

WESTERN INDIAN OCEAN

Regional coral bleaching alert

DATE OF THIS ALERT: 15 January 2011

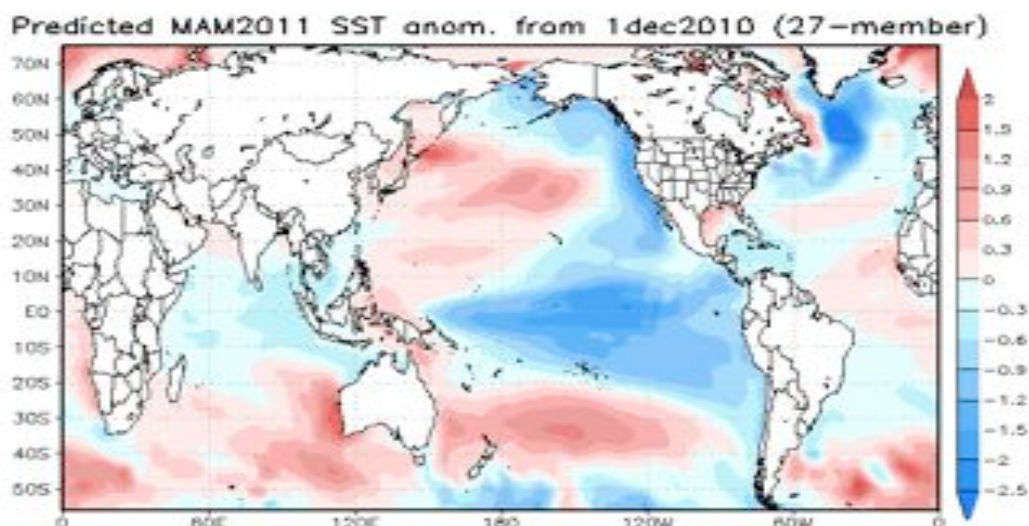
Contact: bleaching@cordioea.org or for past alerts visit: <http://www.cordioea.org/bleachingalert/>

This bleaching alert runs from January to May each year, compiling publicly available information and observations from the field into an accessible document.

Global indicators, January 2011

Based on global indicators, the suggestion is that 2011 will be a cool year, but this might change later in the year.

Global Temperatures



Source: <http://www.jamstec.go.jp/frsgc/research/d1/iod/>

From the SST anomaly map predicted for March, April and May 2011, a clear La Nina pattern is shown and this will influence the SST's in many parts of the Tropical Indian Ocean to be cooler.

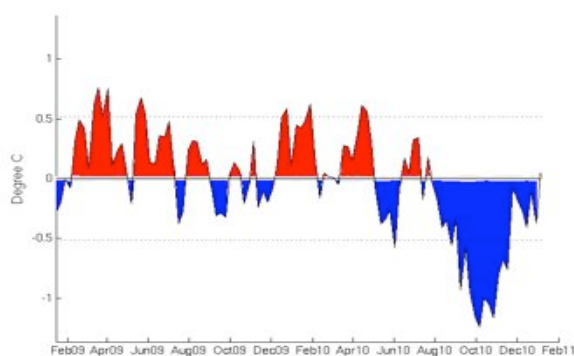
ENSO Indices

Nino 3.4 Index



<http://www.bom.gov.au/climate/enso/indices.shtml>

Dipole Mode Index (DMI)



http://ioc-goos-oopc.org/state_of_the_ocean/sur/ind/dmi

The Weekly Nino3.4 index indicates that La Nina effect has extended into the year and might be long lasting while the DMI shows a negative Indian Ocean Dipole an impression of La Nina event.

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Bleaching Alert

The table below summarizes all the information to a prediction for low, moderate or high risk of bleaching.

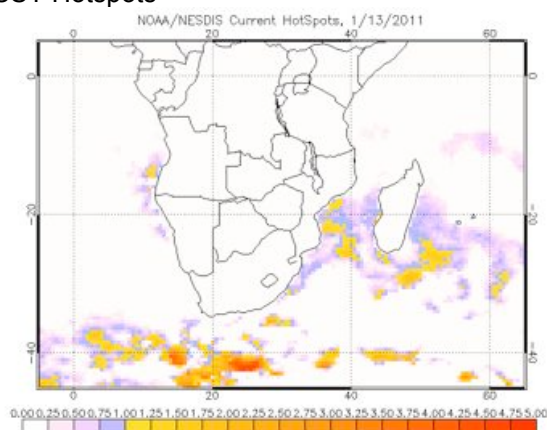
High moderate low none expected

Date	Level	Observation	Alert
15 Jan 11	Low	Global indicators suggest a cool year with La Niña and Indian Ocean Dipole conditions predicted to extend into the year. Hotspot development is so far very low restricted to the southern WIO and so cautious prediction of bleaching risk this year.	SE Madagascar, S Mozambique channel

Sea Surface Temperatures

SST maps

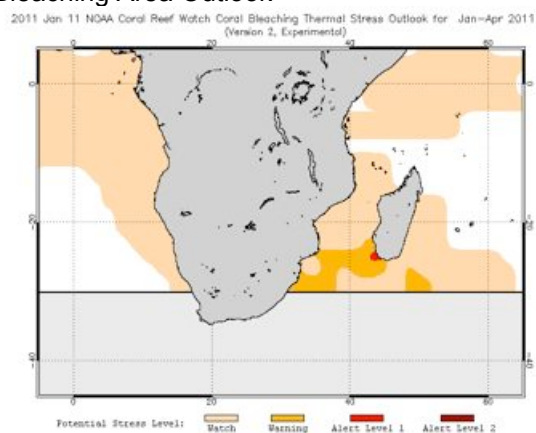
SST Hotspots



15 January 2011

Slight warming of seawater is shown around the central Mozambique channel and off southeast of Madagascar. The hotspots will likely expand and move north and west over coming weeks.

Bleaching Area Outlook



Stress outlook for Jan-April 2011

According to NOAA's coral reef watch, the potential stress level for coral bleaching in most areas of the WIO is still on watch i.e. the potential for bleaching is still low

Source:

http://coralreefwatch.noaa.gov/satellite/bleachingoutlook/outlook_messages/bleachingoutlook_current.html

Explanations

Sea Surface Temperatures (SST)

The surface of the sea heats up by direct insolation, causing stress to corals and other shallow water organisms. Satellites directly measure the skin-temperature of the sea, providing these maps and coral bleaching products for early warning.

Predicted Bleaching

The Bleaching Thermal Stress Outlook is based on sea surface temperature (SST) forecasts generated by the Linear Inverse Model from the NOAA Earth System Research Laboratory. In a normal year, the Outlook forecasts no potential for bleaching. When forecast SST exceeds bleaching thresholds over a long enough period to cause bleaching, the outlook maps display the bleaching potential.

Wind-driven mixing

Wind is an important physical factor influencing conditions conducive to coral bleaching. Wind-driven mixing reduces temperature stress and wind generated waves can scatter harmful levels of incoming solar radiation.

- Cyclones - cause strong mixing, reducing SST.
- Doldrums - periods of sustained low wind promote stratification, and heating of the upper layers of water. They therefore promote environmental conditions adverse to corals experiencing thermal and/or light stress.

Global indicators

Local temperatures are affected by global and regional trends. With global warming, temperatures are expected to rise over longer periods (decades), but significant variation can occur between years, and under the influence of regional factors such as ocean-atmosphere interactions across the Pacific and Indian Ocean.

Multivariate ENSO Index (MEI)

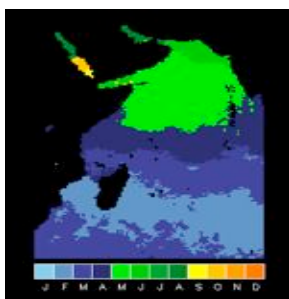
El Niño/Southern Oscillation (ENSO) is the most important coupled ocean-atmosphere phenomenon to cause global climate variability on interannual time scales. Negative values of the MEI represent the cold ENSO phase (La Niña), while positive MEI values represent the warm ENSO phase (El Niño).

Southern Oscillation Index (SOI)

The Southern Oscillation Index (SOI) is calculated from the monthly or seasonal fluctuations in the air pressure difference between Tahiti and Darwin. A 'deep' and consistently negative SOI pattern (less than about minus 6 over a two month period, with little change over that period) is associated with El Niño conditions. (Note, a negative SOI is equivalent to a positive MEI)

Dipole Mode Index (DMI)

This is a measure of the Indian Ocean Dipole (IOD), the Indian Ocean's equivalent to the Pacific Ocean's ENSO. The Dipole Mode Index (DMI) is a measure of the anomalous SST gradient across the equatorial Indian Ocean from east to west. When the DMI is positive, then the phenomenon is referred as the positive Indian Ocean Dipole (IOD), equivalent to a positive MEI and El Niño.



Climatology – Western Indian Ocean

The warmest month for sea surface temperatures is the one with highest risk for bleaching of corals.

In southern Madagascar/central Mozambique this is in February, and moves northwards with the sun through March and April in Tanzania and Kenya, to May in the northern IO

(Maximum Mean Monthly temperature, source: NOAA/Coral Reef Watch/Scott Heron)