



# Impact of Climate Change on Coral Reefs Degradation at West Lombok, Indonesia.

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## ABSTRACT

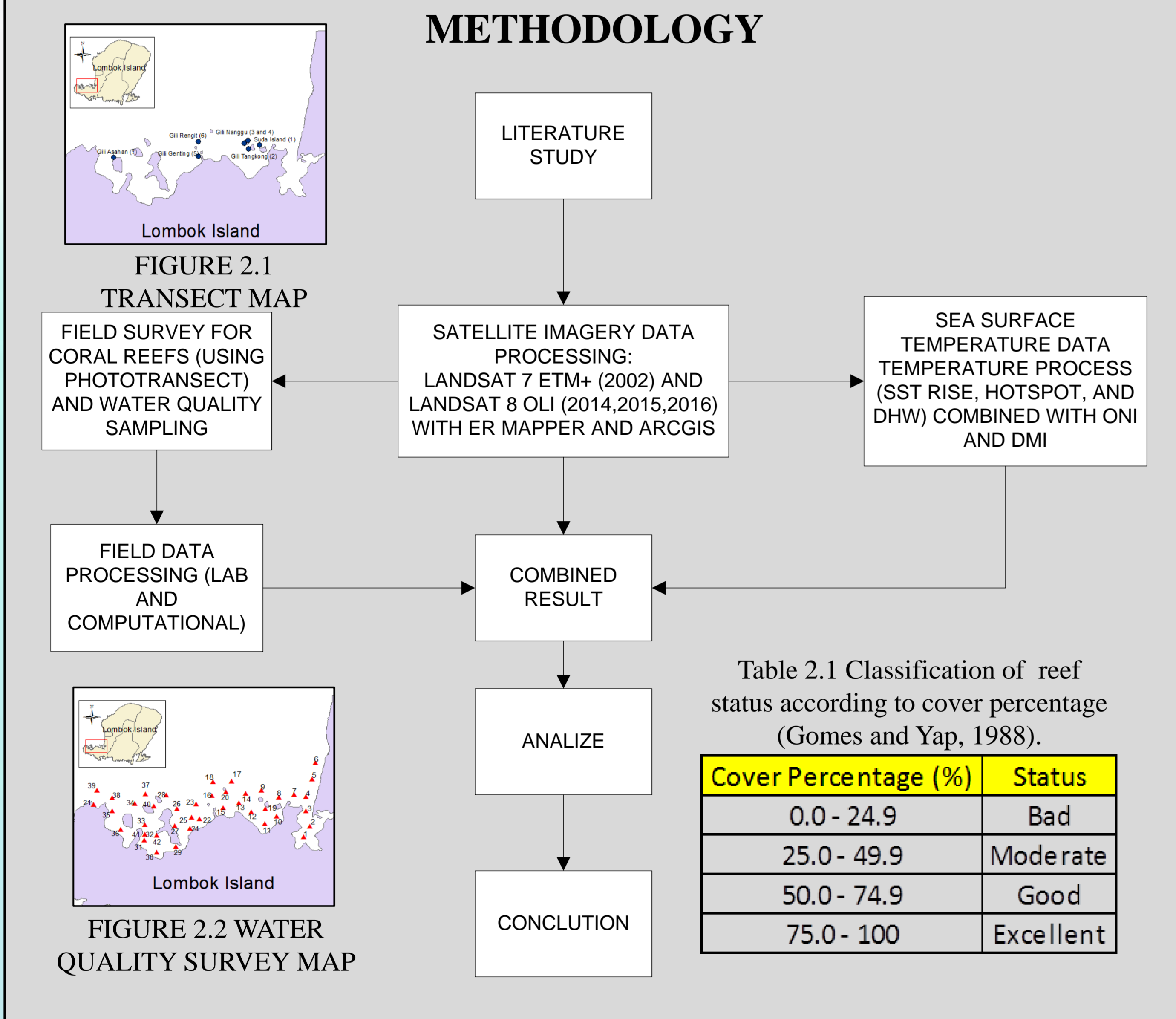
West Lombok regency, Lombok Island, especially Northern Sekotong waters is a tourism region in Indonesia, Which has beautiful coral reef and marine ecosystem. The coral reef damage has been widespread in this area. Survey has done on 23 – 28 May 2016 in collaboration with Research and Development Center of Marine and Coastal Resources, Indonesia Ministry of Fisheries and Maritime Affairs, and mapping coral reefs using Landsat 7 and Landsat 8 during 2002 – 2016 as well as processing of monthly sea surface temperature (SST) data from satellites AquaModis and OI SST V2 and daily sea surface temperature data from satellites NOAA Coral Reef Watch. The result indicate that coral reefs in this area have degradation 17,55% or 78,21 Ha from 455,68 Ha (2002) to 367,46 Ha (2016), with degradation rate is 2,8 Ha/year during 2002 – 2014; 8,1 Ha/year (2014 – 2014) and 36 Ha/year (2015 – 2016) that caused because of rise of the sea surface temperature that makes the high intensity of hotspot phenomena that causing degree heat weeks (DHW) in 2016 that reaches 9,77 °C, Another cause of coral reef degradation in this area is the spread of heavy metal waste such as Hg, Cd, Cu, Pb, and Zn.

Keyword: Coral reefs, sea surface temperature, hotspot, DHW, Lombok Island

## INTRODUCTION

Indonesia is the biggest archipelagic country in the world. Indonesia has 16 % or more than 39.500 km<sup>2</sup> world's coral reefs (Burke et al, 2012).. One of the area that has a wealth of coral reefs is Lombok Island, which is located in West Nusa Tenggara Province. In West Nusa Tenggara, coral reefs is one of the economic aset that the province have to build up (Cesar, 2000). West Lombok regency, Lombok Island, especially Northern Sekotong waters is a tourism region in Indonesia, Which has beautiful coral reef and marine ecosystem, the example is Sekotong that located in west area of Lombok Island But now, the condition of coral reefs in Indonesia, incuding Sekotong in there have been damaged. Almost 95 % threatened by human aktivty and natural disaster such as climate change (burke et al, 2012). Climate change has resulted in an increase of the intensity of El Nino and La Nina which is very influential on changes in the extent of coral reefs. Therefore, the research about impact of climate changes in coral reefs is very important for us, to knowing how much degradation that the climate change gives.

## METHODOLOGY



## CONCLUSION

The present study revealed that coral reefs in Sekotong waters has been decreasing due to coral mortality and bleaching caused by rising of sea surface temperature that can be show by hotspot appearance and DHW especially in 2016 where the DHW reached 9,77 °C and should make coral mortality likely. Classification result from satellite imagery year 2002, 2014, 2015, and 2016 show coral reef that live in Sekotong waters decreases every year, it is know that there is degradation of 7,65% (34,11 Ha) from 2002 to 2014, 1,97 % (8,1 Ha) from 2014 to 2015, and 8,94% (36 Ha) from 2015 to 2016, with a total of 17,55% degradation from 2002 to 2016 or 78,21 Ha. Other possible reason why coral reef decreasing is sea water quality that no longer meet standart such as temperature, salinity and a lot of heavy metal waste disposal.

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## RESULT

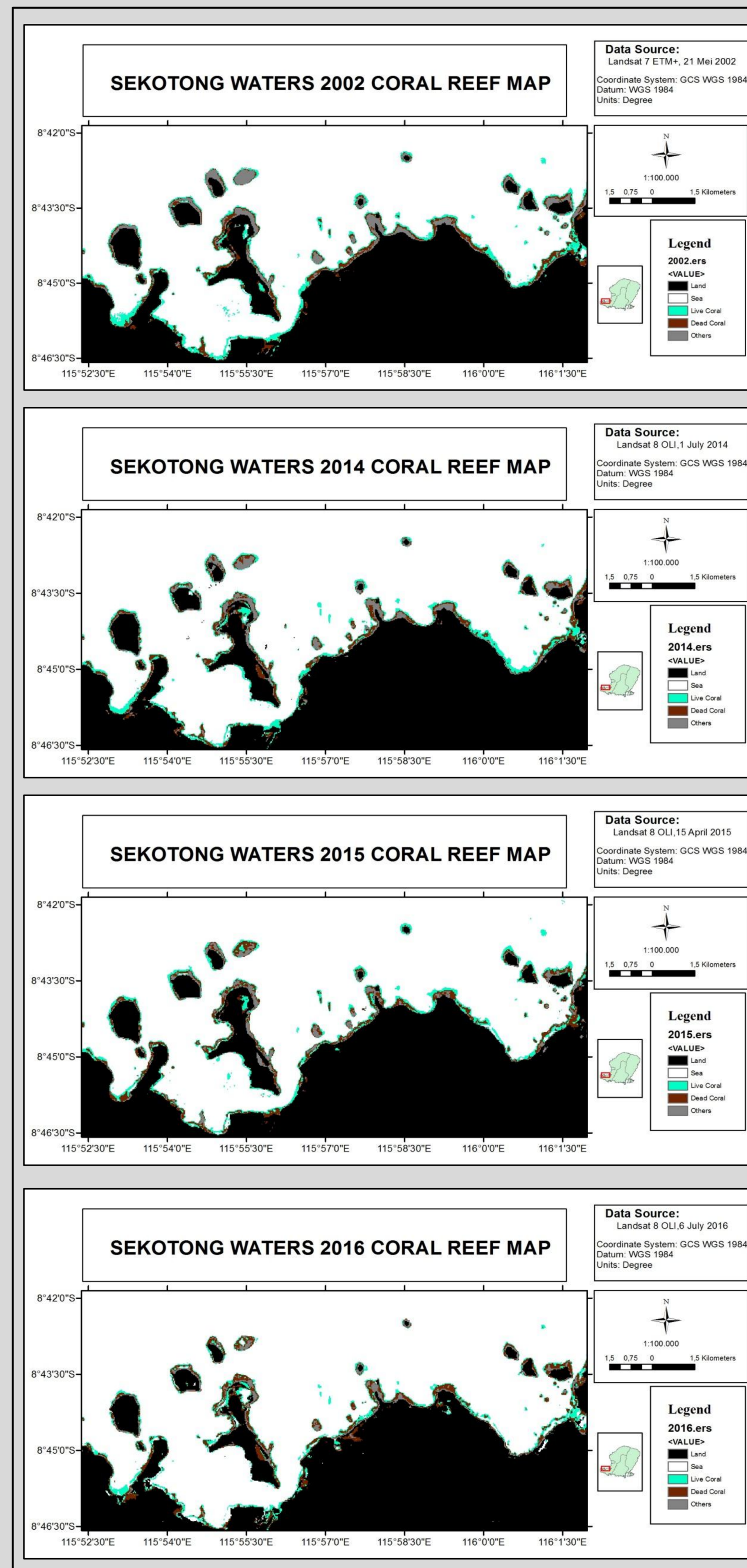


Figure 3. 1 Sekotong waters coral reef map 2002 - 2016

Table 3.2. Degradation rate of coral reef

Year	Degradation rate of coral reefs/year	
	Ha/Tahun	Persen/Tahun
2002-2014	-2.84	-0.64%
2014-2015	-8.1	-1.97%
2015-2016	-36	-8.94%

Table 3.1 Wide area of live coral and dead coral/year

Year	Live Coral (Ha)	Dead Coral (Ha)
2002	445.68	375.84
2014	411.57	383.67
2015	403.47	413.36
2016	367.47	449.46



Figure 3.2Coral reef in Gili Asahan



Figure 3.3 Coral reef in Gili Tangkong

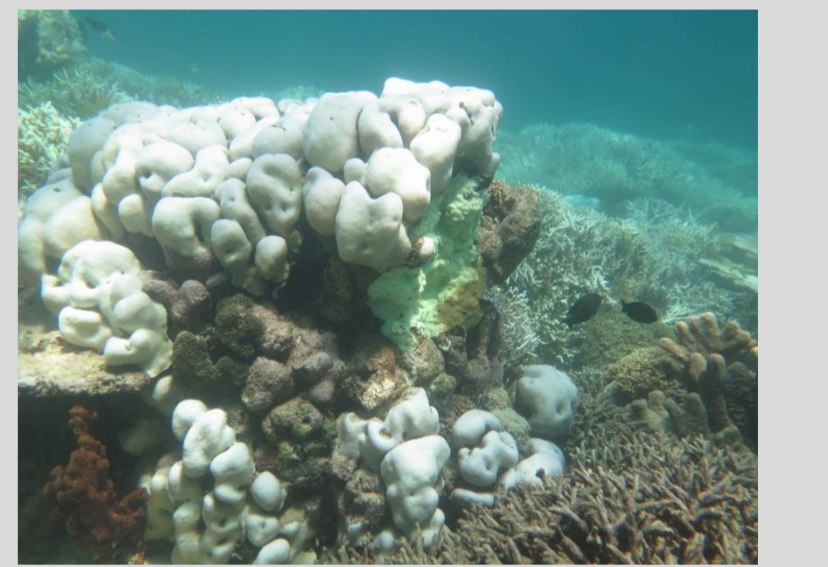


Figure 3.4 Coral reef in Gili Asahan

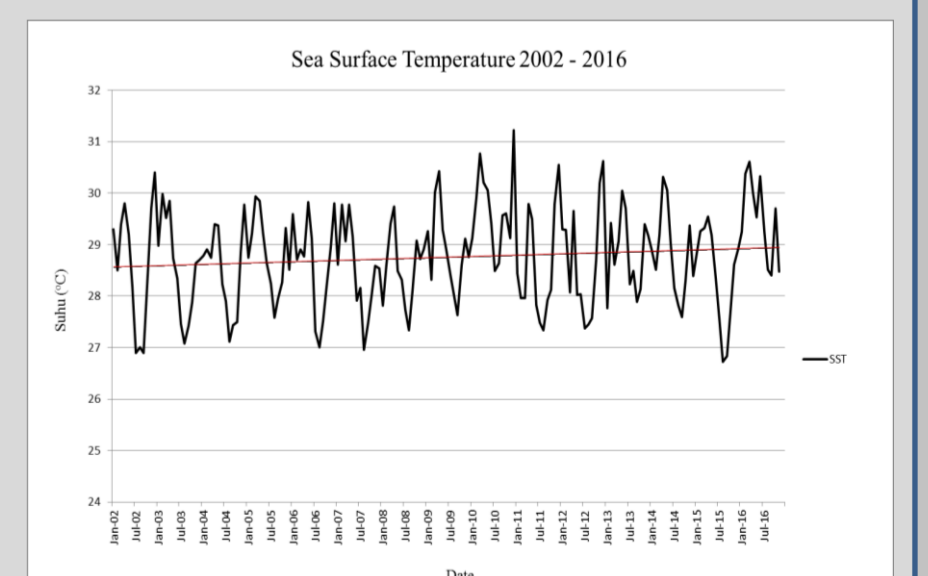


Figure 3.5 Rise of SST 2002 - 2016

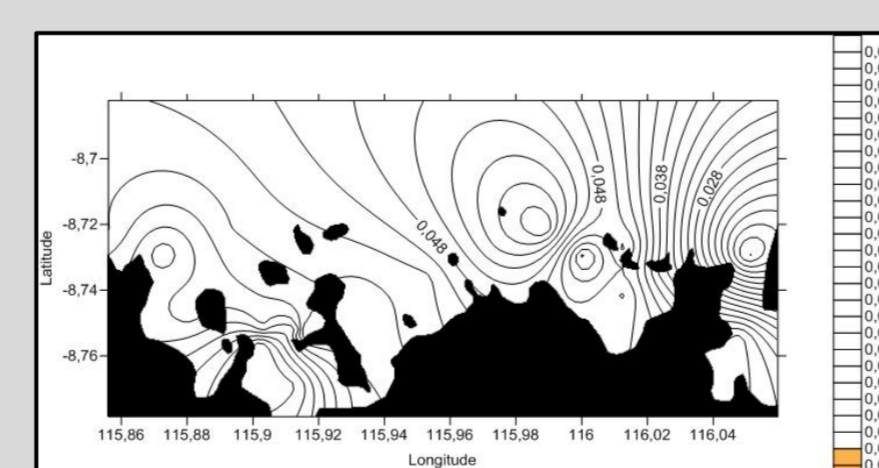


Figure 3.6 Spatial distribution of Pb in Sekotong waters

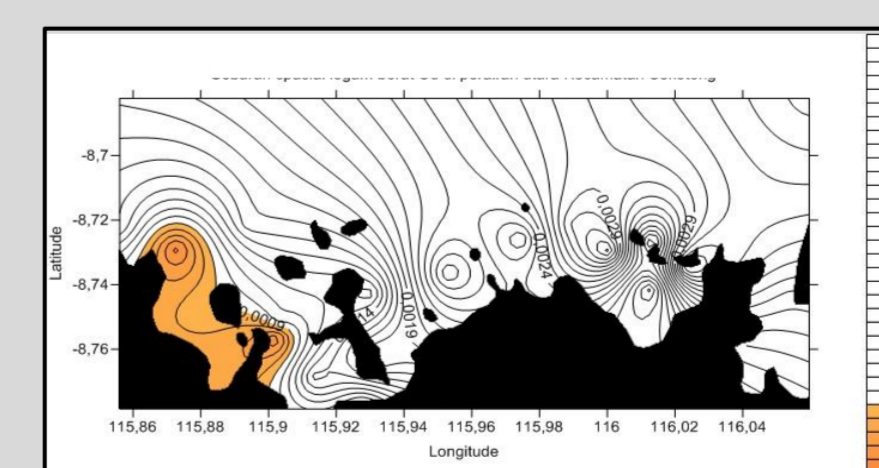


Figure 3.7 Spatial distribution of Cd in Sekotong waters

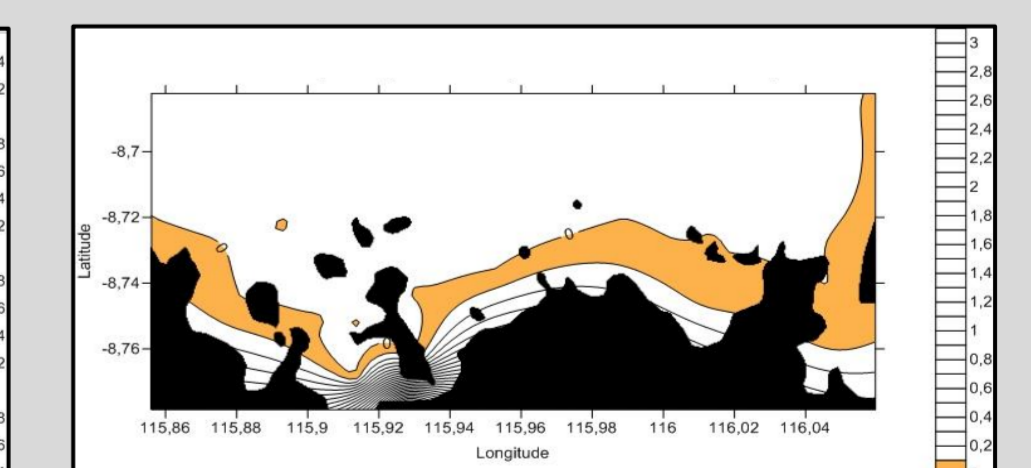


Figure 3.8 Spatial distribution of Cu in Sekotong

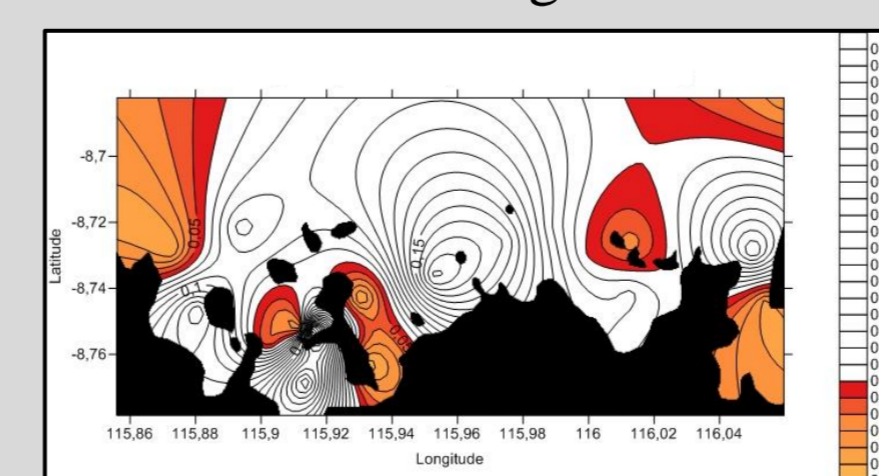


Figure 3.9 Spatial distribution of Zn in Sekotong waters

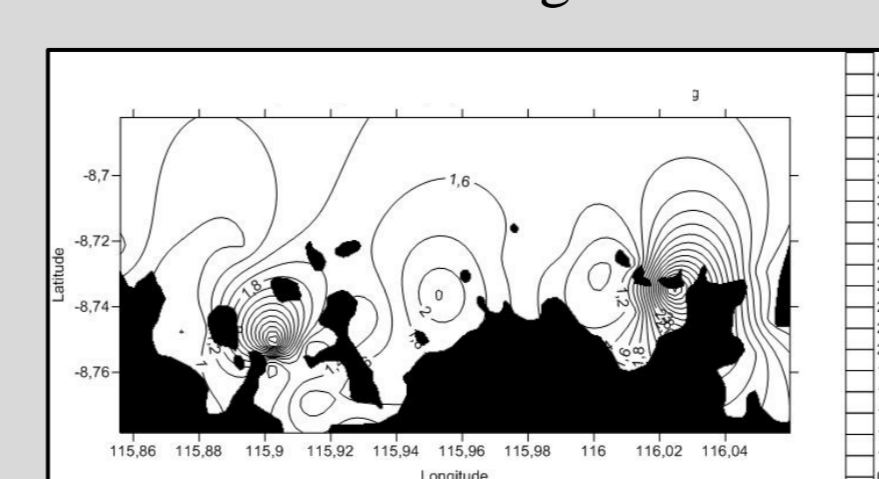


Figure 3.10 Spatial distribution of Hg in Sekotong waters

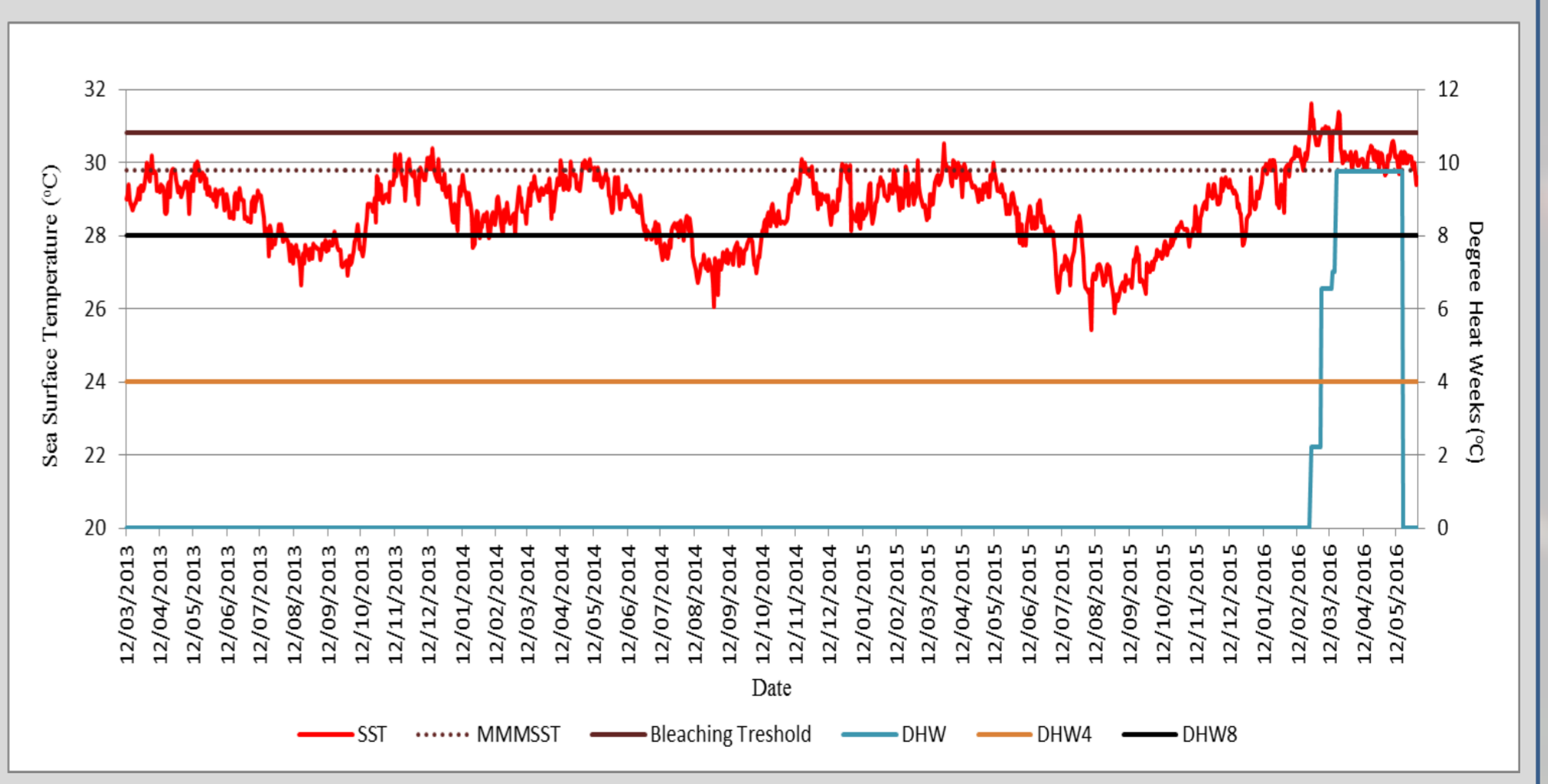


Figure 3.11 Result of data processing in DHW, Maret 2013 – Mei 2016 period.