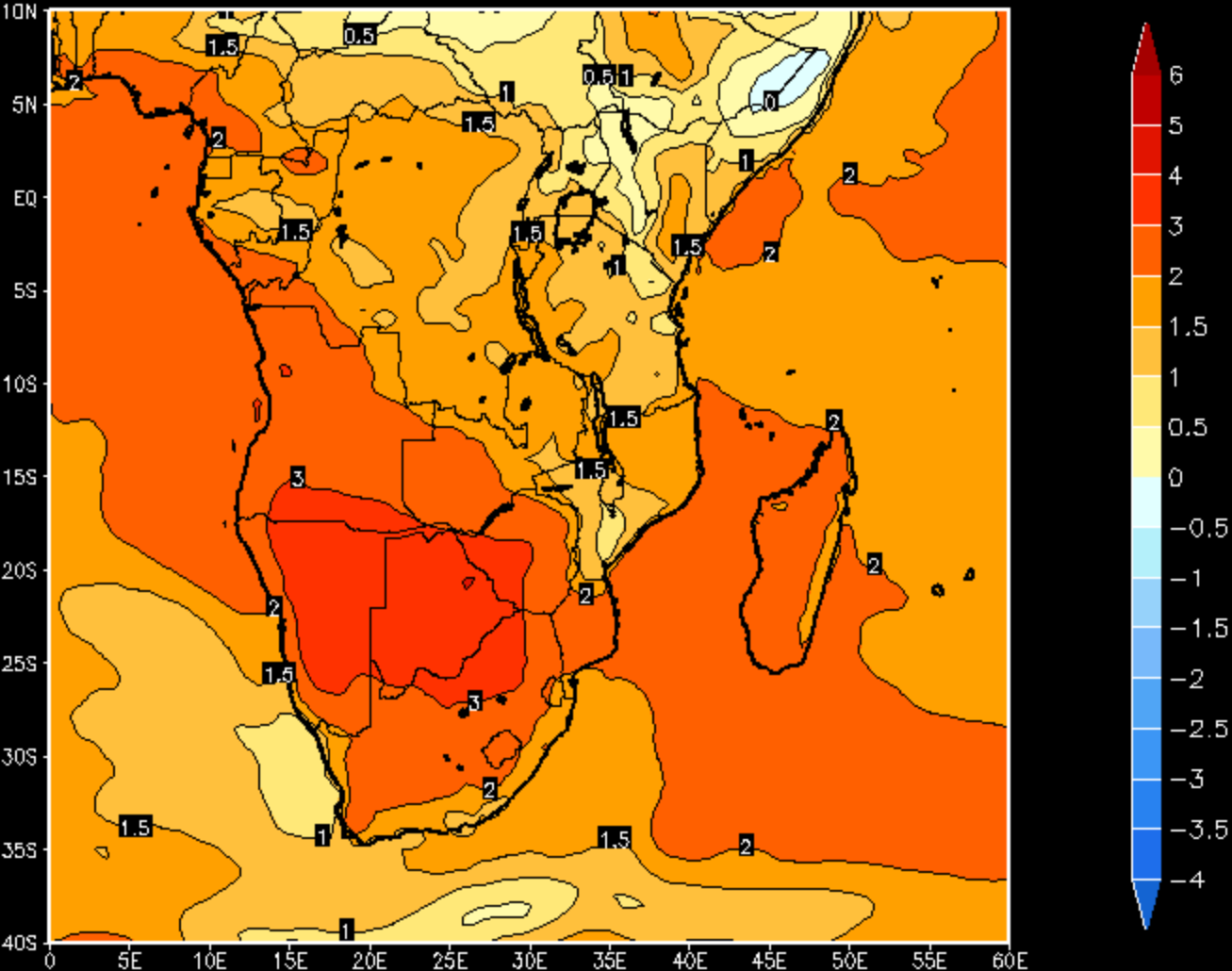
Temp anomaly 2075



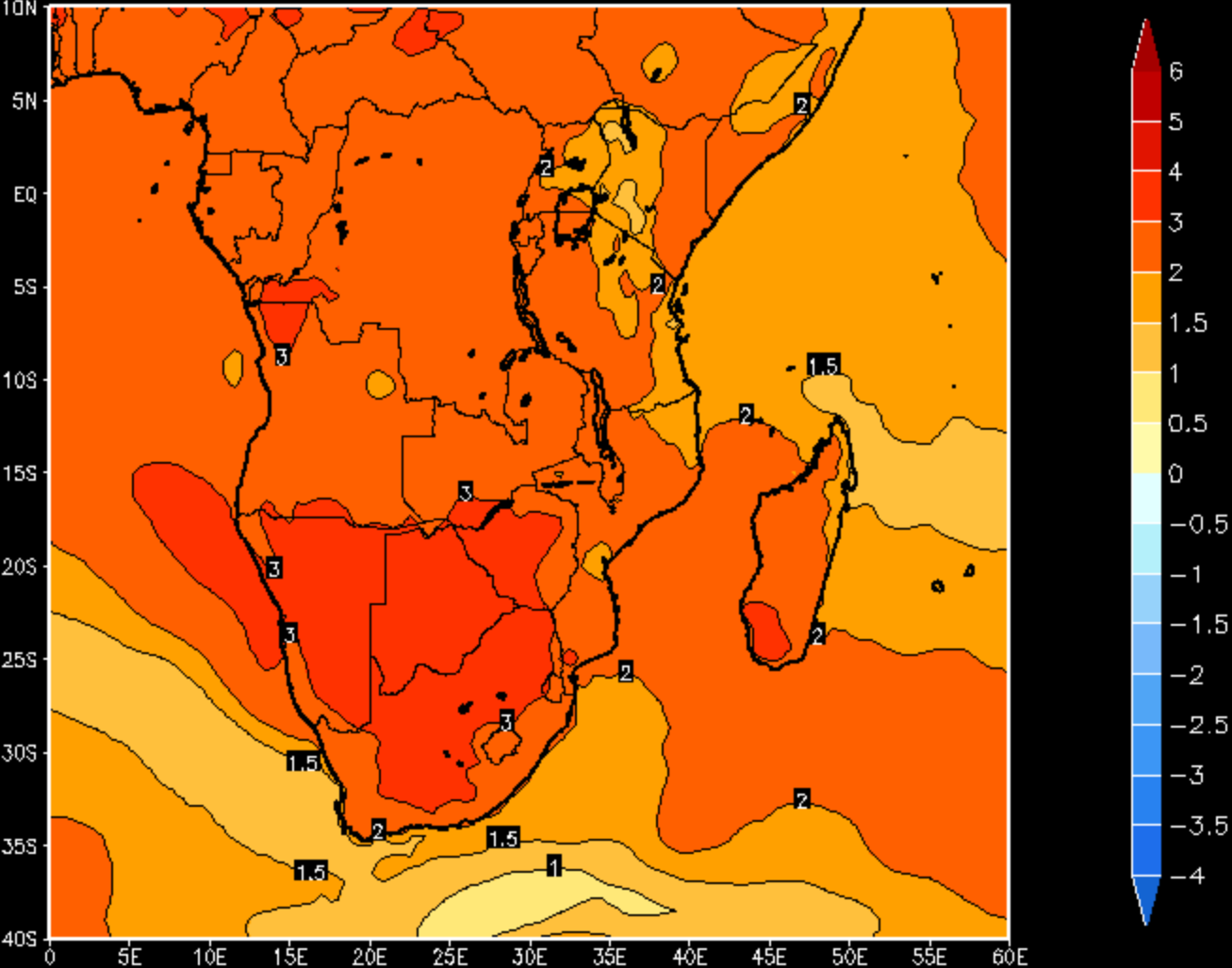
Temp anomaly 2076



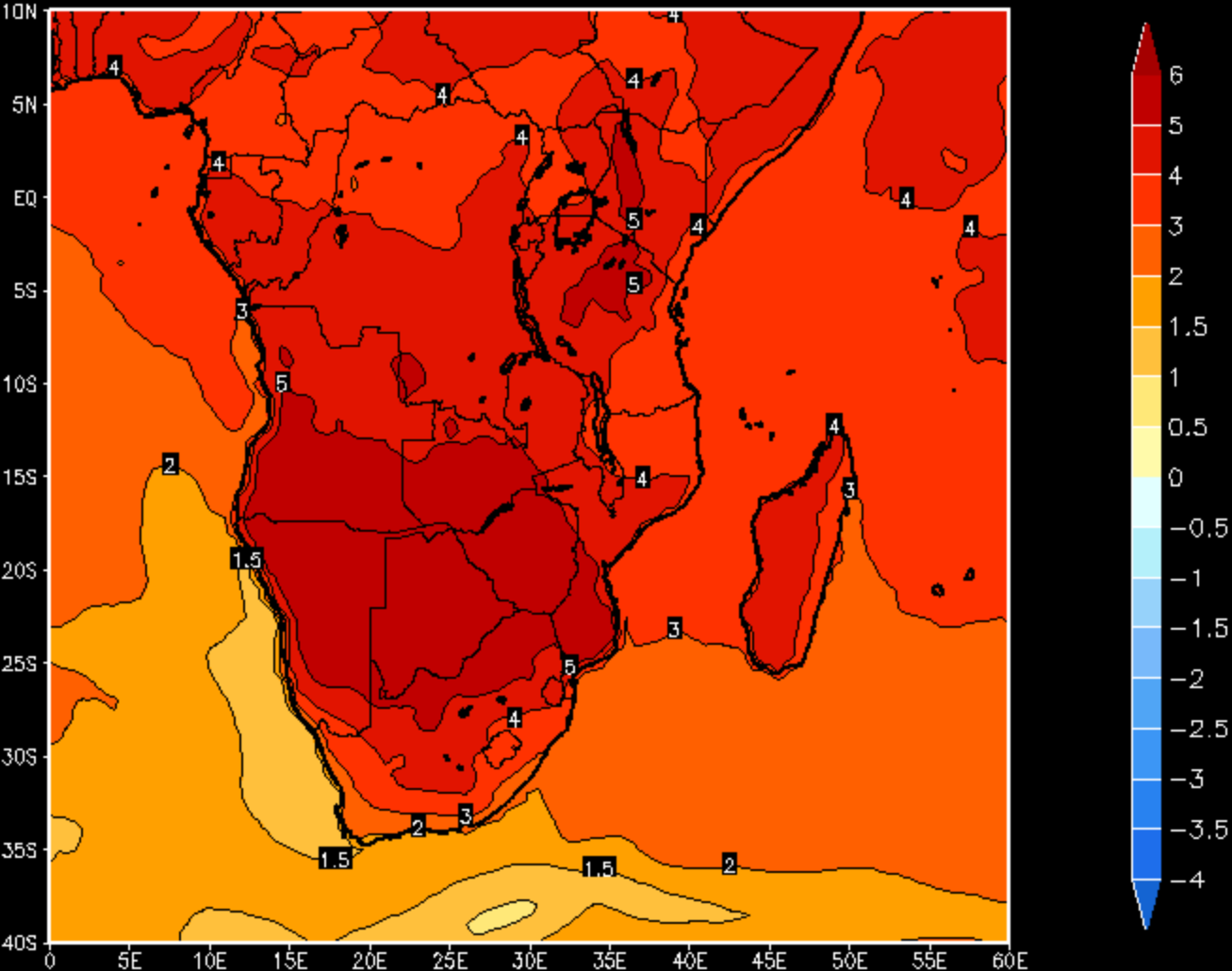
Temp anomaly 2077



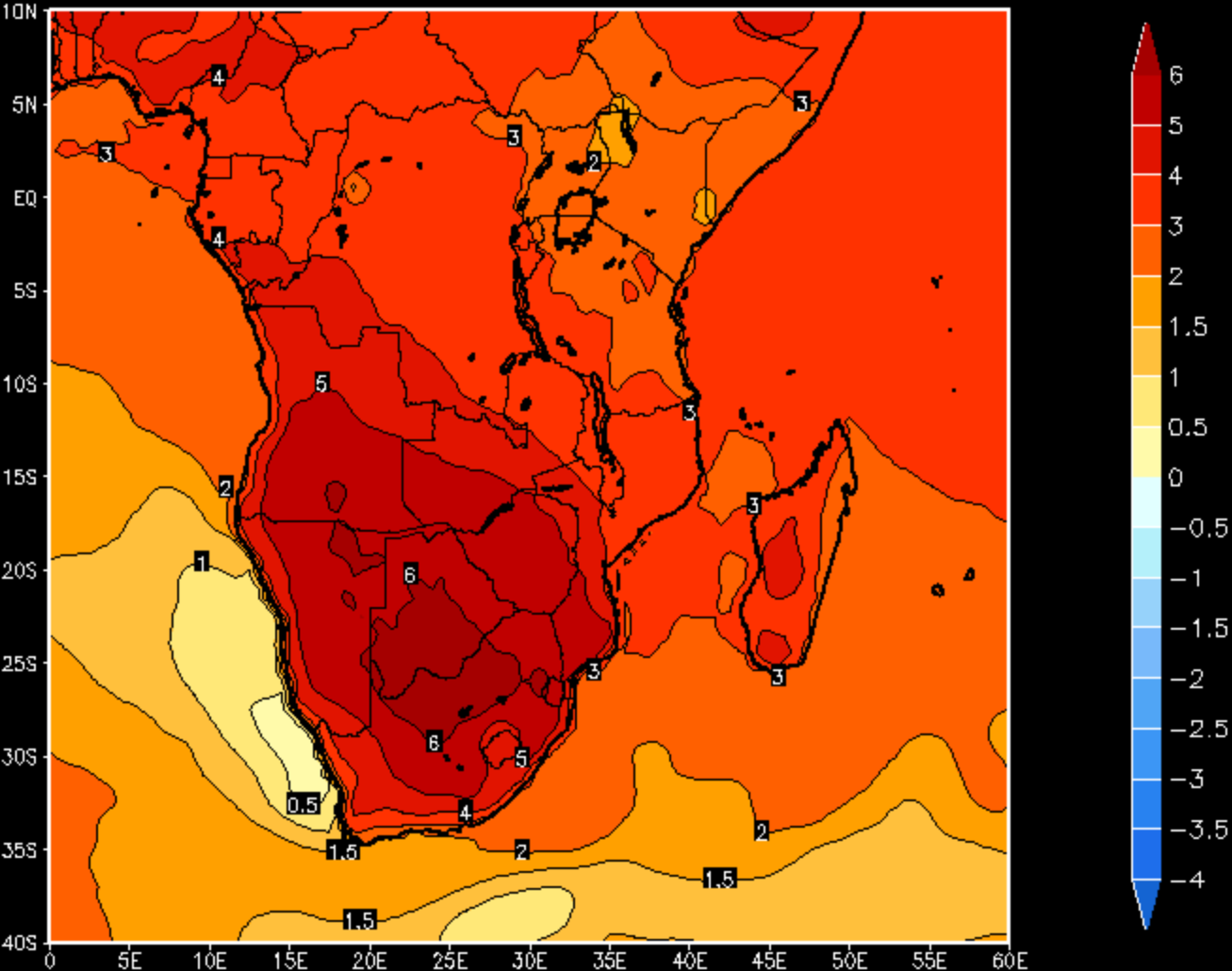
Temp anomaly 2078



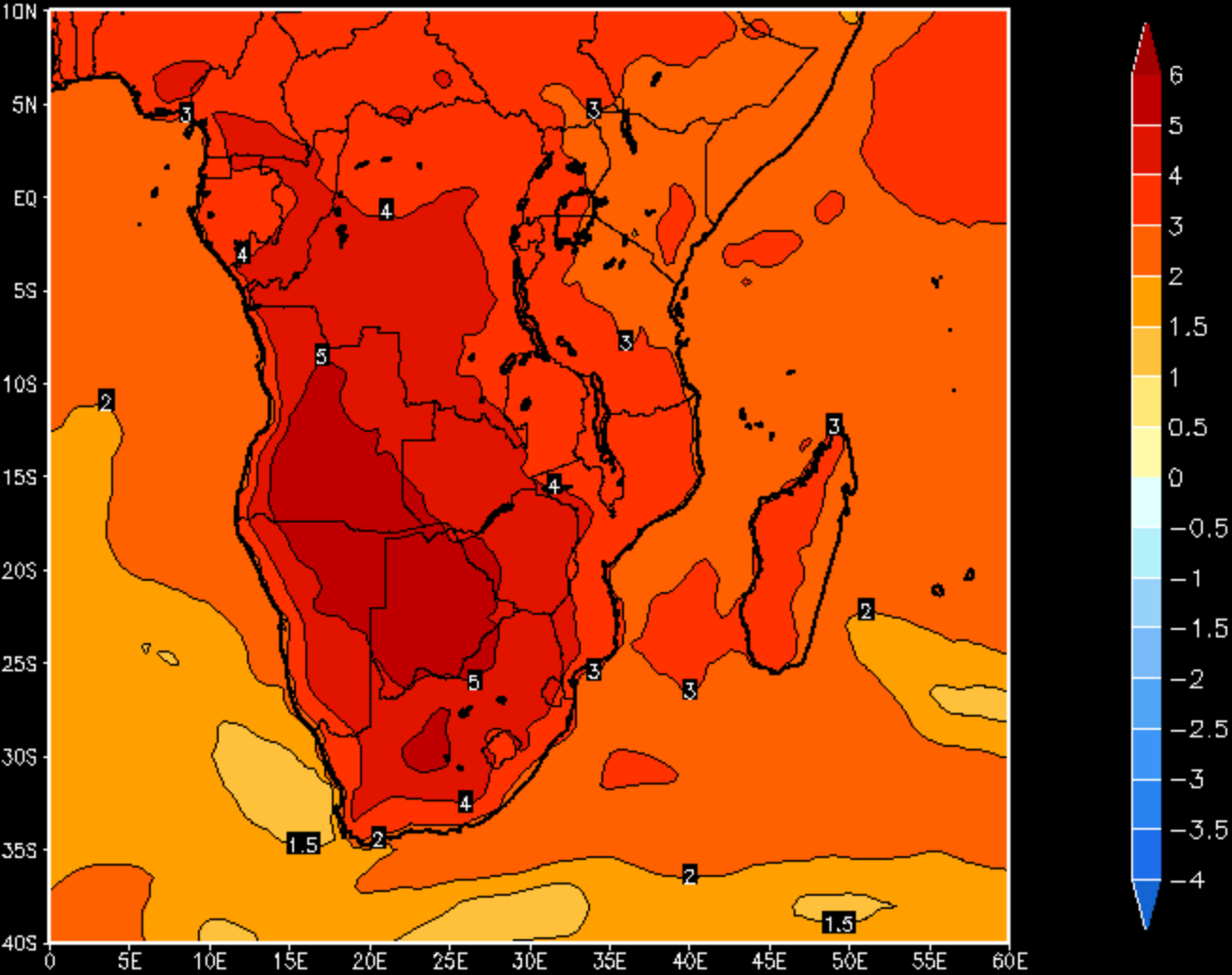
Temp anomaly 2079



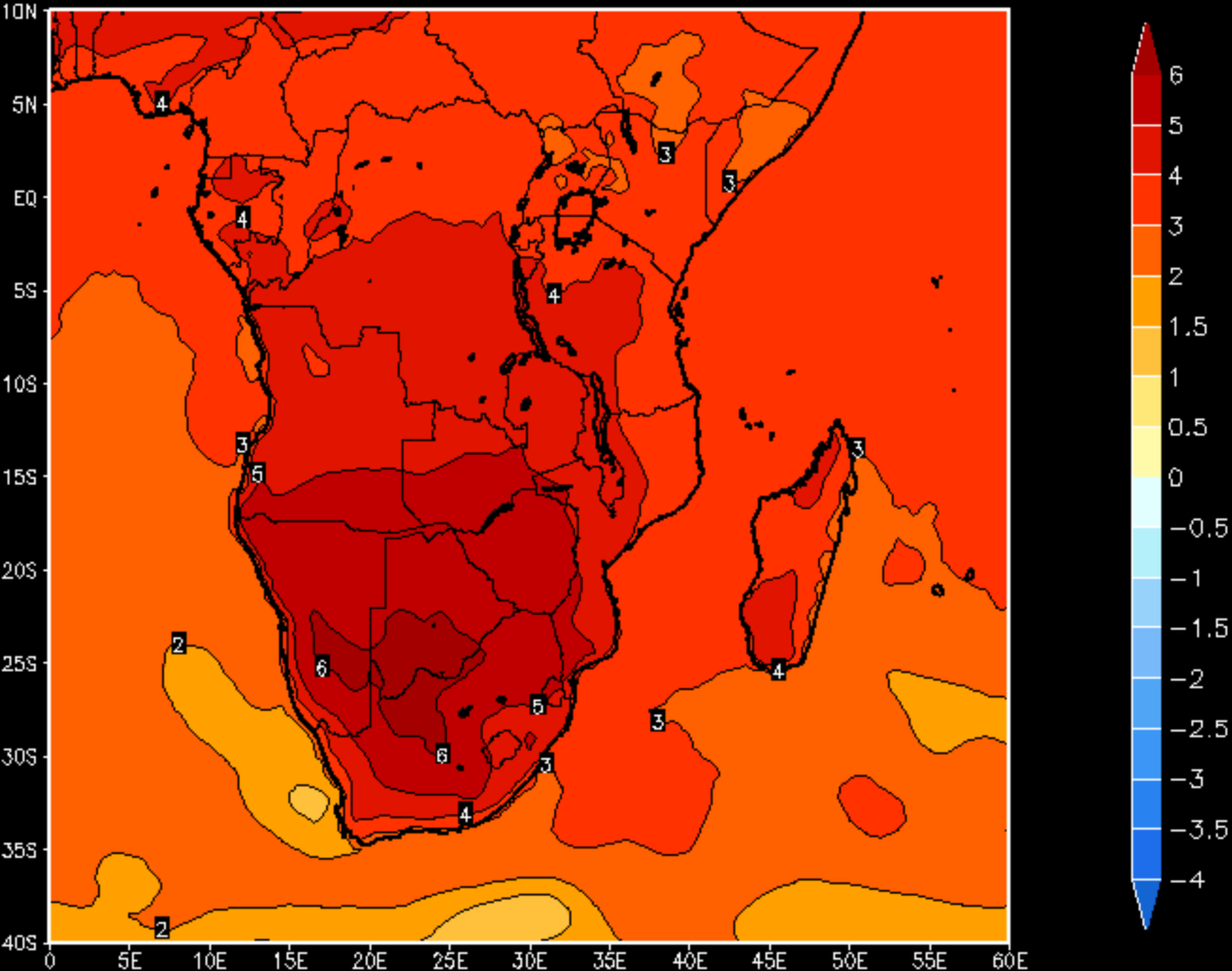
Temp anomaly 2080



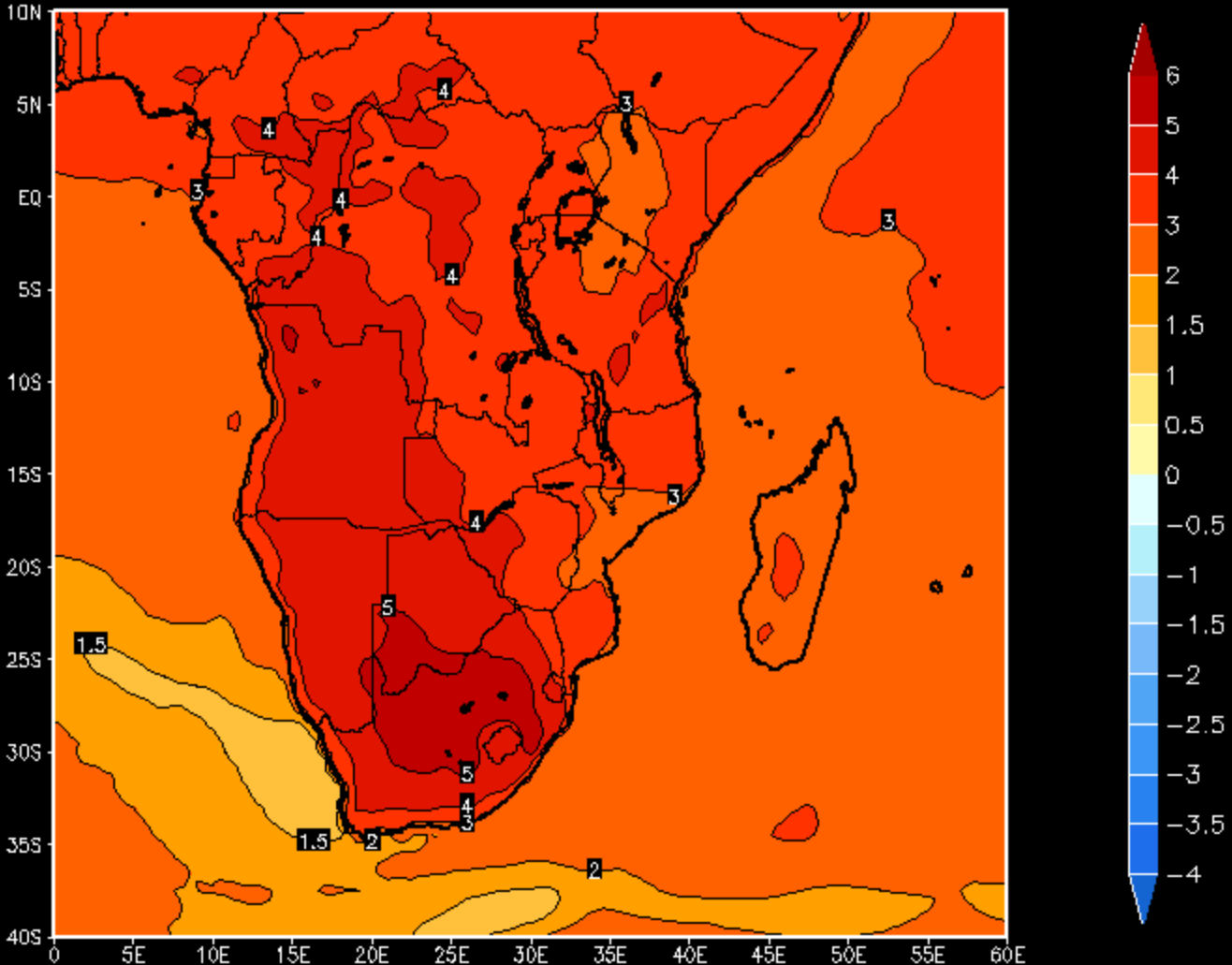
Temp anomaly 2081



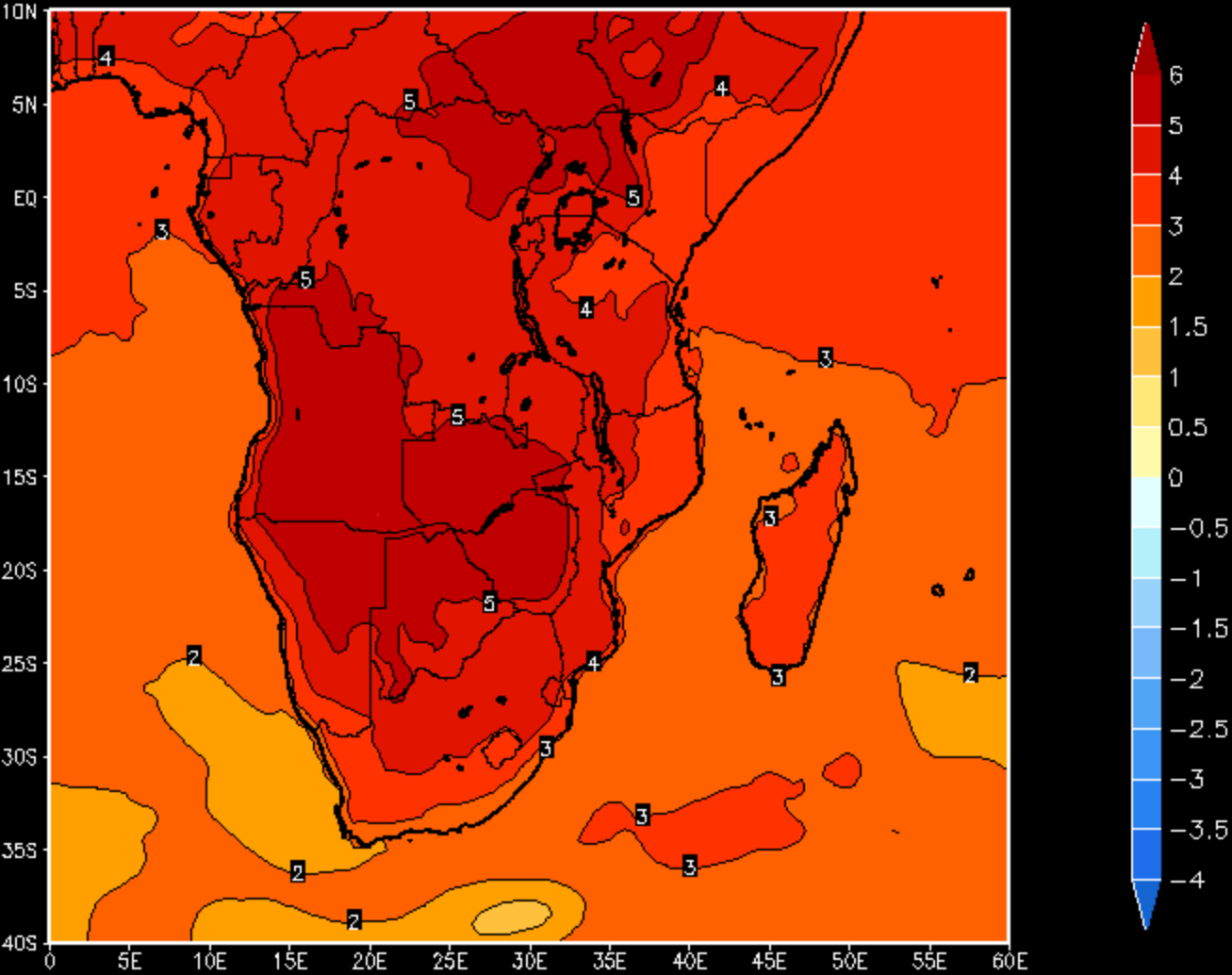
Temp anomaly 2082



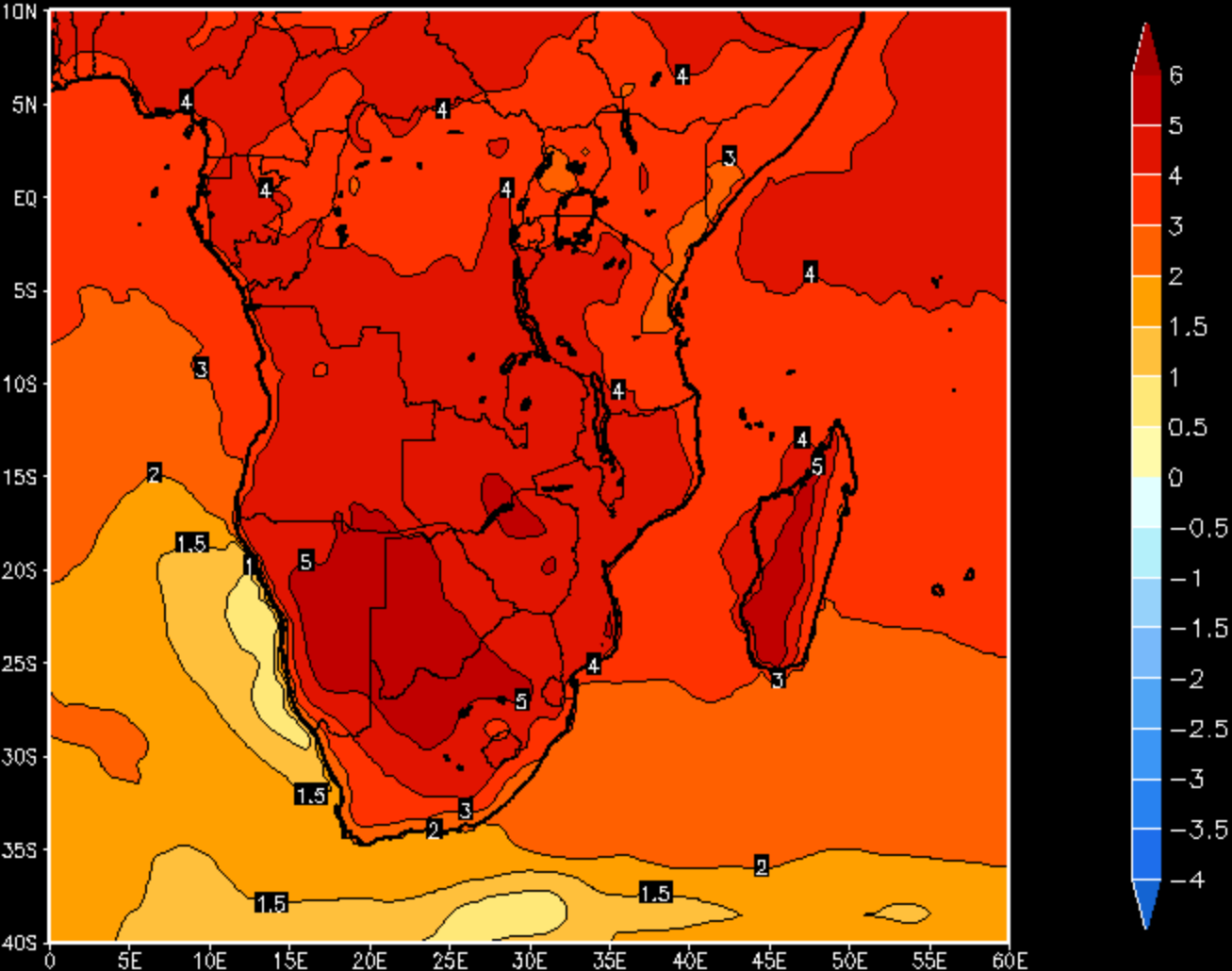
Temp anomaly 2083



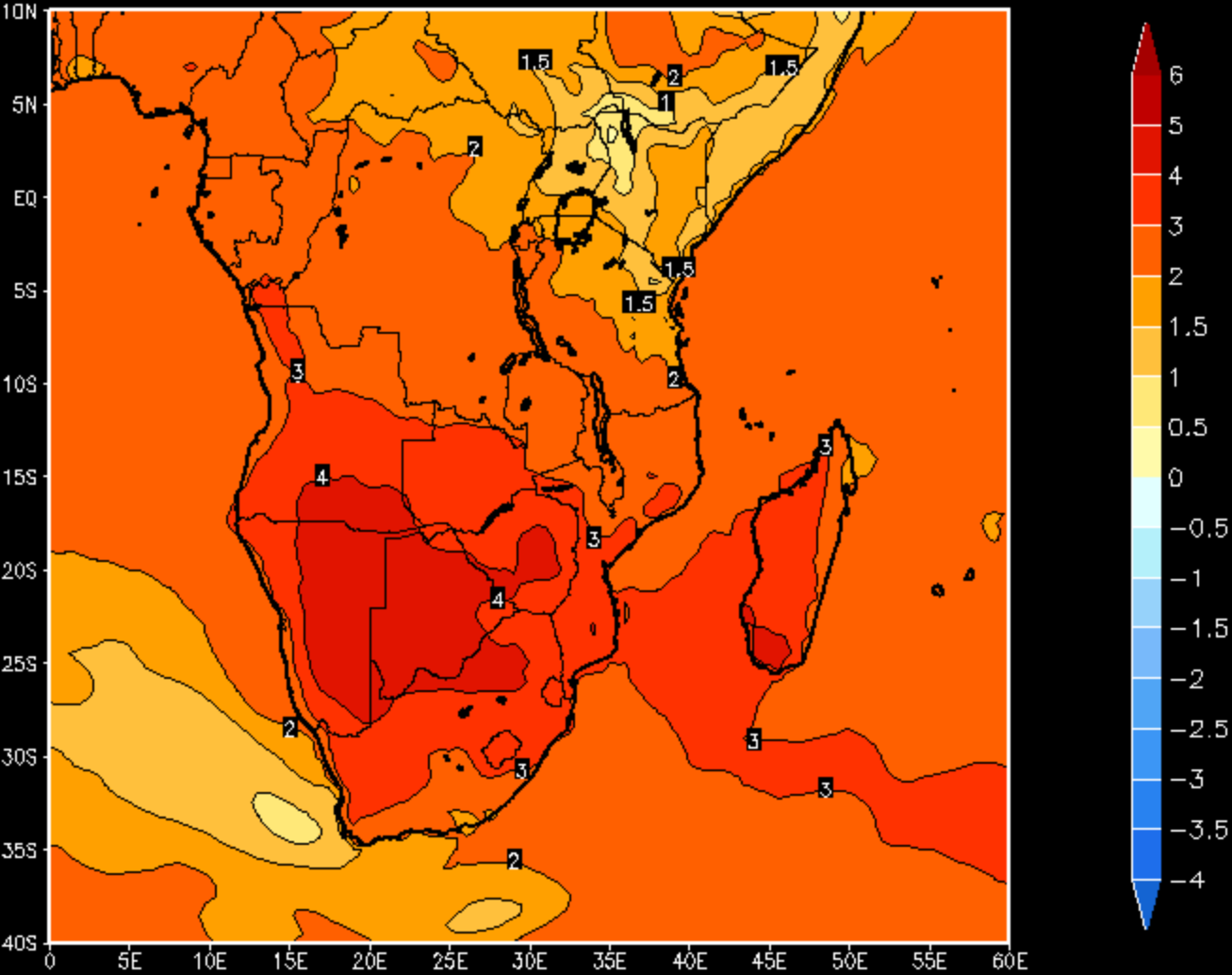
Temp anomaly 2084



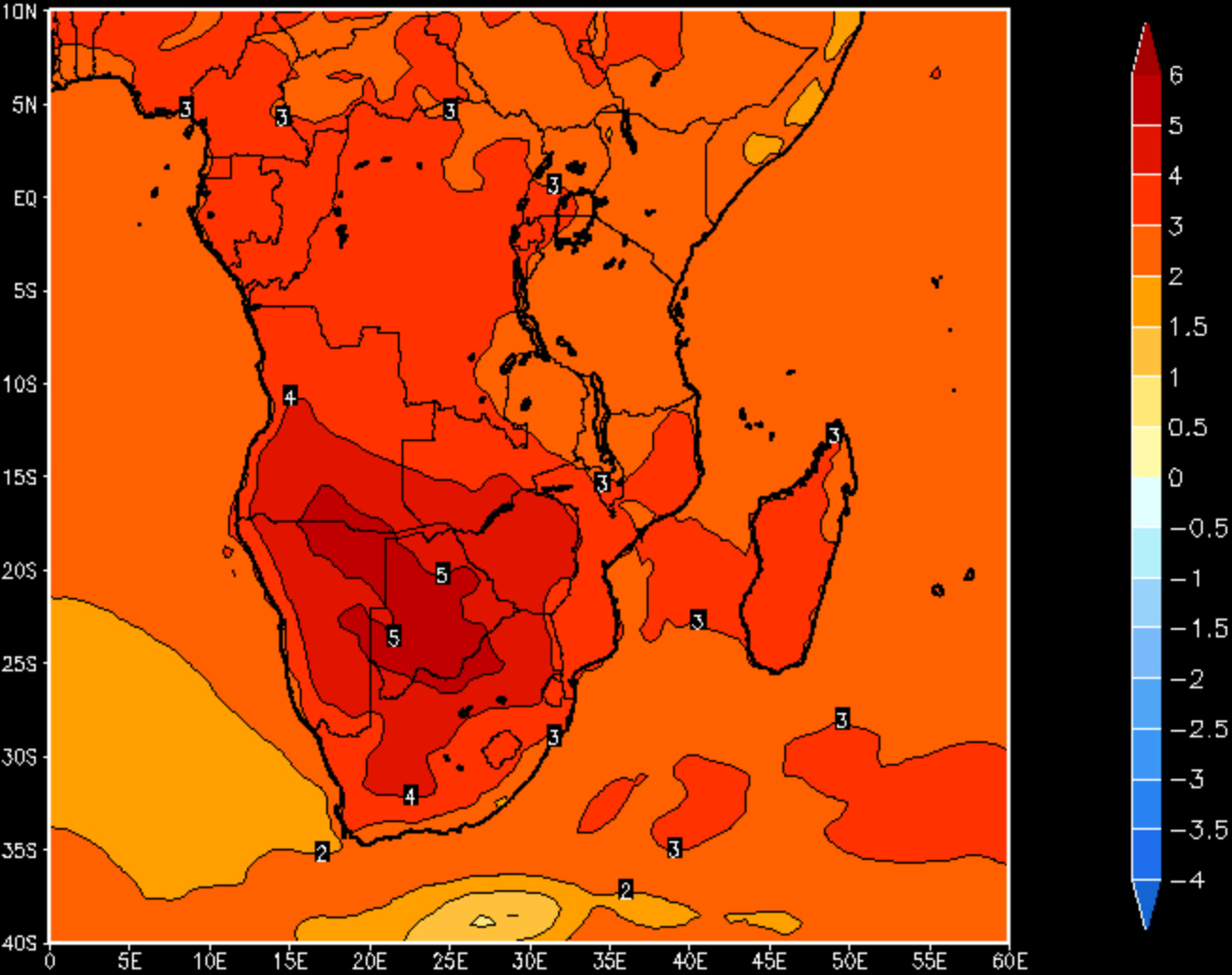
Temp anomaly 2085



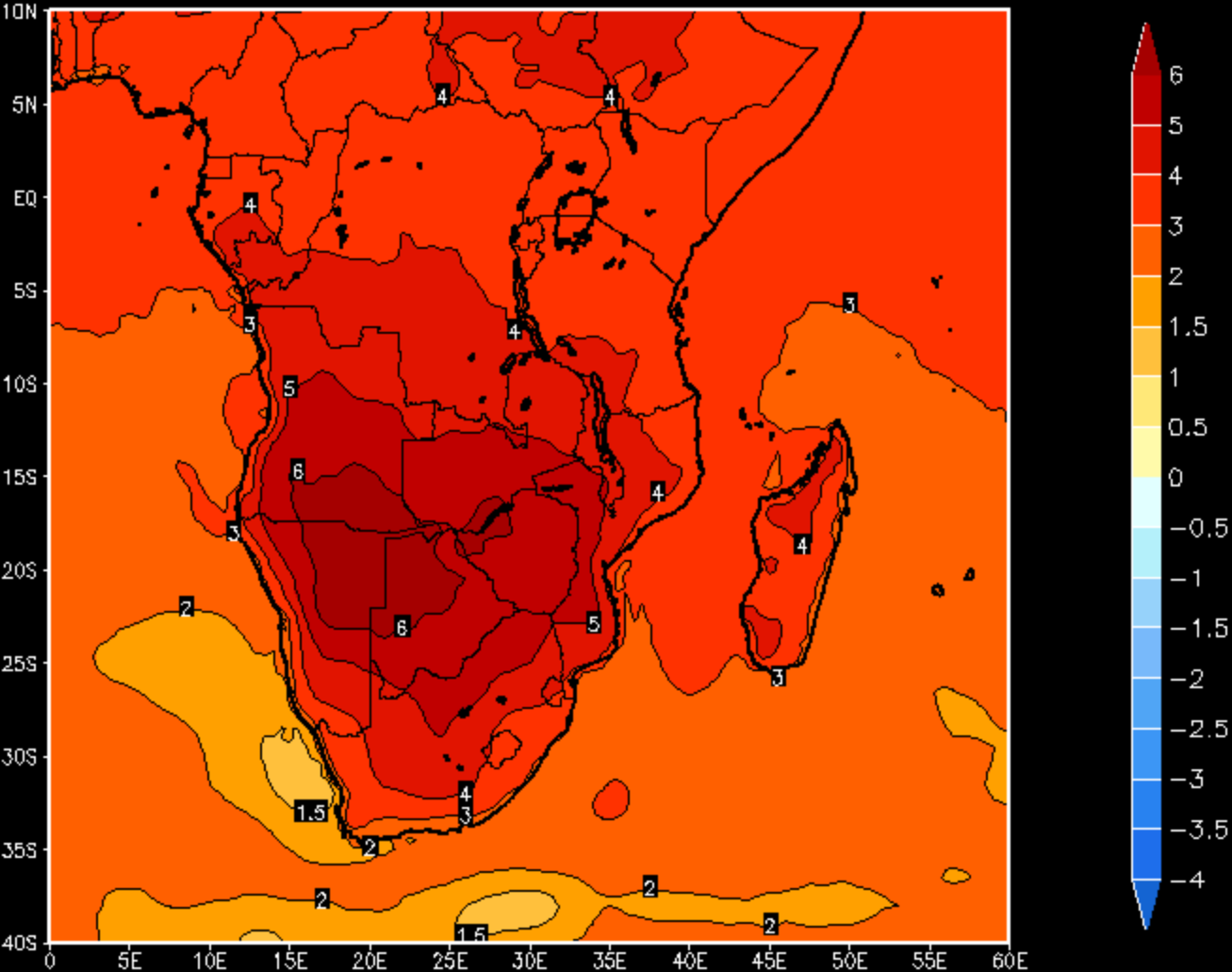
Temp anomaly 2086



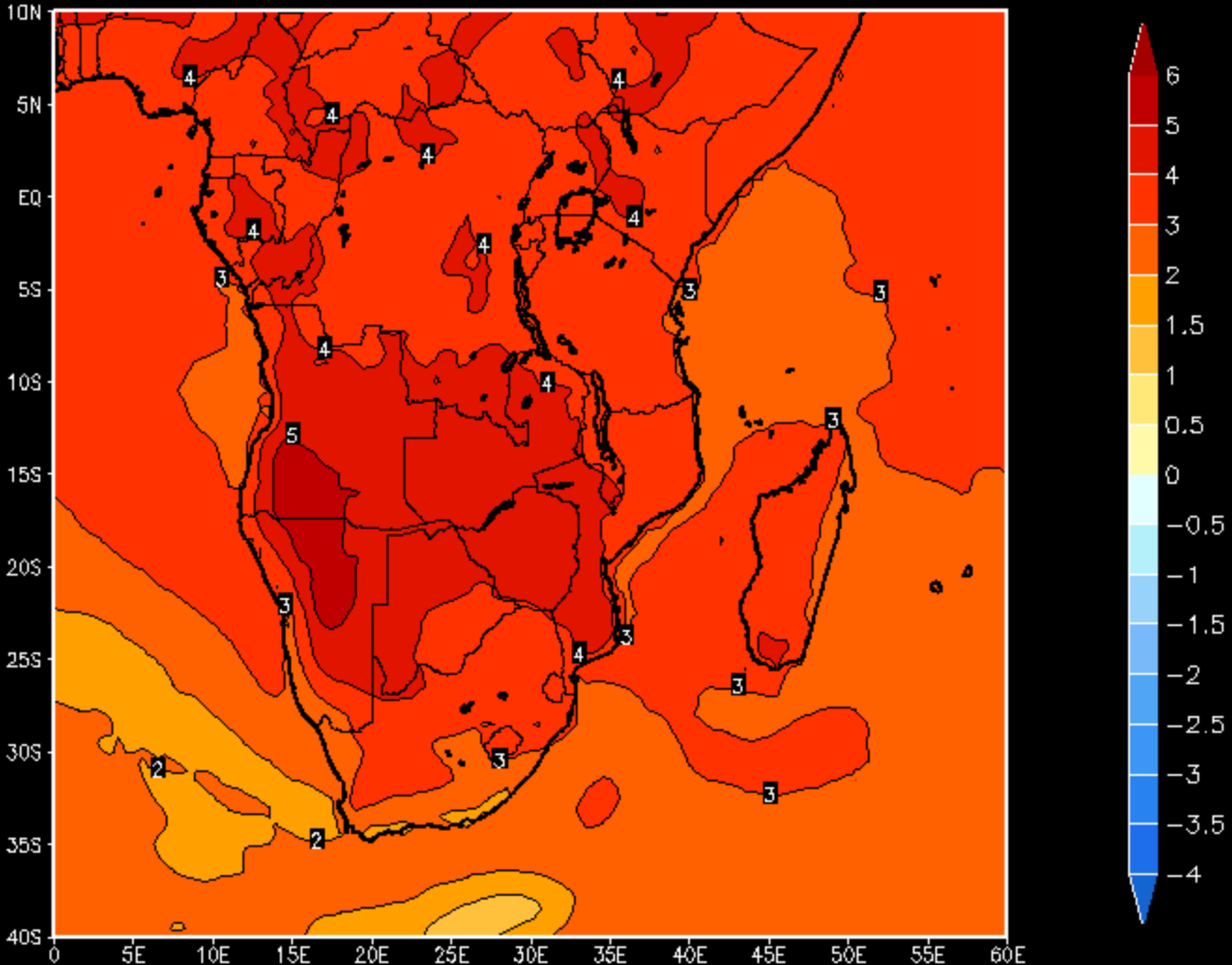
Temp anomaly 2087



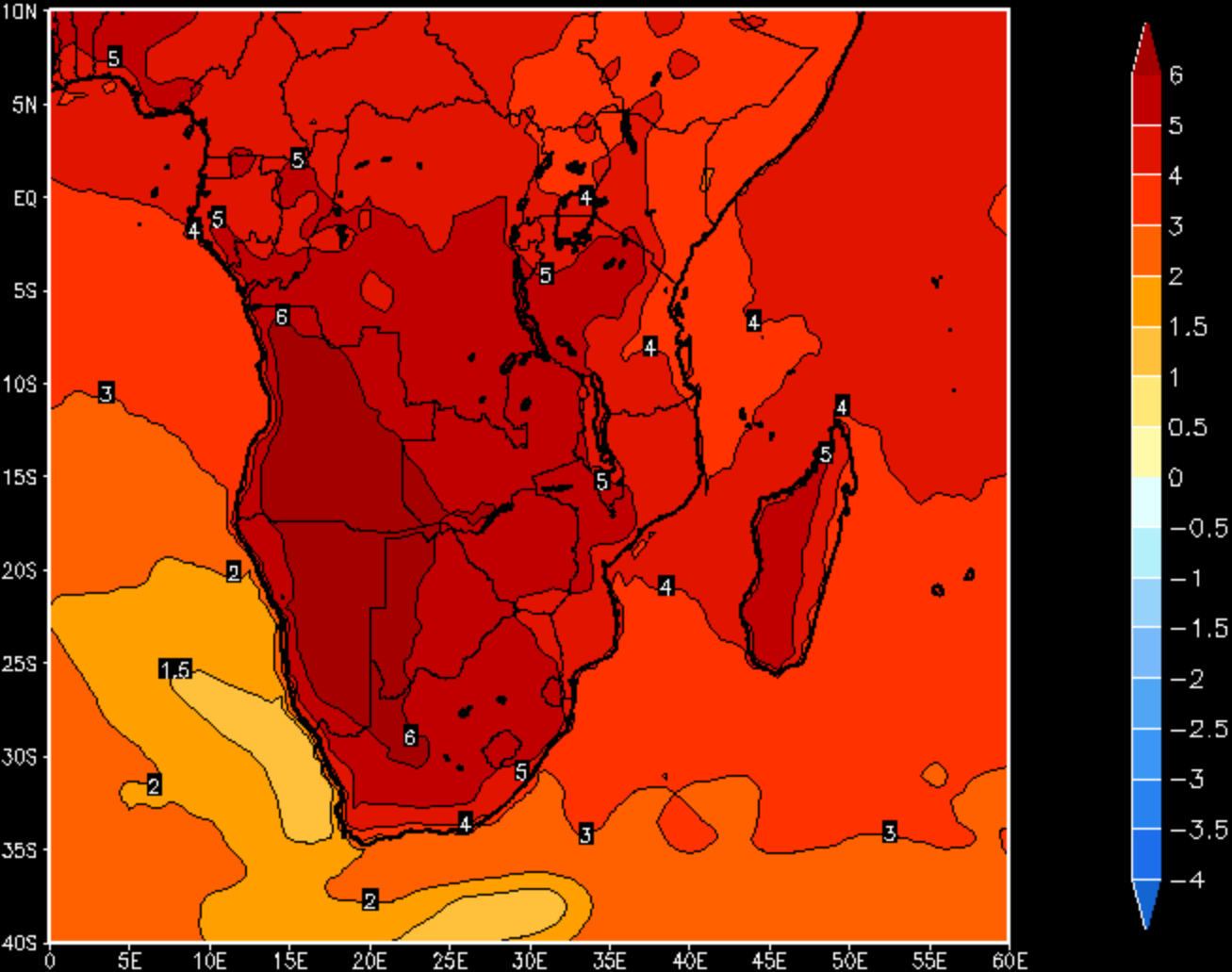
Temp anomaly 2089



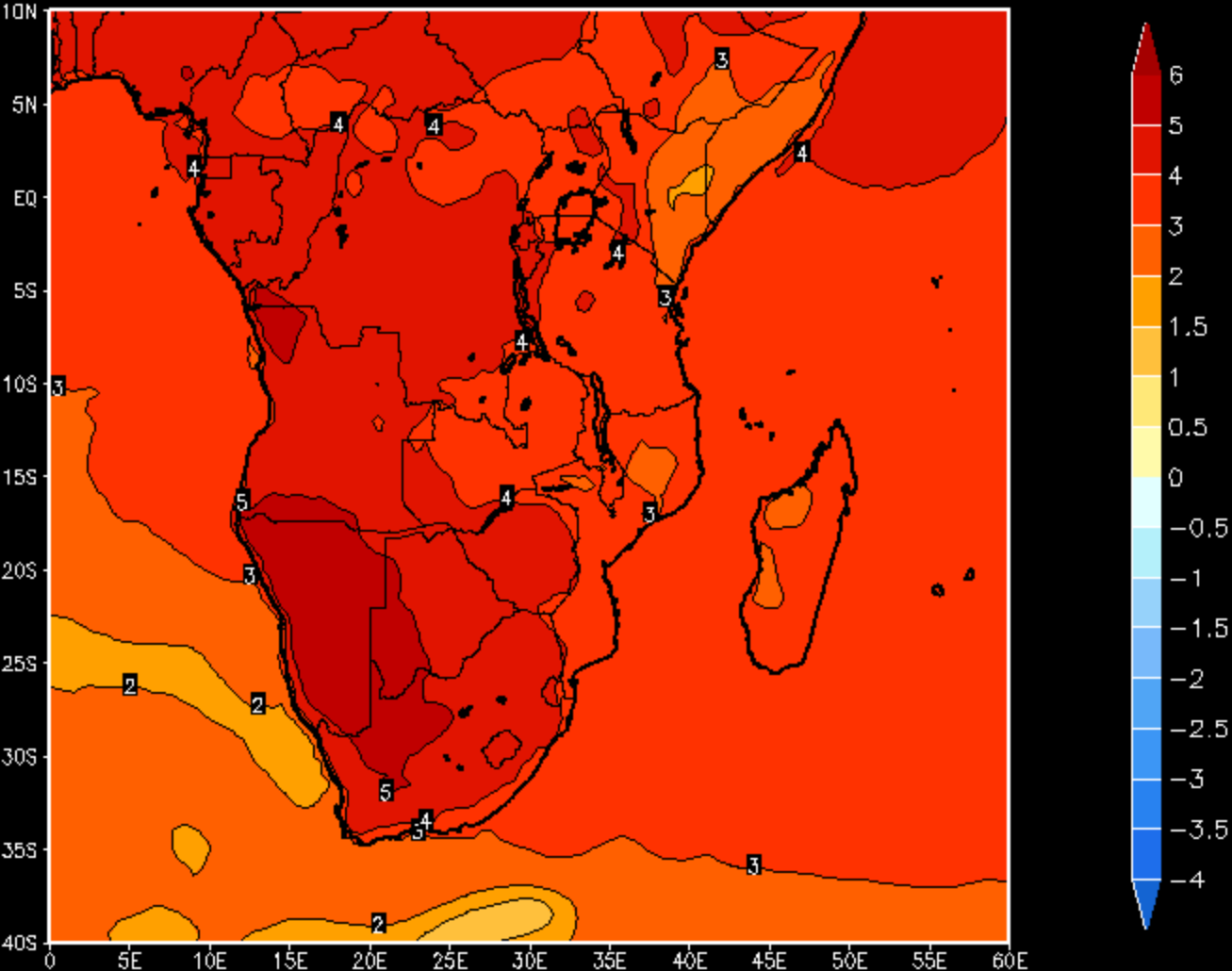
Temp anomaly 2090



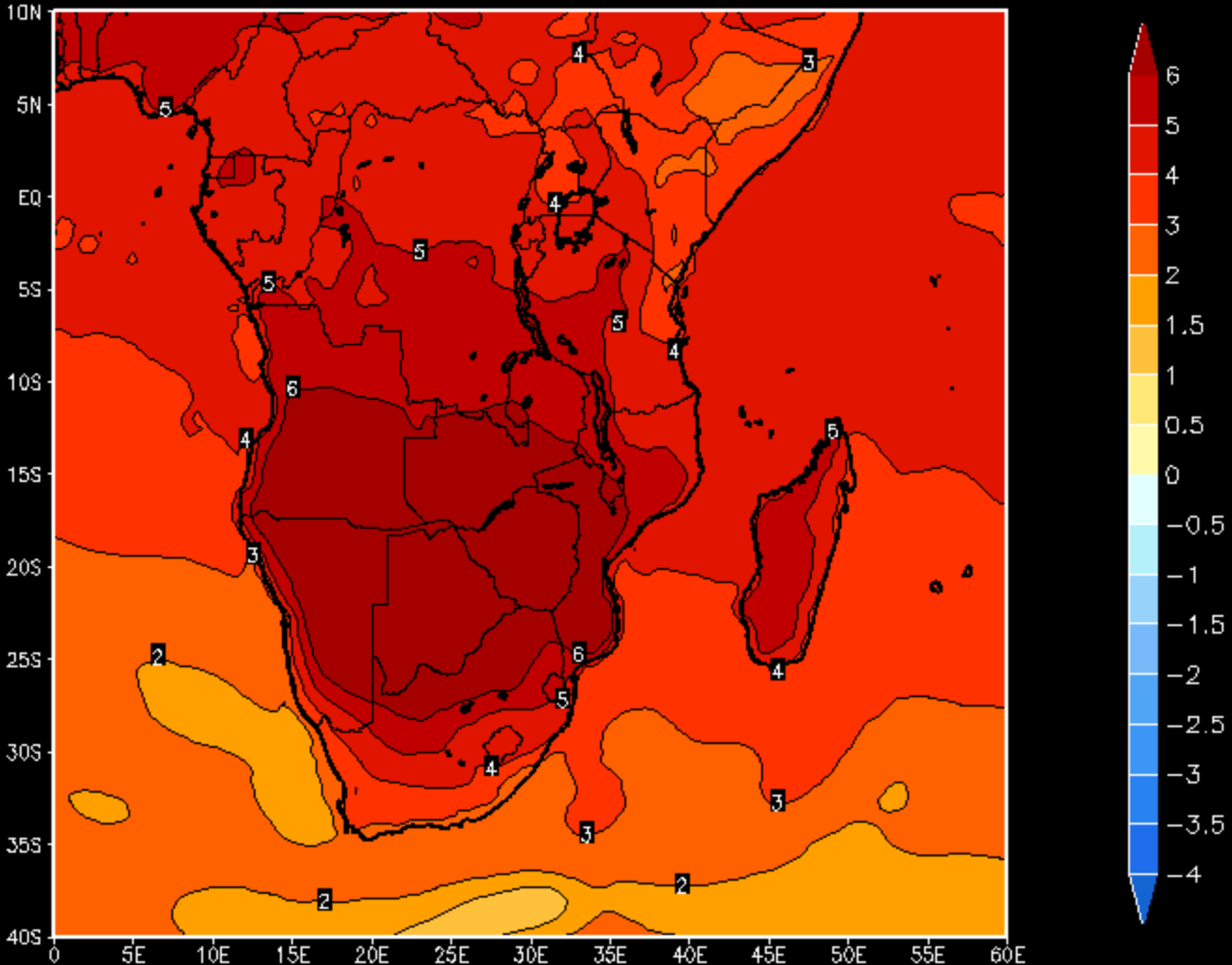
Temp anomaly 2091



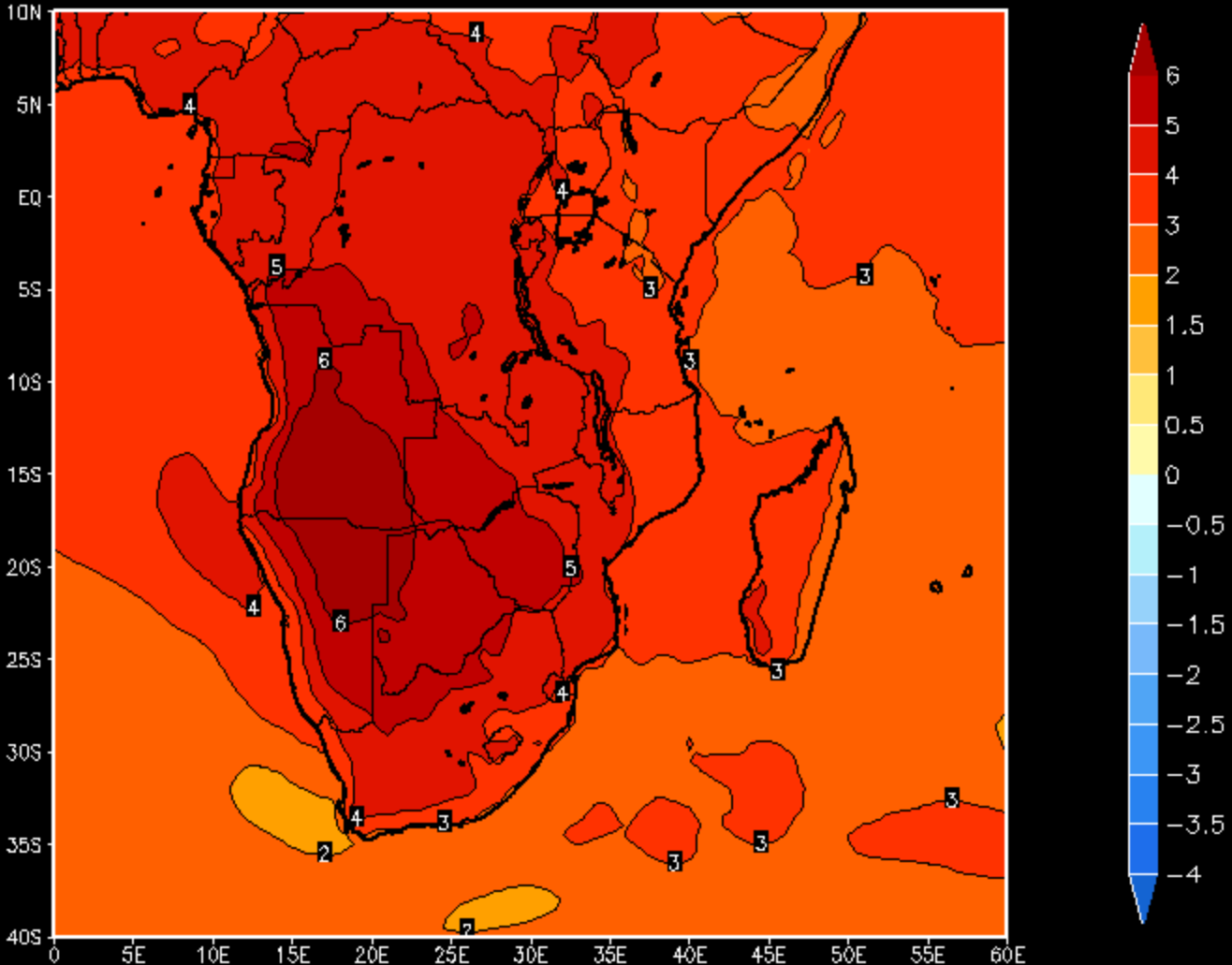
Temp anomaly 2092



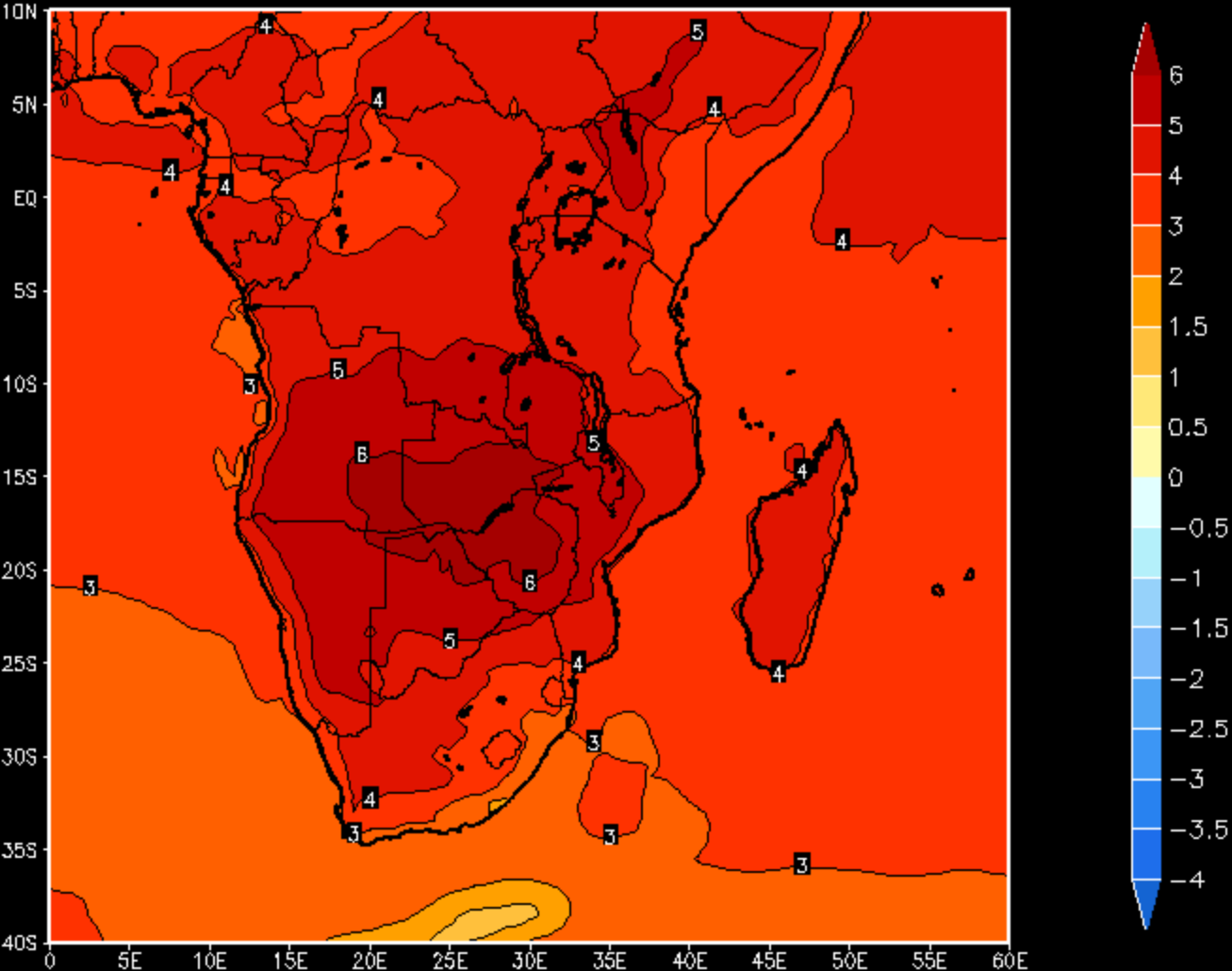
Temp anomaly 2093



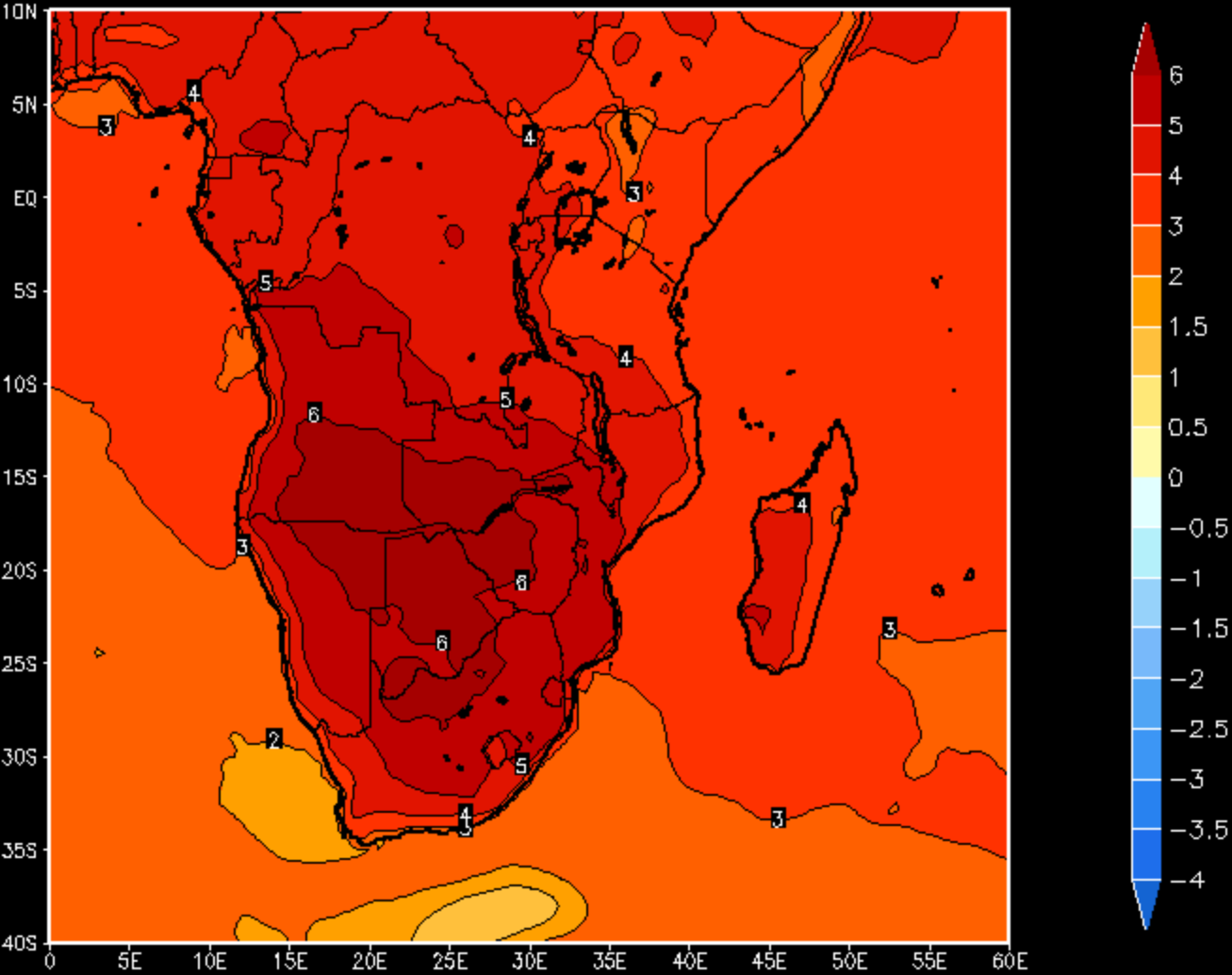
Temp anomaly 2094



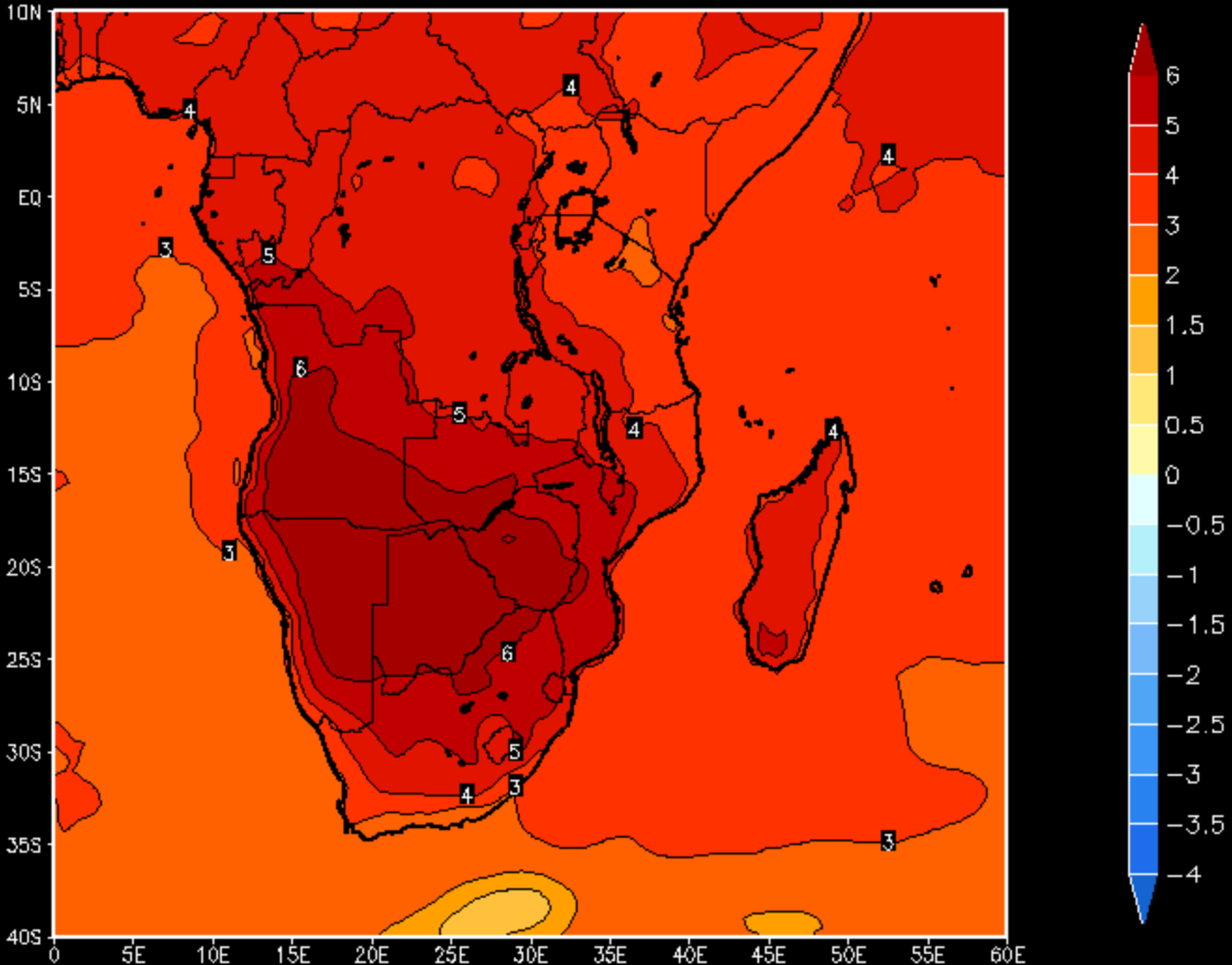
Temp anomaly 2095



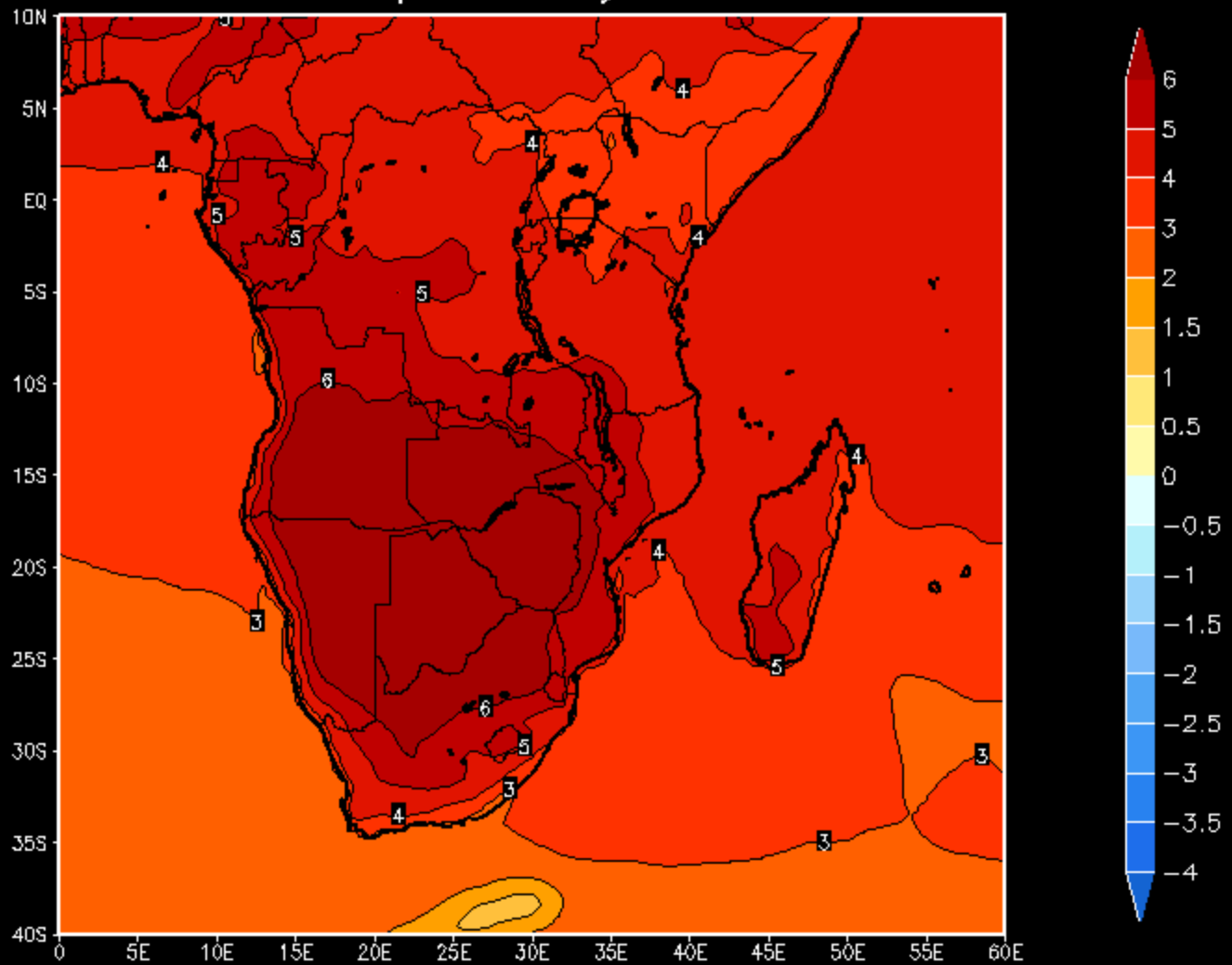
Temp anomaly 2096



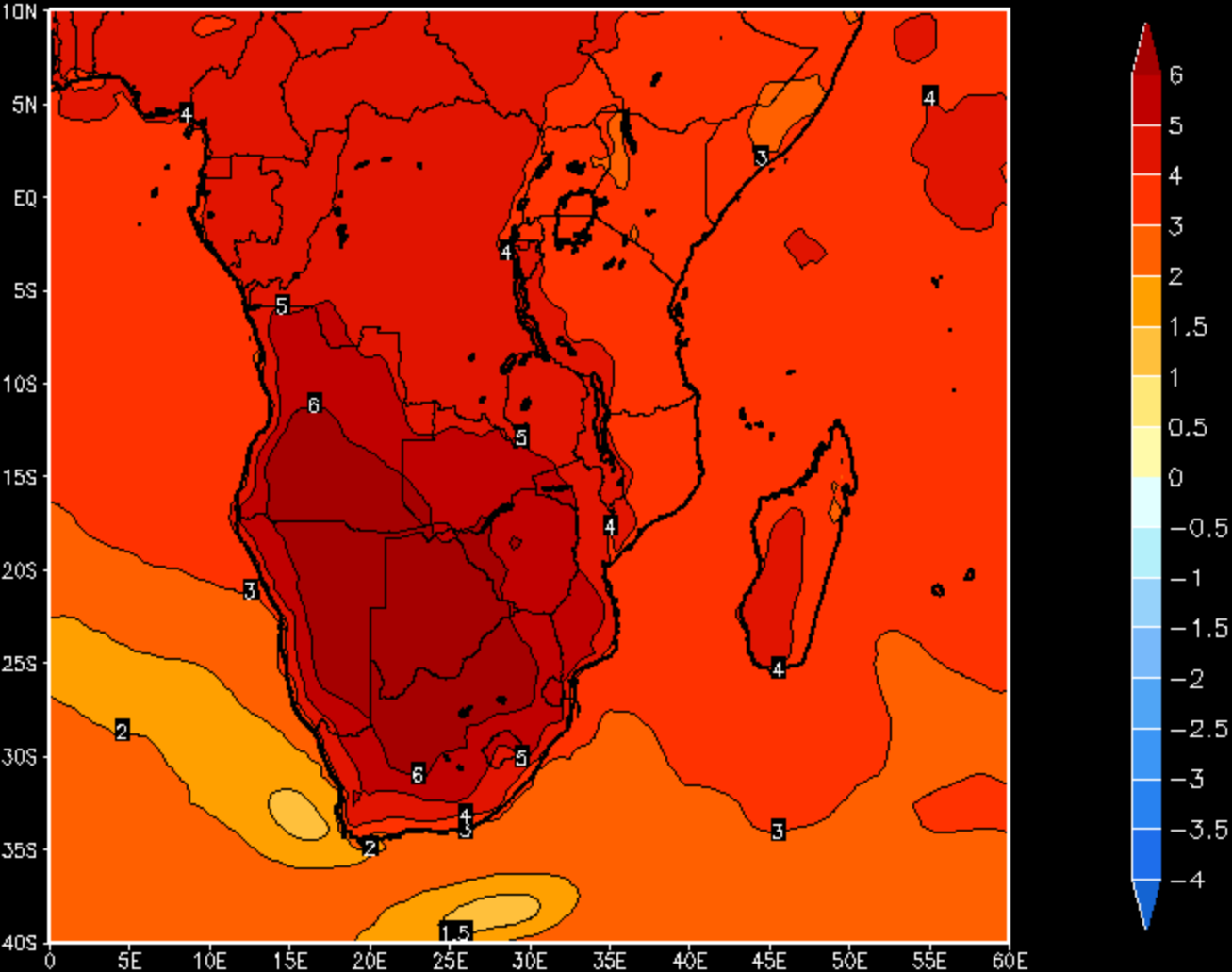
Temp anomaly 2097



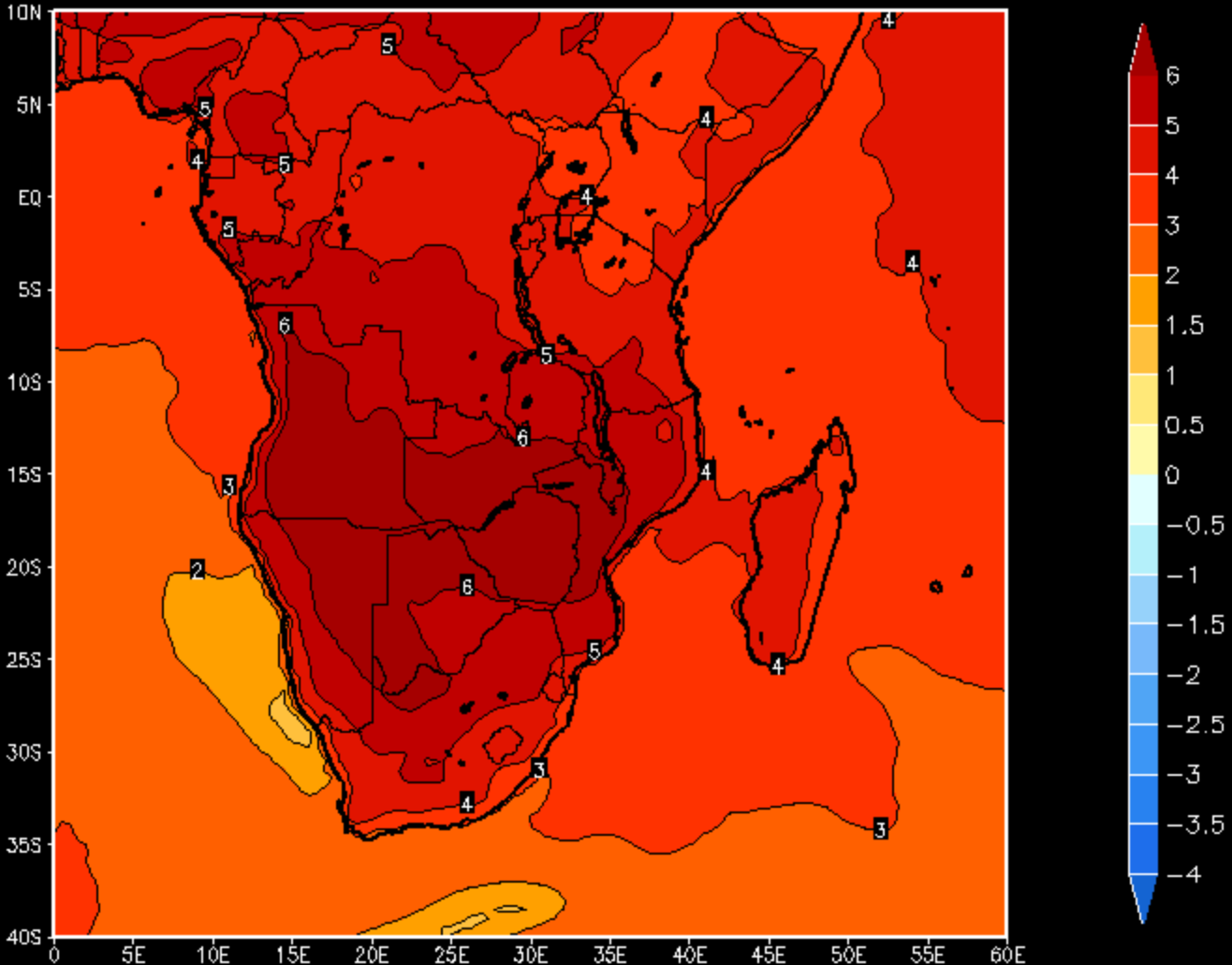
Temp anomaly 2098



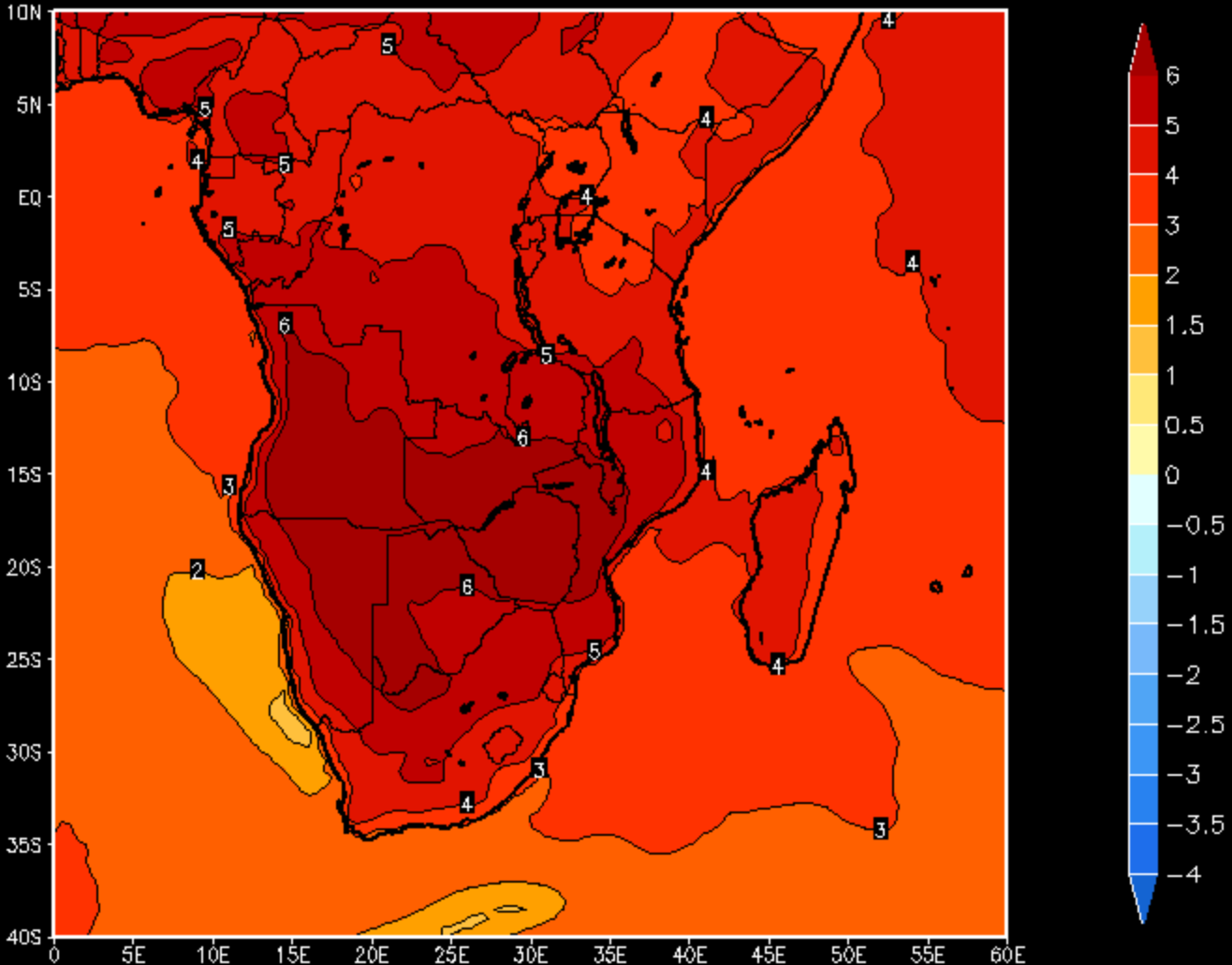
Temp anomaly 2099



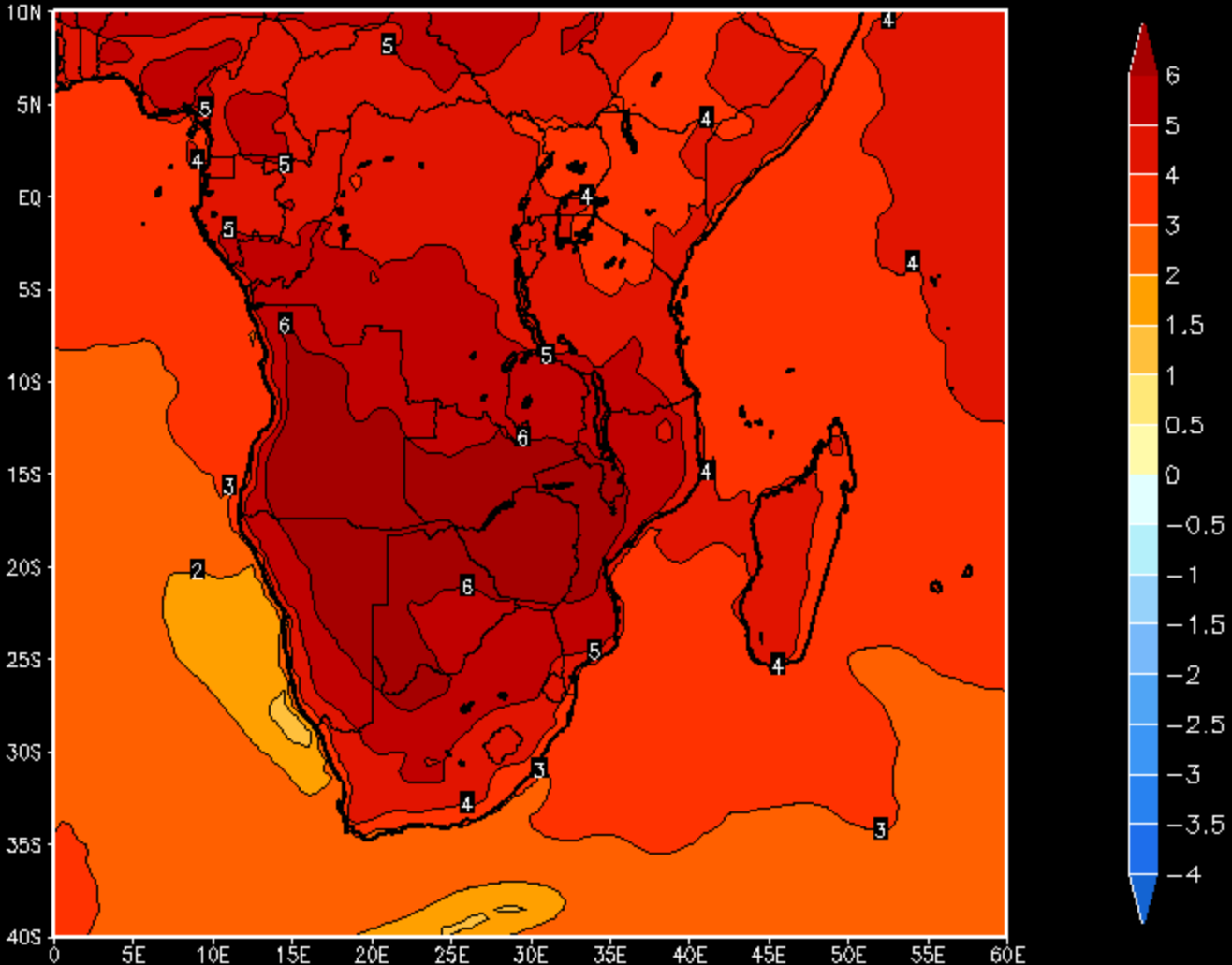
Temp anomaly 2100



Temp anomaly 2100



Temp anomaly 2100



What does this all mean for southern Africa?



What does this all mean for southern Africa?

- Biggest direct economic effects – roads!
- Livelihoods effects – local food security (dryland agriculture); human settlements
- Weather disasters – floods, drought, heat
- Water security, except in South Africa
- International land grabs for food security
- Health, pests and diseases?
- Ecosystems? Wildfire, bush encroachment, rivers and wetlands, human demands
- Coastal impacts – sea level, marine fisheries

What does this all mean for southern Africa?

- Southern Africa needs development
- Southern African emissions tiny (excl. SA)
- High global emissions have adverse impacts
- SA – peak, plateau, decline, give us time
- Adaptation and development opportunities
- Mitigation and development opportunities

Position of southern Africa in global climate change

- What is climate change – impacts on development and opportunities
- IPCC ar5 findings
- UNFCCC and emissions
- Southern Africa perspective emissions and impacts – imbalance in the region
- Impacts – climate; agriculture; water;
- Opportunities – development integrated with adaptation and mitigation
- Conclusions