

# Field survey of Palu Tsunami, 20180928

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# Members & Itinerary

Fumihiko Imamura, Tohoku University

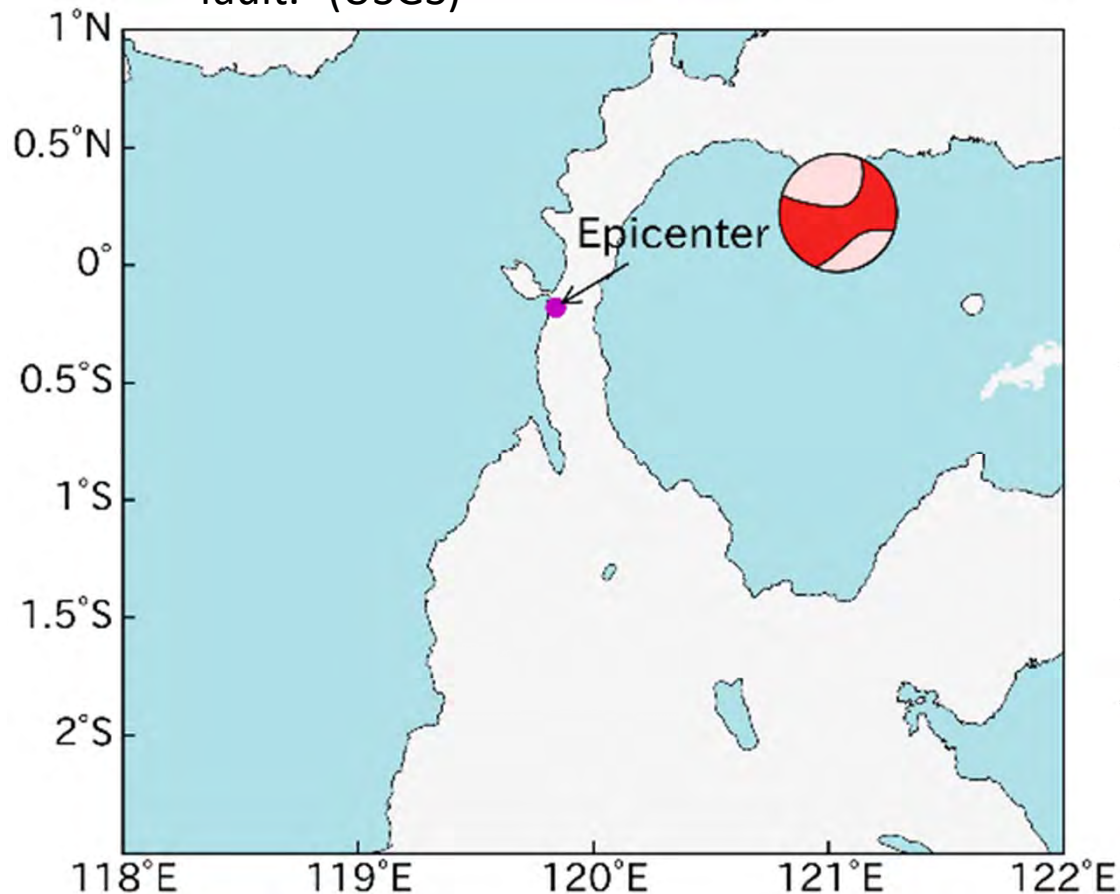
Abdul Muhari, Marine Spatial Management, MMAF

Taro Arikawa, Chuo University

- 2<sup>nd</sup> /Oct Tokyo to Jakaruta 3<sup>rd</sup> /Oct
- 3<sup>rd</sup> /Oct Meeting at Jakaruta
- 4<sup>th</sup> / Oct Jakaruta to Palu
- 5<sup>th</sup> / Oct Field Survey in Palu
- 6<sup>th</sup> / Oct Palu to Jakaruta
- 7<sup>th</sup> / Oct Presentation at Jakaruta and to Tokyo(8<sup>th</sup>)

# Summary of the earthquake

- “The September 28, 2018, M 7.5 earthquake near Sulawesi, Indonesia occurred as a result of strike-slip faulting at shallow depths within the interior of the Molucca Sea microplate, part of the broader Sunda tectonic plate. Focal mechanism solutions for the earthquake indicate rupture occurred on either a left-lateral north-south striking fault, or along a right-lateral east-west striking fault.” (USGS)



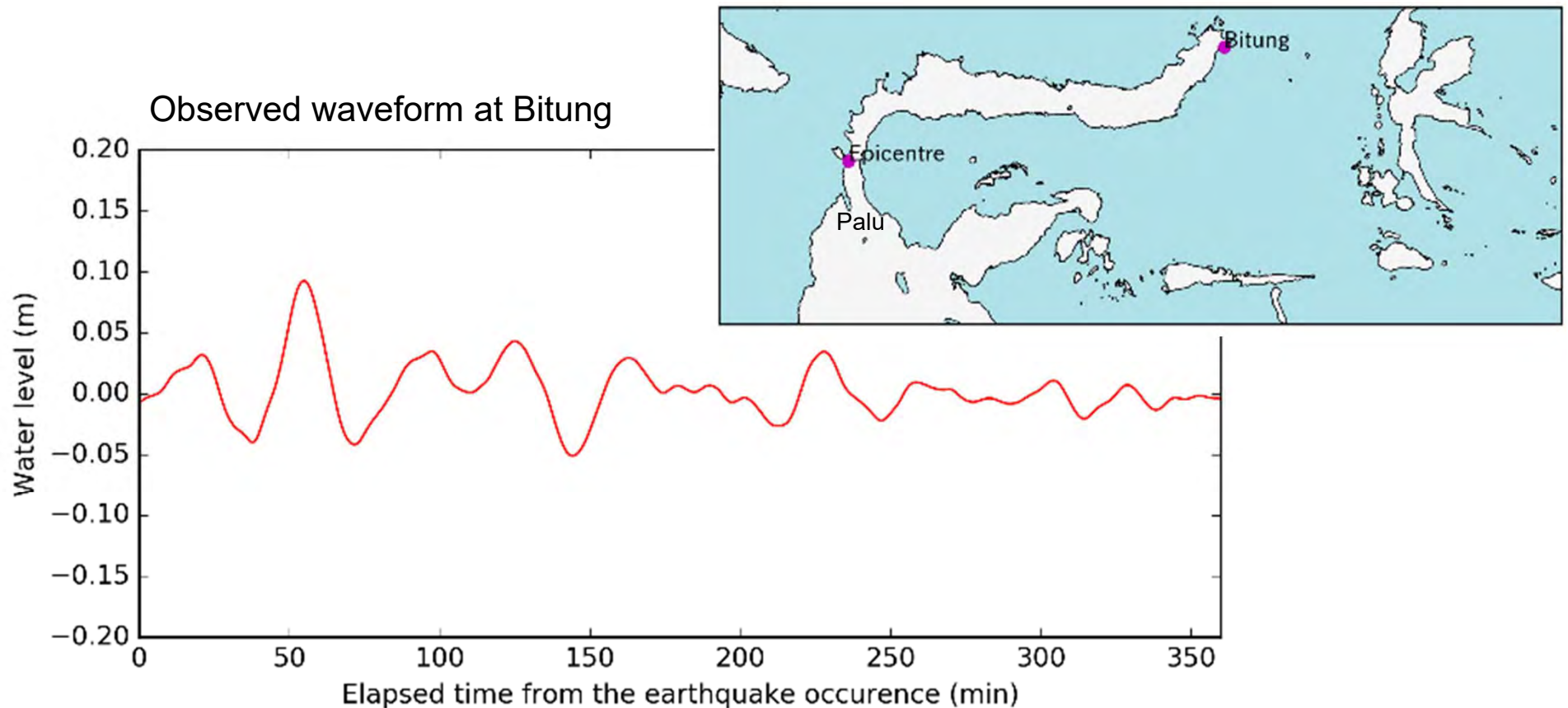
Moment	2.497e+20 N-m
Magnitude	7.53 Mww
Depth	13.5 km
Percent DC	90%
Half duration	20.48 s

Plane	Strike [deg]	Dip [deg]	Rake [deg]
NP1	87	74	-156
NP2	350	67	-17

Parameter source: USGS

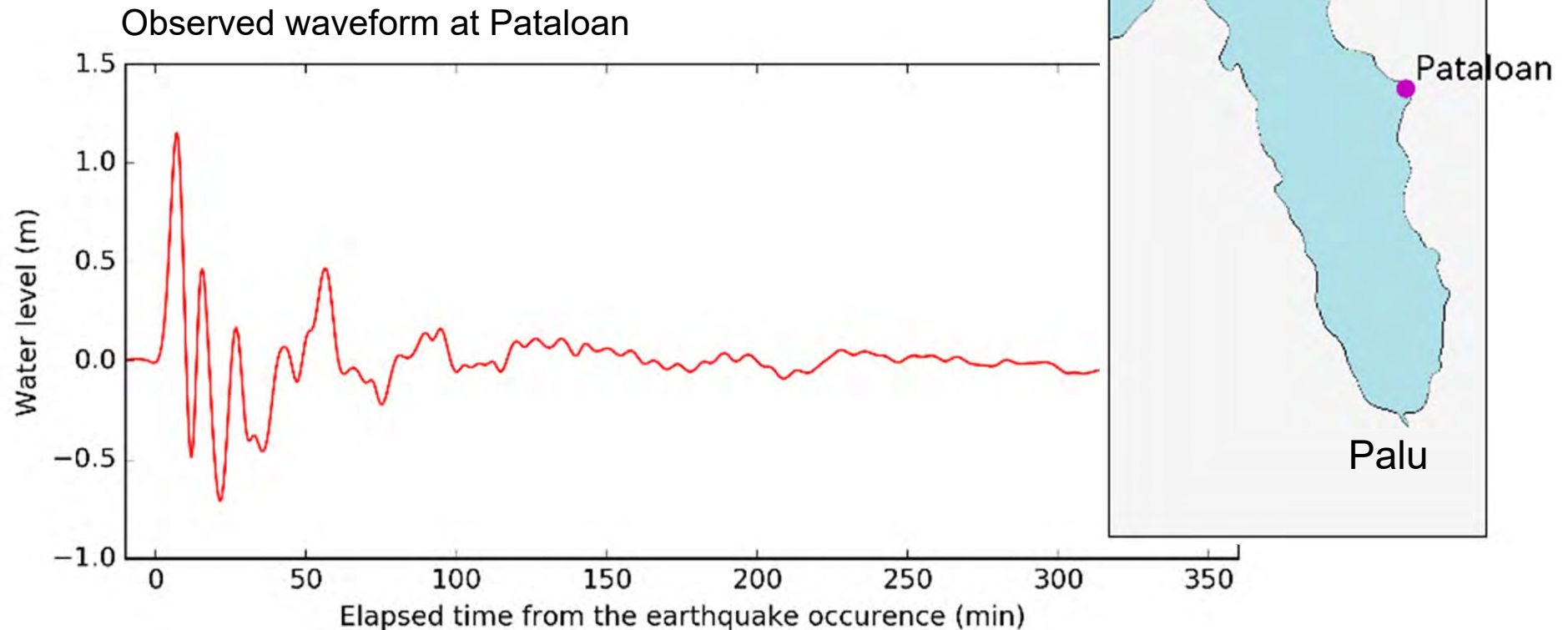
# Tsunami observations - waveform

- A tidal observation data at Bitung was analysed.
- The tsunami waveform was extracted through a filtering ( $T = 4$  to 128min).



# Tsunami observations - waveform

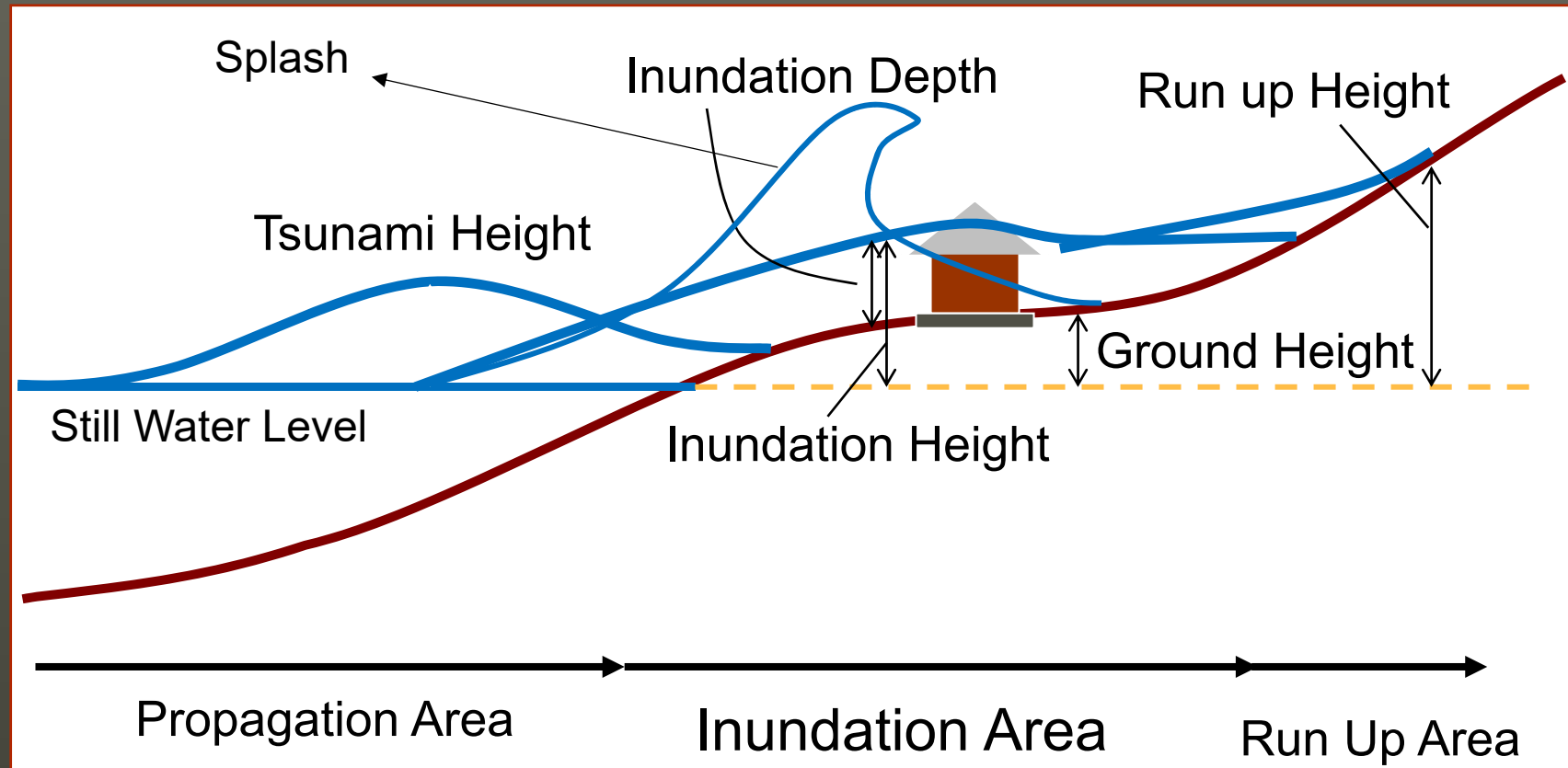
- A tidal observation data at Pantoloan was analysed (the nearest observation point).
- The tsunami waveform was extracted through a filtering ( $T = 4$  to 128min).



# Survey Point

- In Palu City ( south coast of the Bay of Palu)
  - Imamura & Muhari
- In the east coast of the Bay of Palu
  - Arikawa
  - (Courtesy to Mr. Akihiro Nakajima, The Daily Jakarta Shimbun)

# Definition of Tsunami Height





# Field Survey in the south coast of the bay of Palu





























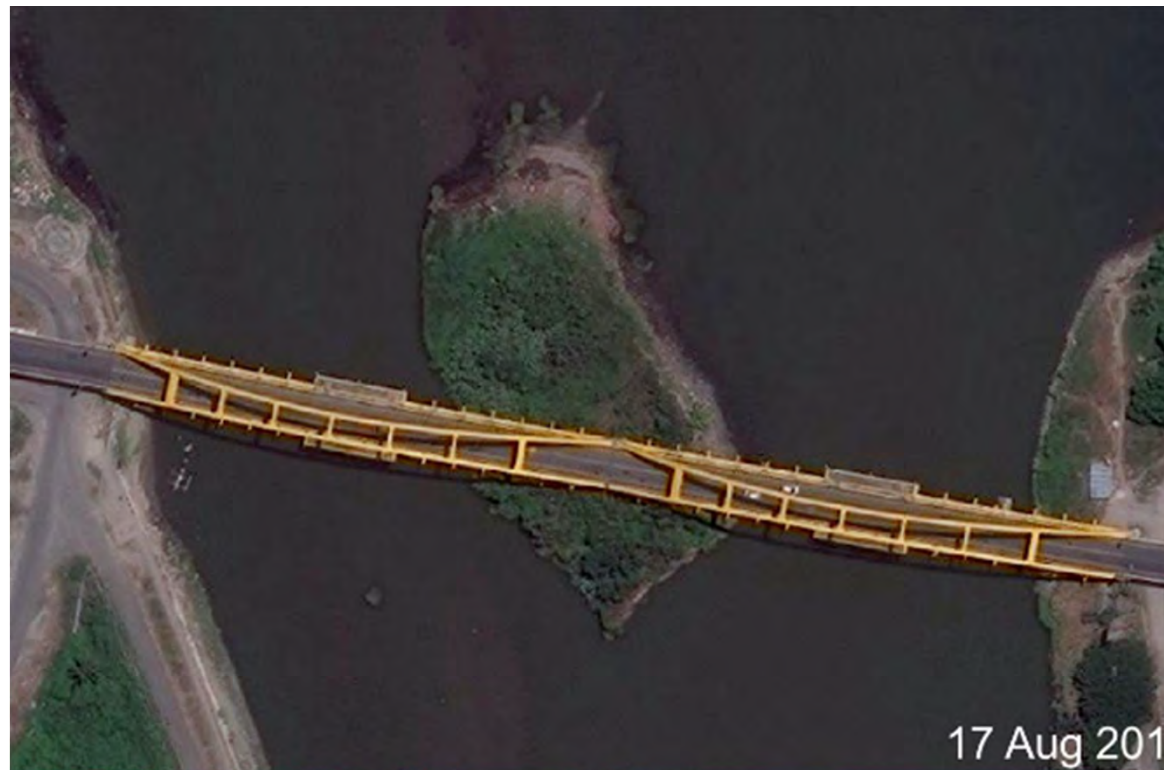












17 Aug 2018



28 Sep 2018

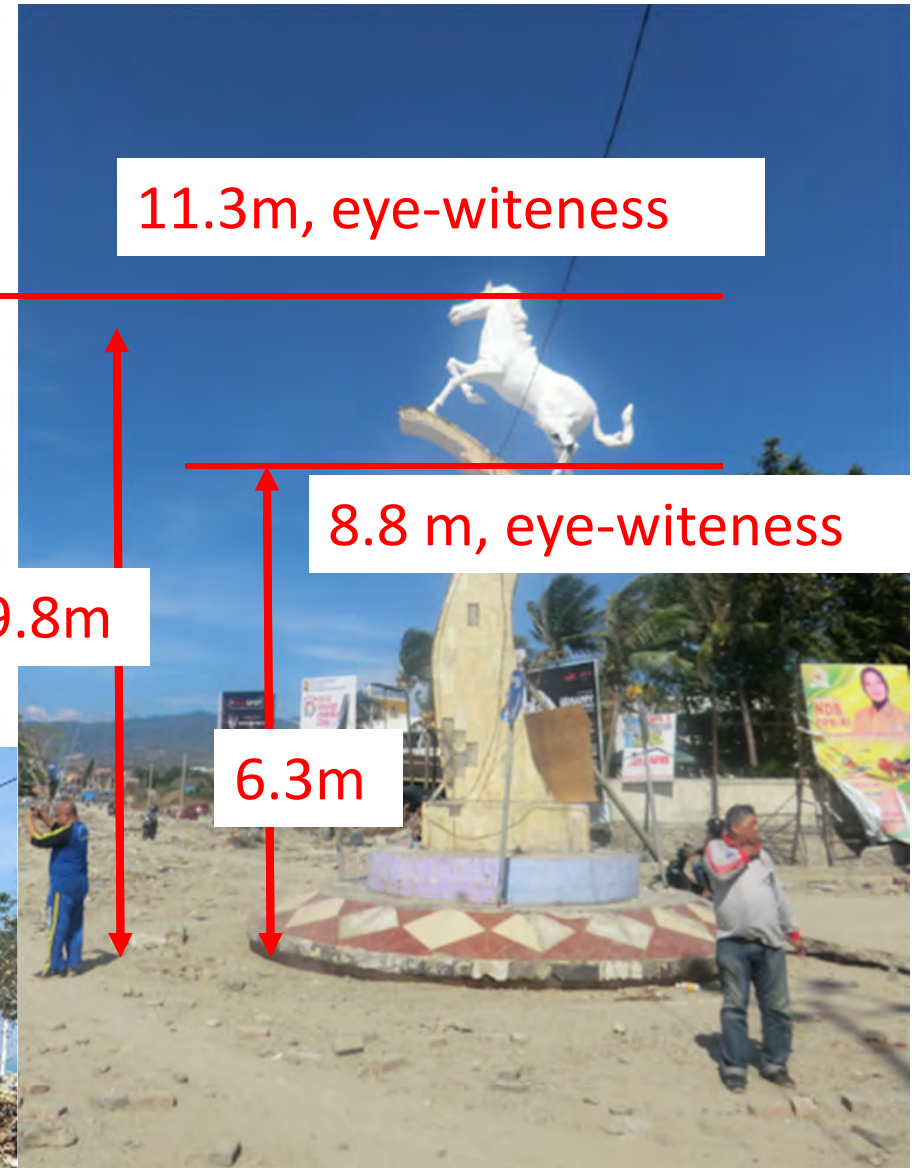












# Field Survey Point of the east side

I.D. =inundation Depth  
I.H. =Inundation Height  
S.H. =Splash Height



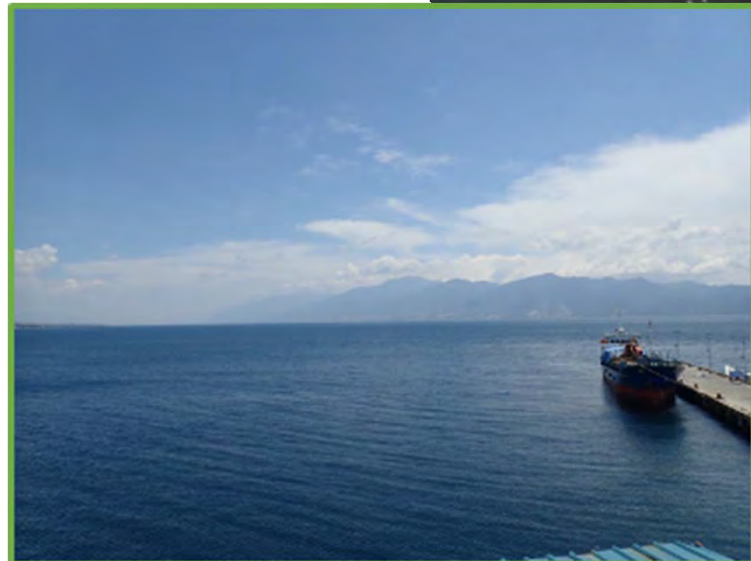
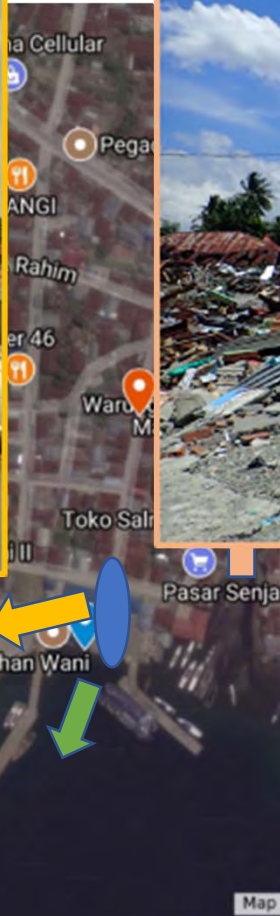


# Wani 2 Pantoloan





# Wani 2 Pantoloan



# Wani 2 Pantoloan Inundation Depth

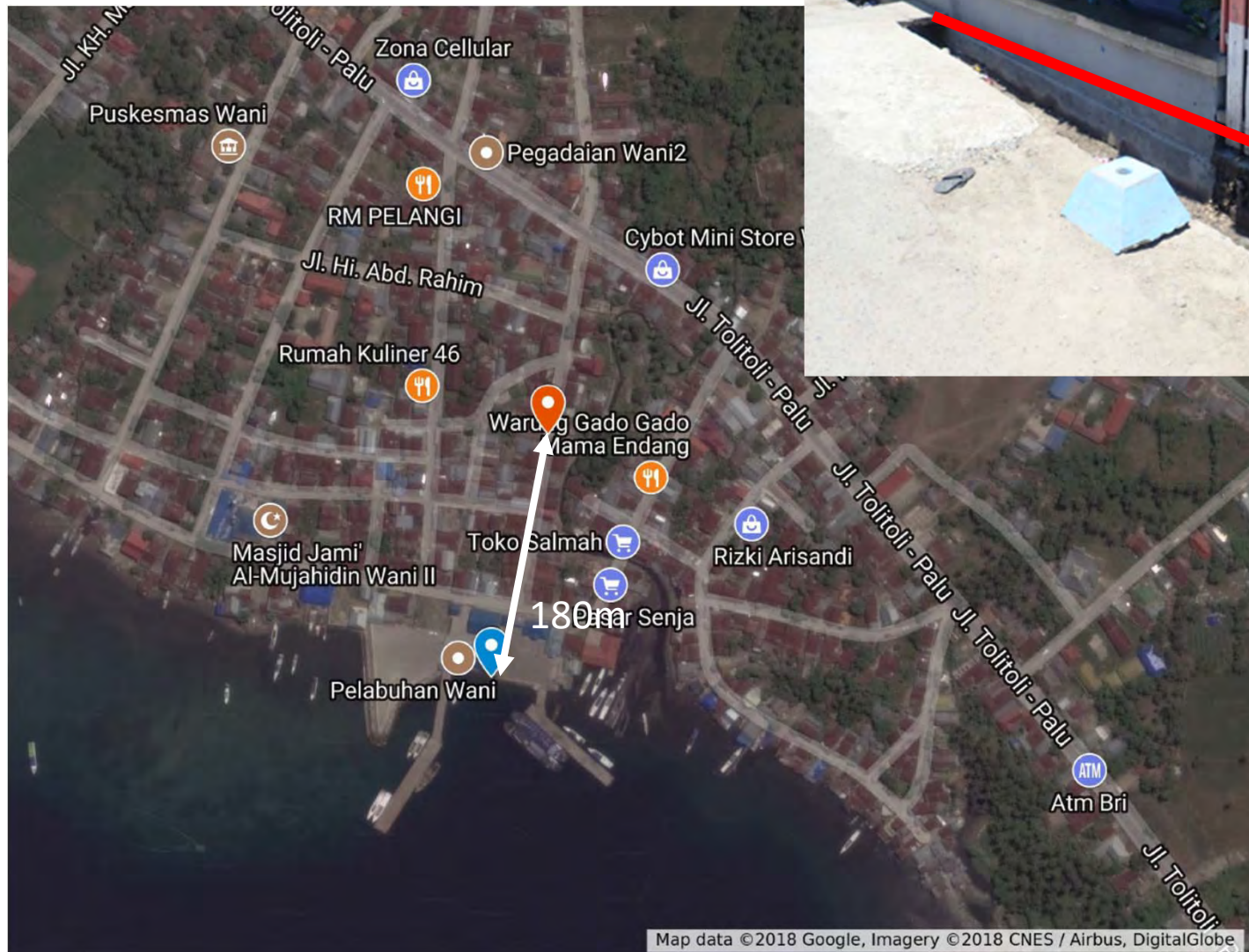


Around 1.9m

+ Quay Wall height (2.3m)

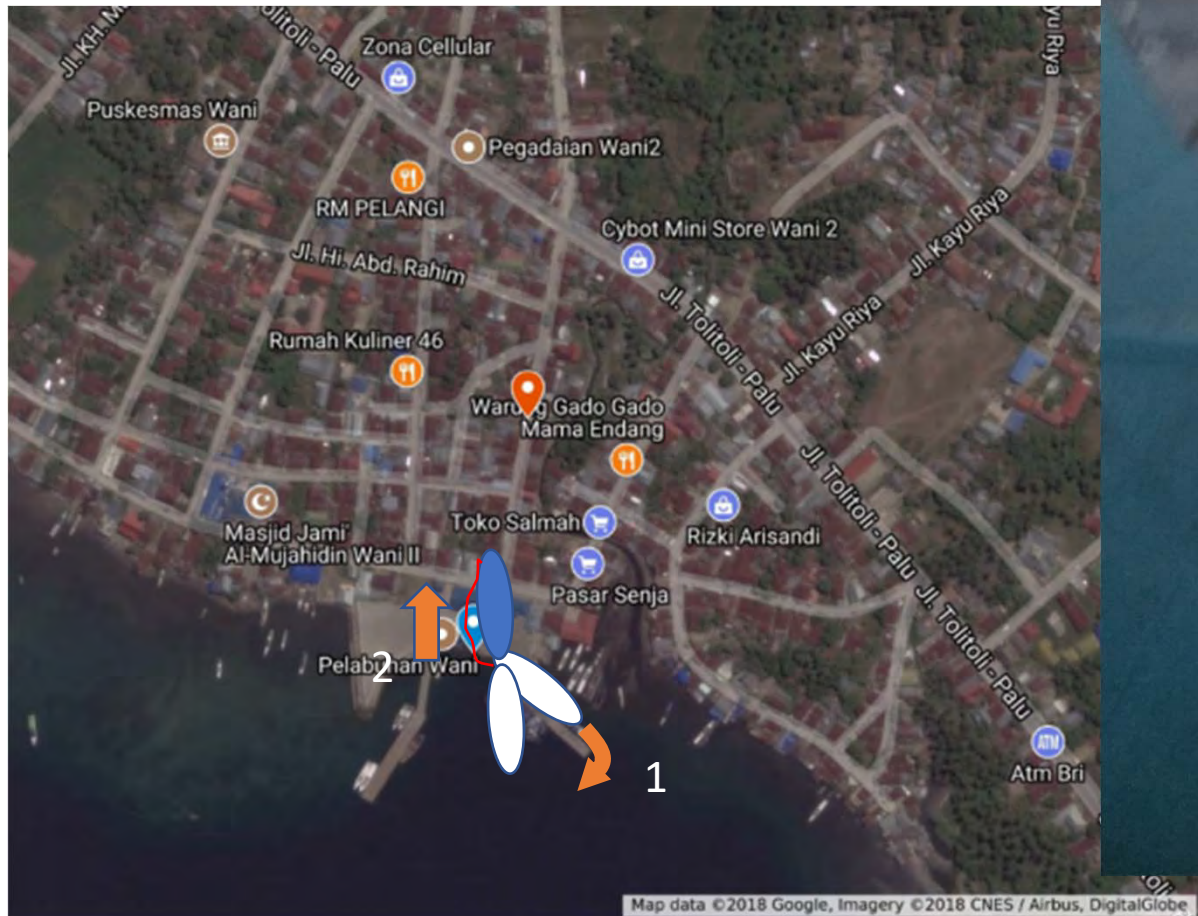


# Wani 2 Pantoloan Inundation Area



# Wani 2 Pantoloan Tsunami Behavior

Tsunami attacked almost 5 mins after the shock



Courtesy to the crew of the ship



# Port, Pantoloan



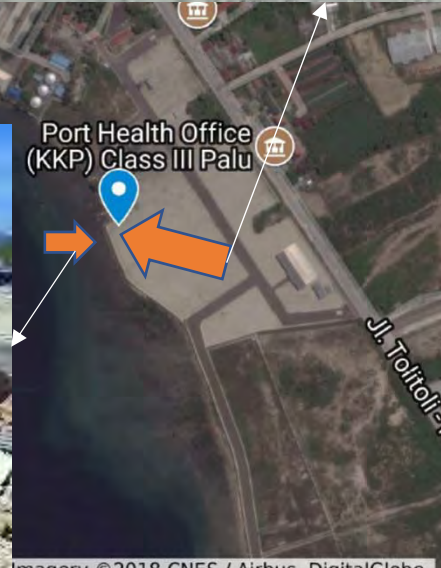
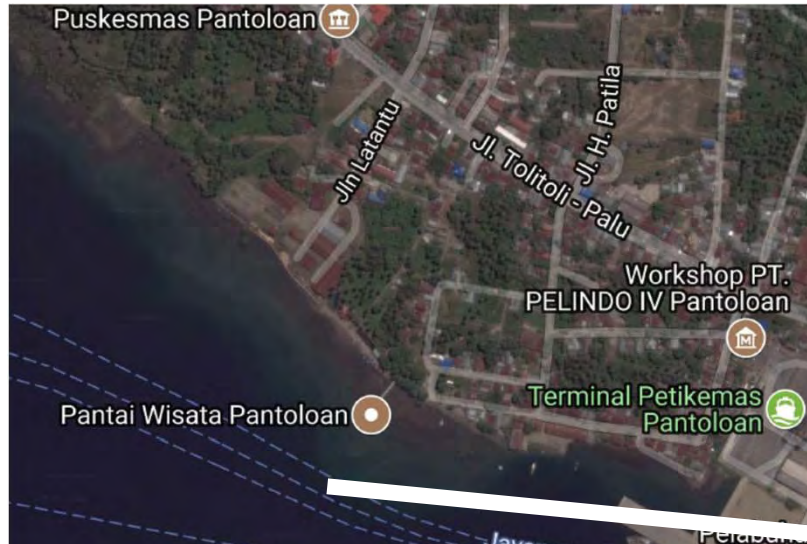
Pantai Wisata Pantoloan





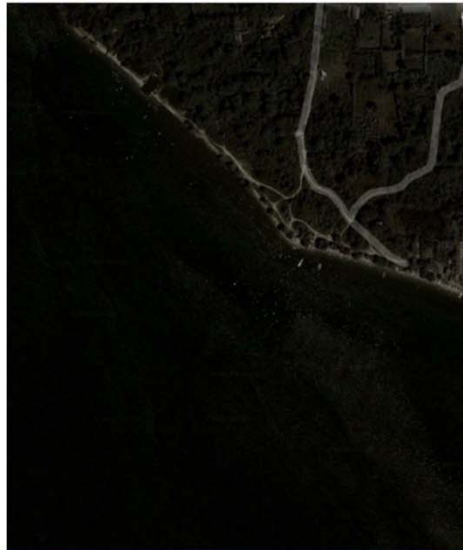
# Port, Pantoloan Tsunami Behavior

I.D.(2.6m), I.H.(4.9m)





# Mamboro



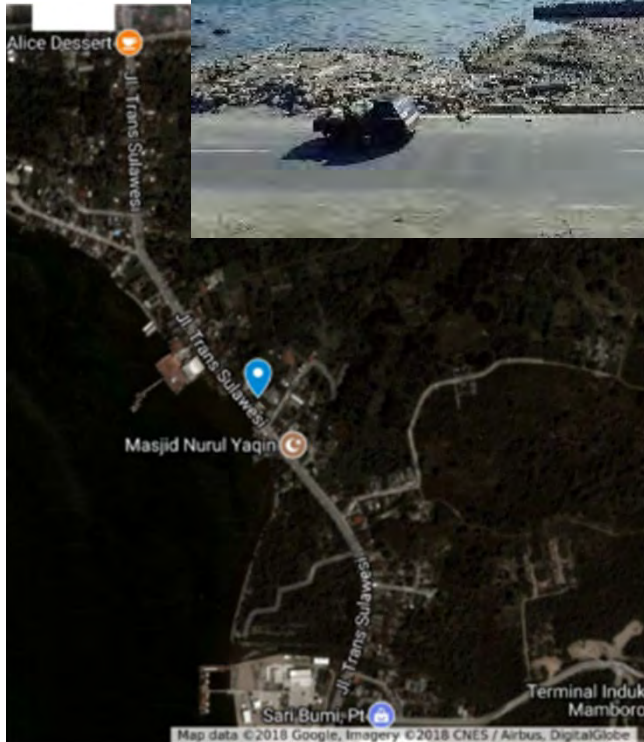


# Mamboro

## Tsunami Height

S.H.(10.1m), I.D.(4.5m), I.H.(6.3m)

From the balcony of the third floor



First Floor





# Mamboro Inundation Height



+4.5m from the ground



# Mamboro2

I.D.(4.8m), I.H.(7.3m)



# Summary

- The Inundation Depth are around 2 to 5m locally.
- Inundation distance is hundreds of meters
  - That means the tsunami wave length is very short
- The splash height was around twice or more as the inundation depth.
  - That means the momentum of the tsunami is large
  - The power of tsunami is larger.
- The tsunami might arrive a few minutes to 10 minutes after the earthquake motion
- People didn't have enough time to evacuate even if the warning is alerted. They evacuated as soon as they watched the tsunami.