

# The Will to Save Lives and Reduce Risks

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**the scientist: “the island is sinking.”**  
**the community: “like a boat?”**

# PULAU KITA TENGCELAM...

## APAKAH INI BERHUBUNGAN DENGAN GEMPABUMI?



Pulau yang tenggelam, informasi dari Coral dan pengukuran dengan GPS membantu kita memahami bumi.



Puslit Geoteknologi



Tectonic Observatory

# OUR ISLANDS ARE SINKING... BECAUSE OF EARTHQUAKES!

## 1 What is an earthquake?

An EARTHQUAKE is a trembling of the ground caused by sudden breakage and sliding of rock along a fault zone. The region in the west of Sumatra has many earthquake sources, because it is located along the plate boundary, where an oceanic plate is subducting under Sumatra and pushing on the rocks below the islands.



For tens to hundreds of years, the earth blocks squeeze very slowly against each other. The pressure builds up until it exceeds the rock strength, at which time the rocks break suddenly. This sudden breaking causes the islands to pop up and seismic waves to spread through the surrounding region.

## 2 How do we know our islands are sinking?

BEACHES are slowly moving onto land.

TREES that used to be growing on land have now drowned and are sitting in the water off shore.

From investigating CORALS and measuring land movements by modern GPS INSTRUMENTS



## 3 What do our corals tell us?



CORAL shaped like cups show the islands are sinking during the centuries between earthquakes.

For tens to hundreds of years, coral grows faithfully record events when the islands pop up, and periods when the islands slowly sink.

Shaded areas show places where the ocean's crust broke under the islands, and they sank for 2 meters during the earthquake.

Historical large earthquakes of the Batu and Mentawai Islands.

1797/99 During the quake a tidal wave rose along the coast, which reached a height of 50 feet above the usual water level. At this occasion a reef was about 100 feet high and dangerous for the navigation.

Personal accounts of earthquakes taken from the historical record 1797 February 10, about 10pm. West coast of Sumatra. The first great earthquake must have been a 100 wave back, which was followed by a 100 wave back. The water was so high that the beach was covered and at the same time many cottages were washed away. In the wall of most buildings tall cracks. During the whole night as well as during the whole day the ground was in a moving position. Every 15-20 minutes a loud shaking took place.

## 4 What is happening now with our islands?

The GPS (Global Positioning System) instruments deployed in the Batu and Mentawai Islands are modern tools to measure movements of land very accurately.

Records of the instruments show that the islands are slowly sinking and SQUEEZING toward Sumatra at about a few centimeters per year. This indicates that we are in a period of earth-pressure accumulation that began after the last major earthquakes. This squeezing will continue until the next large earthquake.

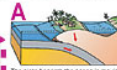


## 5 What happens to the ocean water if the islands suddenly spring up?

When the rocks beneath the islands spring up, the sudden movement causes the ocean water to flow AWAY from the land.

When the ocean comes back onto the islands, it comes in a series of waves. These waves are TSUNAMIS.

Tsunami waves can be very small (centimeters) to very large (tens of meters).



## 6 How can we prepare for earthquakes and tsunamis?

Earthquakes may strike without warning. However, we can make preparations to lessen their damaging effects. First, let's understand what causes them. Second, let's try to avoid as many earthquake dangers as possible.

Buildings made from wood or other light materials are safer than those made from heavy materials, because if they fall during an earthquake they are less likely to hurt us.

Following an earthquake, high ground faraway from the beach is a good place to be to avoid tsunami waves.

MORE EARTHQUAKE INFORMATION

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**the community: “are we safe?”**  
**the scientist: “we can model.”**



# '...the unpopular tsunami earthquake' Mentawai Tsunami , October 25 2010

- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- **2010**



A good example of a  
'worst case scenario'

Mentawai Assessment  
on Preparedness,  
February 2011

LIPI-BNPB-Australian  
Indonesian Facility for  
Disaster Reduction





- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- **2012**
- 2013

**‘...the unpopular Outer-rise earthquake’  
Aceh, Mag 8.5, April 11 2012**







**Outerise earthquake tsunami,  
Urban city Padang, 11 April 2012**



**Mind the (capacity) gap**

**who owns the risk?**







Schools, Y%

Agriculture Z  
%

Women and Household X  
%

100%

DRR

mainstreamed?

Social  
welfare, A%

Infrastructure & Public  
Works, D%

Marine and  
Fisheries, M%

Communication & Information C%

Tourism, E%

Ports and  
Transportation, B%



# Mainstreaming disaster risk reduction into the creative industry and intercultural dialogues



LIPI-Indonesian Institute of Sciences

***“..music is an amazing system. It transforms messages more acceptable to its listeners. It’s a form of human’s greatness in creativity..”*** Herbie Hancock – World Jazz Legend, 2011

**...the perfume effect?**





## Indonesian “Sesame Street”: EQ education



